AN EXPLORATION OF BODY IMAGE PERCEPTION IN AN AFRICAN AMERICAN POPULATION

by

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PURPOSE: This study examined body image perception among participants of the Healthy Black Family Project (HBFP) through the Center for Minority Health. As part of this examination, body image perception of the participants' social networks, differences between ethnicities, and the association of disease risk with body image perception were studied.

METHODS: The participants' perceptions of body image were assessed using responses in words as well as pictures. Body image satisfaction was assessed by comparing current and ideal bodies selected from a pictorial scale. Chi-square analysis and Fisher's Exact tests were performed to assess the accuracy of the participants' perceptions of body image in comparison to measured BMI. Body image perceptions of the social networks were compared with the participants' perceived and measured BMI using ANOVA and linear regression analysis. Comparisons between ethnicities were also assessed using Fisher's Exact test and 95% confidence intervals. Risk perception between weight categories was assessed using ANOVA and Fisher's Exact tests.

RESULTS: This analysis revealed body image perceptions underestimated measured BMI's. Consistent with other published studies, females wished to lose weight, while males wished to remain the same or gain weight. Obese participants were more accurate in assessing their weight category using the pictorial scale, while normal weight participants were more accurate in words.

The majority of social networks were perceived as obese and participants of both genders associated with female family members of similar size. HBFP participants perceived larger bodies as obese than a previously studied Caucasian population and female participants chose larger bodies as ideal. Disease risks were not consistently associated with body image perceptions.

CONCLUSIONS: In this population, significant differences in body image perception exist. Accuracy of body image differs between weight categories and body image satisfaction differs between genders. In contrast to Caucasian populations, different perceptions of obesity exist and larger female bodies are perceived as ideal.

PUBLIC HEALTH SIGNIFICANCE: Programs involving disease prevention and weight management should involve components of body image perception education. In order for these education programs to be more effective, they should include factors that encompass differences in ethnicity, gender, and weight class.

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1.0 INTRODUCTION

The Healthy Black Family Project (HBFP) was established in 2004 by the Center for Minority Health (CMH) within the Graduate School of Public Health (GSPH). The program has been under the leadership of Dr. Stephen B. Thomas since 2000. The main goals of the HBFP are to provide access to health promotion and disease prevention services to those at risk for diseases as well as address health disparities among ethnic and racial minorities. This community based project attempts to accomplish these goals by providing activities such as health risk assessments, family health histories, stress management programs, nutrition assistance and guidance, and smoking cessation classes. The CMH is also a part of the Healthy Class of 2010 campaign which focuses on eliminating health disparities by the year 2010.

As part of this community based intervention, this study sought to examine body image perception within an African American community. Using perceptions described in words and using the pictorial scale developed by Harris and colleagues (2008), this study also investigated body image satisfaction and accuracy of body image perception. Accuracy was determined by comparing body image perceptions to BMI measurements taken at the initial fitness assessment. As part of this examination, body image perception of the participants' social network and differences between ethnicities regarding body image perception were also studied. In particular, ethnic differences between two populations, a predominately African American population within the HBFP and a predominately Caucasian population studied by Harris and colleagues

(2008) were explored. Two main aspects were examined including differences in perceptions of the body scale developed by Harris and colleges (2008) and differences in perceptions of ideal body image. Since increased risks of many diseases including cardiovascular disease, diabetes, and hypertension are associated with obesity, the association between disease risk and body image perception was studied.

2.0 BACKGROUND AND SIGNIFICANCE

2.1 HEALTH DISPARITIES IN THE UNITED STATES

In the 2000 census, African Americans made up approximately 13% of the population [CDC-OMHD, 2008], yet this subset of the population carries a disproportionately high burden of disease [CDC-OMHD, 2009] and death rates due to disease [CDC-OMHD, 2008]. African Americans have a high prevalence of hypertension, infant mortality, and tuberculosis [CDC-OMHD, 2009]. In addition, the life expectancy of African American populations is much lower than the average American, 73.1 years versus 77.8 years respectively [CDC-OMHD, 2009].

In 2004, African Americans had the highest age-adjusted death rate of all causes of all races and ethnicities. In particular, African Americans had the highest rates of death due to heart disease, cancer, diabetes, and HIV/AIDS [CDC-OMHD, 2008]. In 2005, the three leading causes of death among African Americans were heart disease, cancer, and stroke [CDC-OMHD, 2009]. A study done by Kingston and Smith (1997) found higher prevalence rates of hypertension and diabetes among African Americans in comparison to Caucasians. In addition, the study also found higher rates of heart conditions and arthritis in African American women in comparison to Caucasian women.

There have been several factors or causes associated with health disparities among minorities in the United States. Some of these include socioeconomic status (SES), genetics, life

stage, racial harassment and discrimination, physician bias, patient preference, and doctor-patient communication. It is clear from the literature that none of these factors are the sole cause of health disparities; instead it is a combination of factors.

SES is one of the major factors that has been studied in relation to health disparities. Lower SES may lead to chronic conditions through a combination of behavioral, psychosocial, social, biological, and genetic factors [Williams, 1992; Sobal and Stunkard, 1989; Novotny et al., 1988]. Lower SES may lead to poorer outcomes due to later diagnosis of disease [Kington and Smith, 1997], reduced access to health care services [Freeman and Corey, 1993], or lower quality of medical care [Kahn et al., 1994]. It is possible that poor health affects SES, leading to an inability of individuals to work and earn income [Kington and Smith, 1997].

The study done by Kington and Smith (1997) found large disparities in income and wealth across racial and ethnic groups. For example, African American men earned incomes approximately two thirds of the Caucasian men and had wealth that was 28% of Caucasian men. When these differences in SES are taken into account, the prevalence rates of hypertension and diabetes were still significantly higher among African Americans than Caucasians. Another study also supports the premise that SES is only one factor in health disparities. Davey Smith and colleagues (1998) found that mortality rates increased with decreasing income for both and black and white men, indicating that SES is not the only factor affecting health disparities among ethnic minorities.

Lower SES can affect individuals' health during different stages of life. If lower SES is "experienced" earlier in life (prenatally or in childhood), then health consequences can occur later in life due to processes set out in early life. For example, lower SES can lead to low birthweight in children which has been associated with higher rates of hypertension,

cardiovascular disease, diabetes, and respiratory disease in adulthood. Health consequences can also occur as a result of lower SES over one's lifetime [Nazroo, 2003].

The impacts of racial harassment and discrimination have also been suggested as factors affecting health disparities. One study found that 80% of African American respondents experienced racial discrimination in their lifetime [Krieger and Sidney, 1996]. Several studies have shown associations between self-reported racial harassment and hypertension, psychological distress, poorer self-rated health, and sick days [Krieger et al., 1993; Krieger and Sidney, 1996; Krieger, 2000; James et al., 1987]. In addition, these studies found that differences in rates of hypertension between African Americans and Caucasians were reduced when experiences of racial harassment were taken into account.

Several factors affecting the patient-doctor relationship may affect health disparities [Ashton et al., 2003]. One factor is a potential bias of the services that physicians offer to minorities. A 1996-1997 study showed that physicians were less likely to offer cardiac catheterization to African American women than African American men and Caucasian men and women [Schwartz et al., 1999]. Another factor may be that patients of different ethnicities have different medical preferences. Some studies have shown different preferences among the African American population, including more aggressive end-of-life care than Caucasians [Shepardson et al., 1999], more African Americans tend to seek mental health services for depression [Diala et al., 2001], and African Americans have been shown to be more averse to surgical risks [Oddone et al., 1998]. Another factor may be the communication between the physician and the patient. Some studies have found that pre-visit counseling on how to ask questions and negotiate with the doctor have led to better health outcomes among "patients differing markedly in sociodemographic characteristics" [Kaplan et al., 1989].

According to the above studies, there are many factors involved in health disparities among the African American population. In order to eliminate these disparities it is imperative that public health interventions address these factors. Part of these interventions should include a component regarding body image perception. This study will address the differences in body image perception among genders and ethnicities and the importance of accurate body perception and how it may affect disease risk perception.

2.2 ETHNICITY AND BODY IMAGE PERCEPTIONS

King (1991) describes perception as the "process by which the individual organizes, interprets, and transforms information from sense data and memory that gives meaning to one's experience, represents one's image of reality, and influences one's behavior". In addition, King also states that "an individual's perceptions provide the meaning and context within which behavior is enacted." Drawing upon these definitions, body image perception can be described as the way in which individuals incorporate what they see in the mirror and information obtained from the media, family, friends as well as their culture group to form an impression of their body. This perception has the potential to affect how individuals approach weight loss and dieting as well as their beliefs about disease risk. Because each individual will differ in these views and interpretations, it is possible that there are differences not only between individuals but also between ethnic groups.

Using focus groups, Gore (1999) set out to determine African American women's perceptions of weight. Specifically, Dr. Gore wanted to explore the meaning of weight and to understand the way in which African American women form behaviors based on cultural and

social views in the hopes of creating more effective weight management programs for these women. The findings of this study included perceptions of weight, ideal weight, normal weight, underweight, and obesity. The women in these focus groups expressed that weight is a personal and individual issue, not something that can be measured by standard charts. In particular, these women felt that standard charts were "another way of saying that African American women were not beautiful because of their weight." Similarly, ideal weight was based more on individual preferences, not standards.

In addition, these women expressed that their perceptions of normal weight have both cultural and individual meanings. Some of the cultural influences were related to family matters such as family gatherings, heritage, and food. Many women expressed that the taste for certain foods arose during the slave era. These foods were generally higher in fat and carbohydrates and were eaten because of the scarcity of other more nutritious foods and because they were more filling.

According to the women in these focus groups, underweight was associated with an appearance of illness or abnormality. Similarly, overweight and obesity were not associated with being healthy. One woman described her perception of obesity. "Obesity is people as big as a door. Really big people. Especially if they were small people at one time. If you find somebody who was 98 pounds when they got married and here they are now wider than that door, that's obesity. They eat like there's no tomorrow."

Based on these findings, Dr. Gore (1999) concluded that changes needed to be made to the methods used for weight loss in the African American population. Diets and routine physical activity needed to incorporate cultural food patterns as well as the cultural meanings of ideal weight.

Another study done by Altabe (1998), also examined the differences in body image perception between ethnic groups. The study found that most body image studies only included a comparison between Caucasian and non-Caucasian participants. However, several studies have shown that there are many differences in body image perception between various ethnic groups which merit further exploration. For example, Altabe (1998) found that when comparing the body silhouettes that participants felt best represented their body versus the silhouette that best represented their ideal body, Caucasians showed more size discrepancy than African and Asian Americans. Hispanic Americans showed more body dissatisfaction than either Asian or African Americans. Lastly, Altabe (1998) found that African Americans had the most positive self-view of general body image perception.

Another study examining body image perception was done by Baptiste-Roberts and colleagues (2006). The study population included African American women with type II diabetes. The subjects were part of Project Sugar I, a randomized controlled trial which evaluated the effectiveness of primary-care based interventions to improve the control of diabetes. Through the use of interviews, participants were asked questions regarding demographic and weight information, in addition, BMI was measured, and body image perception was assessed using the Stunkard scale [Stunkard et al., 1980]. From the results of the study, Baptiste-Roberts and colleagues concluded that it is important to address the individual's body image, risk of disease, desired body image, and weight loss perceptions. In addition, the results suggest that it is important for health care providers to focus on the health benefits of weight loss in a culturally appropriate manner. This study also pointed out the fact that few studies have examined the relationship between obesity and perceived disease risk.

One such study was done by Gross and colleagues (2005). The study examined differences between genders in body image and health perceptions among graduating seniors from a historically black college. The study found that perceived disease risk due to weight was related to body mass index (BMI), family weight history, body awareness, and income, but not body size dissatisfaction.

The results of the above studies suggest that differences in body image perception among various ethnic groups exist and are in need of further study. There is a paucity of research examining the relationship between body image perception and disease risk perception, therefore, further research is needed to examine this relationship.

2.3 BODY IMAGE PERCEPTION TOOLS

Tools to assess body image have changed over time. Some of the different tools include contour drawings, darkened silhouettes, photographs, and other alternative methods used to manipulate a drawing or photograph. Some of these alternative methods include using lights or calipers to allow participants to choose widths and depths of specific body parts [Fries, 1977; Garner and Garfinkel, 1981; Slade and Russell, 1973], marking widths of body parts on a large sheet of paper [Askevold, 1975; Garner and Garfinkel, 1981; Pierloot and Houben, 1978], using slide projections [Glucksman and Hisch, 1969] or adjustable mirrors [Taub and Orbach, 1964] to distort photographs, using a specially adapted television monitor to adjust one's own image [Allebeck et al., 1976], and using a computer program to adjust an image [Dickson-Parnell et al., 1987]. These tools have been used in many studies to examine relationships between body image perception and a variety of topics including female attractiveness, body image satisfaction,

dieting, exercise, and personality. Additionally, these tools have been used to assess differences in body image perception between genders, different populations, and between weight categories. The following sections will describe the different tools used to assess body image perception and their uses in different studies.

2.3.1 Contour Drawings

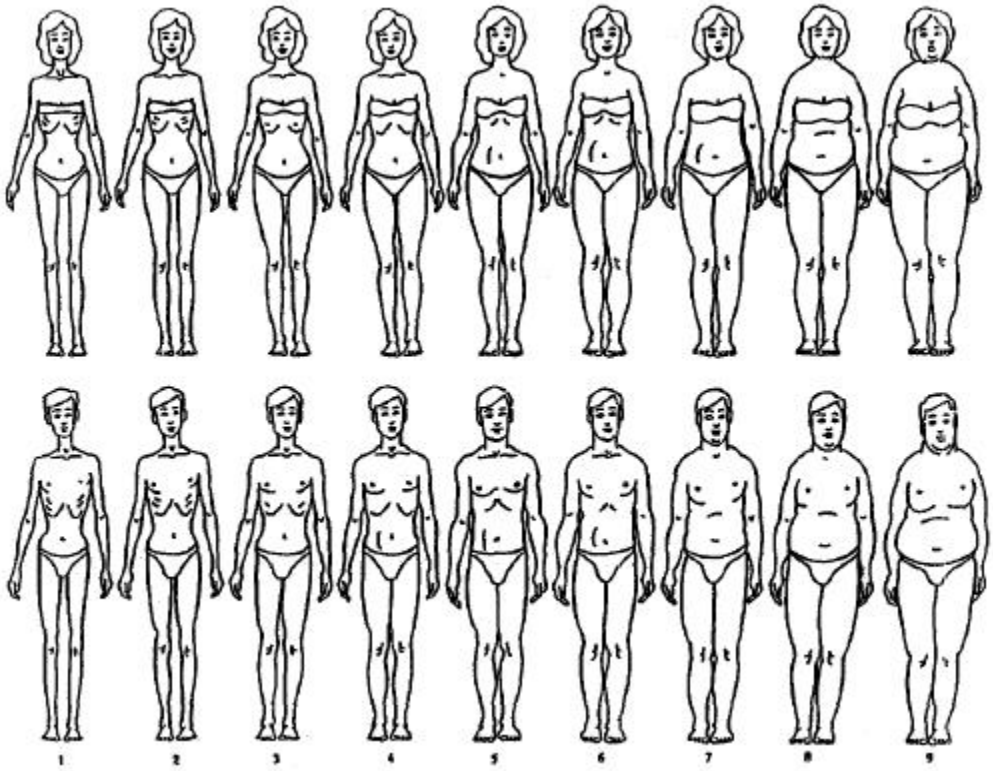

Figure 1. Thompson and Gray (1995) Contour Drawing Rating Scale

An example of a contour drawing is shown in Figure 1. Several different forms of contour drawings have been used to assess body image in a variety of populations. One study done by Singh (1993) explored the correlation between body fat distribution (using the waist-to-hip ratio) and female attractiveness and mate selection. These contour drawings represented 3 weight categories: normal, underweight, and overweight. Each drawing within each weight category only differed in waist-to-hip ratios (WHR), while facial and bodily features remained constant. The study found that low WHR was an important factor in determining female attractiveness.

Another study done by Fallon and Rozin (1985) examined the differences in body image perception between males and females. The study used the contour drawings developed by Stunkard and colleagues (1980) which were developed for a Danish population consisting of nine male and female drawings. The study found that males were generally satisfied with their current figure, while females wanted to lose weight. In addition, the study found that men think that women like heavier figures than females report and females think men like women thinner than men report. The authors reasoned that this difference was due to the higher incidence of dieting, anorexia, and bulimia in American women when compared to American men.

A study done by Silberstein and colleagues (1988) also used these same contour drawings. This study compared the relationships of body satisfaction, self-esteem, dieting, and exercise between males and females. The study found that men and women did not differ in their degree of body dissatisfaction. Males were as likely to want to be heavier as they wanted to be thinner, while virtually no females wanted to be heavier. The study found that women exercise for weight control more than men. Among females, measures of self-esteem were not associated with weight dissatisfaction. The authors suggested that this was due to the normative

discontent within our culture. Normative discontent, as defined by these authors, is the normalcy of women feeling discontent with their weight because thinness is stressed within our culture.

Another study done by Tucker (1984) was done to determine whether a relationship existed between personality and body build. This study used the Perceived Somatotype Scale [Tucker, 1982] which consisted of seven contour drawings representing the 3 somatotypes of the male body: ectomorph, mesomorph, and endomorph. The ectomorphic body type is associated with low fat storage and long and thin muscles and limbs. The mesomorphic body type is associated with low fat levels, large bones, a solid torso, wide shoulders, and a narrow waist. The endomorphic body type is associated with high fat storage, a large bone structure, and a wide waist [Sheldon, 1940]. The study found that males with mesomorphic body types had high self confidence and satisfaction with their current body, low anxiety and emotional liability, and tended to be sociable and have an easygoing nature. In contrast, males with ecto- and endomorphic body types tended to have low self confidence and dissatisfaction, high anxiety and instability, and tended to be withdrawn and asocial.

2.3.2 Darkened Silhouettes

Like the numerous types of contour drawings, there are several varieties of silhouettes used to examine body image perception between different populations. Two studies used silhouettes to examine body image in female anorexic and bulimic populations. One of these studies, done by Bell and colleagues (1986), used silhouettes representing eight different body figures ranging from emaciated to obese. This study found that anorexic individuals tended to overestimate their body image, while obese individuals tended to underestimate their body image.

Another study assessing body image differences in a population of bulimic participants was done by Counts and Adams (1985). The study used a series of seven silhouettes developed from each participant's actual profile. The participants had a photograph taken in profile, allowing an artist to create a figure from the photograph. Next, the neck, arms, bust, stomach, thighs, and calves were adjusted to create 6 other silhouettes representing 2.5%, 5%, and 7.5% smaller and larger figures. This study found that the overestimation of size and overvalue of ultra-thin body size were not specific to bulimics, nor were bulimics more dissatisfied with their body image than other weight groups. In addition, the study found that childhood obesity increased the participants' body size overestimations. The differing results from these two studies may represent differences between anorexic and bulimic patients or could be due to the use of different silhouettes.

Another study using silhouettes was done by Anderson and colleagues (1997). This study developed gender specific body-size silhouettes (shown in Figure 2) which were patterned after previous silhouettes [Stunkard et al., 1980; Williamson 1990] and were created to be specific to the African American population. The silhouettes were meant to convey a positive self image and represent the larger body size in the African American population. These silhouettes do not have a direct relationship with the participants' actual BMI. Instead, the relationship was assessed by comparing perceived body size with BMI measurements.

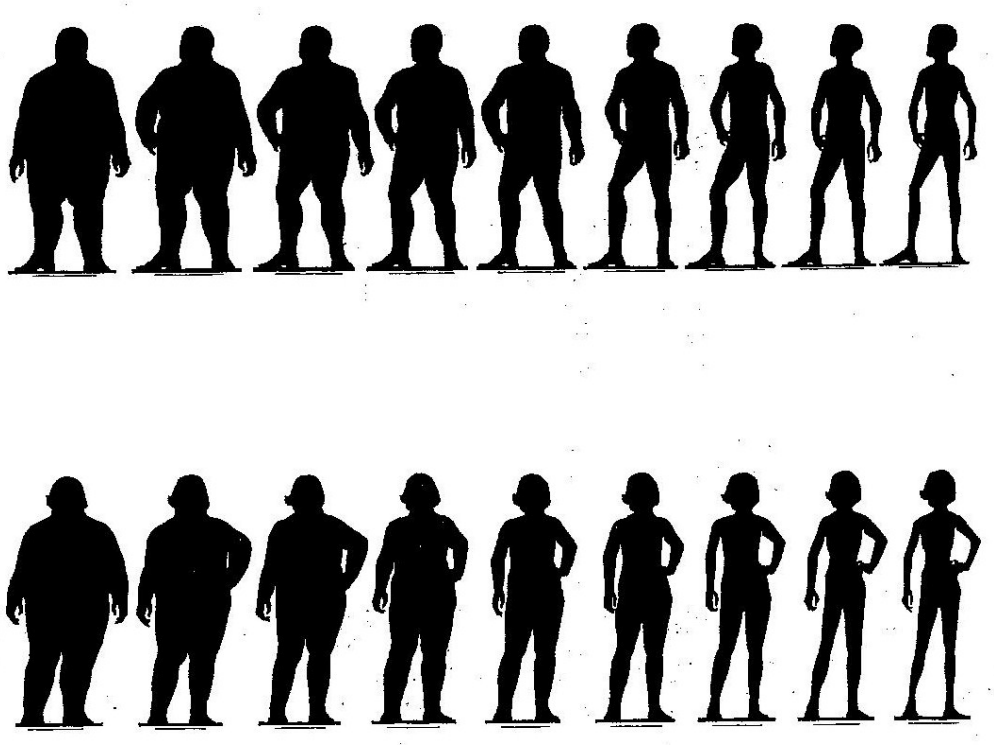

Figure 2. Anderson and Colleagues (1997) Body-size Silhouettes

The study done by Anderson and colleagues (1997) using these silhouettes compared body image perceptions between weight categories and sexes. Additionally, the study assessed satisfaction with current body size and attempts to alter weight as well as associations between satisfaction with body size and psychosocial variables. The psychosocial variables explored in this study included self-rated health, mood control, and health locus of control. The study found that both men and women within the overweight category desired a smaller size than their perceived current size. However, men were more likely to choose a larger size as ideal than women. The study also found that those who expressed less body size satisfaction were more likely to attempt weight changes than those who were satisfied with body size. There was also a slight relationship between body size satisfaction and health locus of control. However, the authors suggested that more analysis is needed on the relationships between body image perceptions and psychosocial variables.

2.3.3 Photographs

Several tools to assess body image have been developed using a pictorial scale of photographs. Some of these include: a scale of seven photographs representing male somatotypes developed by Calden and colleagues (1959), the Body Appearance Scale which was developed by Schonbuch and Schell (1967) including 10 photographs of men based on those published by Parnell in 1958, and the pictorial BMI-based body size guides developed by Harris and colleagues (2008) that was used in this study.

Figure 3. Harris and Colleagues (2008) BMI-based Body Size Guides

The above body size guides developed by Harris and colleagues (2008) were created in the hopes that it could be used as an easy tool to explore the perceptions of overweight and obesity. This tool is different from other pictorial representations of body sizes in that it has a precise relationship to BMI. The body portion of the size guides was created from individual photographs of volunteers while the faces were created using a composite of 3 or more photographs of volunteers. Each body on the scale represents a specific BMI calculated from each volunteer and is approximately 3 BMI values apart. The 10 images of individual bodies represent women and men ranging from underweight (BMI <18.5) to class III obese (BMI ≥40). Of note, there are more figures representing larger BMI values to facilitate obesity research. The study done by Harris and colleagues (2008) found that overweight and obesity were under-recognized. In particular, the study demonstrated the usefulness of a pictorial scale with a direct relationship to BMI in the evaluation of body image perception.

The relationship between the contour drawings (or pictorial scales) and BMI is an important aspect that many other body image perception tools are lacking. One such study was done by Baptiste-Roberts and colleagues (2006). The study used the Stunkard scale (1980) to assess body image perception. In order to translate the results based on the scale to actual BMI's, the authors used linear regression to determine the change in BMI for each body image unit. For example, the mean perceived body image of females (on a scale from 1-9) was found to be 5.6 which translates to a BMI of 35.3. The relationship between the contour drawings and actual BMI must be calculated and depends on a linear relationship between perceived body image and BMI. Therefore, this scale would not be as accurate in assessing body image as the pictorial scale developed by Harris and colleagues (2008).

As mentioned earlier, there are many differences between the various tools to assess body image perceptions. Some of these tools are appropriate for comparisons in certain populations. However, when a direct relationship to BMI is needed in cases where accuracy of body image in relation to weight class, disease prevention, and weight management are being assessed, the pictorial scale developed by Harris and colleges (2008) is the most appropriate tool.

2.4 DISEASE RISK ASSOCIATED WITH OBESITY

According to the National Health and Nutrition Examination Survey (NHANES) from 1999-2004, the prevalence of obesity has significantly increased for men (27.5% from 1999-2000, 31.1% from 2003-2004). In contrast, the prevalence of obesity has not increased significantly for women (33.4% from 1999-2000, 33.2% from 2003-2004) [Ogden et al., 2006]. The NHANES data also shows that the prevalence of obesity is particularly high in the African American population (45%). Obesity is risk factor for a variety of conditions associated with significant mortality and morbidity such as cardiovascular disease (CVD), adult onset diabetes (AODM), and hypertension (HTN) [Colditz et al., 1995; Larsson, 1991; Stamler et al., 1978].

A study done by Manson and colleagues (1995) looked at the association between BMI and mortality. This study found that deaths due to cardiovascular disease were higher among women with a BMI ≥ 22. In fact, women within the obese weight category (BMI ≥ 29) had rates of death due to CVD that were four times higher than those of the leanest women. In addition, women with a BMI ≥ 32 who had never smoked had a relative risk of death due to CVD of 4.1 compared to the risk of women with a BMI < 19. Therefore, this study showed a direct increase in risk of CVD for women due to obesity.

Increased risk due to obesity was also found among males. Associations between BMI, waist-to-hip ratio, and height as predictors of CVD were assessed in a study by Rimm and colleagues (1995). This study found differences in this association among men younger than 65 years and men 65 years and older. Among men younger than 65 years, obesity was a stronger risk factor for CVD, whereas among men 65 years or older, fat distribution was a better predictor of CVD risk. The relative risks for CVD among men younger than 65 were 1.72 (95% CI: 1.10-2.69) for men with BMI 25-28.9, 2.61 (95% CI: 1.54-4.42) for men with BMI 29.0-32.9, and 3.44 (95% CI: 1.67-7.09) for men with BMI $\geq$ 33 compared to men with BMI < 23. However, among men 65 years or older, the relative risks for CVD were more strongly associated with waist-to-hip ratios (relative risk of 2.76, 95% CI: 1.22-6.23) than BMI.

Research has found an association between obesity and diabetes. In 2001, a study done by the Center for Disease Control (CDC) and state health departments showed a significant association between obesity and diabetes [Mokdad et al., 2003]. This study showed that among adults with a BMI between 30 and 39, the odds ratio (OR) of diagnosed diabetes was 3.44 (95% CI: 3.17-3.74) and for BMI $\geq$ 40, the OR of diagnosed diabetes was 7.37 (95% CI: 6.39-8.50) compared with adults of normal weights. In addition, among all racial groups, African Americans had the highest rates of obesity (31.1%) and diagnosed diabetes (11.2%).

Associations between obesity and hypertension have also been examined. A study done by Mokdad and colleagues (2003) found the OR of diagnosed hypertension among obese individuals compared to normal weight individuals to be 3.50 (95% CI: 3.31-3.70) for BMI 30-39 and 6.38 (95% CI: 5.67-7.17) for BMI $\geq$ 40. This data shows that increasing BMI is related to increasing risk of hypertension.

Therefore, it is clear that risk of these common chronic conditions increases with increasing BMI, especially within the obese weight category. In order for disease prevention programs to be effective, it is also important to assess whether body image perception is accurate in order for individuals to seek proper prevention care.

2.4.1 Disease Risk Perception

A few studies have also examined risk perception among different populations. One such study was done by Graham and colleagues (2006) using a community based screening tool. Risk perception of hypertension and diabetes was assessed in a predominately African American population. One of the most interesting results from this study was the proportion of participants who did not perceive themselves at risk of developing hypertension or diabetes, when in fact they were at high risk. Of the participants who believed that they would never develop diabetes, 40% were actually at high risk based on the risk score assessed by the questionnaire used in this study. In addition, 69% of participants who believed that they would never develop hypertension were actually at high risk. These results suggest that there are many individuals in this population who are not aware of their risk to develop chronic conditions such as hypertension and diabetes which are associated with obesity.

3.0 SPECIFIC AIMS OF THE STUDY

3.1 AIM 1

The first aim of this is study was to determine the participants' perceptions of their own body image. These perceptions were based on the participants' responses in words (underweight, healthy weight, overweight, or obese) and in pictures (using the BMI-based size guides developed by Harris and colleagues (2008)). Additionally, this study was used to determine whether participants were more accurate in words or pictures by comparing their responses to their measured BMI's. Lastly, this study investigated body image satisfaction by examining the differences between current and ideal bodies chosen from the pictorial scale.

Hypothesis: Participants would be more accurate in assessing their body image when using the pictorial scale than words. In addition, the majority of participants would not be satisfied with their current body image and would choose a body smaller than that chosen for their current body size.

3.2 AIM 2

The second aim of this study was to determine the participants' perceptions of the body images of their social network. The social network includes family members, friends and community

members of both sexes. The body image perceptions of the social networks were compared to the participants' own body image perceptions in words, pictures, and their measured BMI's.

Hypothesis: The participants would associate with a social network of similar body types.

3.3 AIM 3

The third aim of this study was to compare the results of body image perceptions from an African American population to the results found by Dr. Harris and colleagues (2008) from a predominately Caucasian population. Specifically, this study examined the perceptions of the pictorial scale developed by Dr. Harris and colleagues (2008) in an African American population to determine whether it was viewed differently by the Caucasian population studied by Dr. Harris. In addition, the ideal body size in both populations was compared.

Hypothesis: Based on the literature which reports that the African American population values a larger body size [Allan et al., 1993; Anderson et al., 1997; Lieberman et al., 2003], it was hypothesized that the participants in this study would choose larger images from the pictorial scale to represent healthy weights and ideal body sizes than those chosen by the Caucasian population studied by Dr. Harris.

3.4 AIM 4

The fourth aim of this study was to determine if there is a relationship between body image perception and disease risk perception. The specific disease risks that were evaluated included

cardiovascular disease, diabetes, and hypertension. These disease risks were compared to body image perceptions based on the participants' own body image perceptions in words, pictures, and their measured BMI's.

Hypothesis: Generally, overweight and obesity are associated with higher disease risks [Colditz et al., 1995; Larsson, 1991; Stamler et al., 1978]. Therefore, participants with larger body image perceptions would choose higher risks.

4.0 MATERIALS AND METHODS

This study (protocol# 0403125) was approved by the University of Pittsburgh Institutional Review Board on February 21, 2008 and modified to include the specific questions regarding body image on June 5, 2008. A copy of the approval letter can be found in Appendix A.

4.1 HEALTHY BLACK FAMILY PROJECT

The Center for Minority Health (CMH) was established in 1994 and is located in the Graduate School of Public Health (GSPH) within the University of Pittsburgh. The center was created to translate evidence-based research into community-based interventions and outreach programs as well as address health disparities among ethnic and racial minorities as part of the Healthy People 2010 campaign.

In 2004, CMH established the Healthy Black Family Project (HBFP) to provide access to health promotion and disease prevention services to at individuals at risk for common chronic conditions including cardiovascular disease, diabetes, hypertension, and several types of cancer. This project is based on the "Small Steps, Big Rewards" campaign created by the Diabetes Prevention Program. The Diabetes Prevention Program found that weight loss and physical activity reduced the risk of developing type 2 diabetes by more than one half for individuals who

were diagnosed with pre-diabetes. The HBFP is a program has incorporated these findings to provide positive results to the African American community in the Greater Pittsburgh area.

The Healthy Black Family Project has several different locations across the Pittsburgh area. These include sites at the Kingsley Association (located in East Liberty), Hosanna House (located in Wilkinsburg), and Hill House (located in the Hill District). The HBFP focuses its interventions in the Health Empowerment Zone. This zone includes the East End neighborhoods of Pittsburgh such as East Hills, East Liberty, Homewood North, South, and West, Larimer, Lincoln-Larimer, and Wilkinsburg. These areas have a high percentage of African Americans as well as individuals living below the poverty line.

The short term goal of the HBFP is to educate and mobilize the African American community, neighborhood by neighborhood. This is done through social networks including barber and beauty shops, churches, civic organizations, and the business community. The main focus of this project is to increase physical activity and daily servings of fruits and vegetables, while helping to reduce the stress of daily life, and aid with smoking cessation. In order to accomplish these goals, the HBFP provides many activities. Some of these activities include health risk assessments, stress management, training with health coach fitness instructors, nutrition assistance and guidance, smoking cessation support, aid with the self-management of chronic diseases, and family health histories.

4.2 FAMILY HEALTH HISTORY INITIATIVE

The Family Health History Initiative is a program established in 2003 as part of the Healthy Black Family Project. This initiative was designed to provide participants in the HBFP with

accurate risk information based on a family history of common chronic conditions such as cardiovascular disease, hypertension, diabetes, and several types of cancer. Those participants found to be at a high risk to develop these conditions are encouraged to make lifestyle changes and pursue screening procedures. In addition, the Family Health History Initiative was designed to help reduce fears in the African American community regarding genetic information.

This initiative is carried out by genetic counseling students working for the Center for Minority Health. During the family health history sessions, the genetic counseling students obtain a three generation family tree by creating a hand-drawn pedigree. Disease risks for the common chronic conditions are assessed using the Scheuner criteria [Scheuner et al., 1997]. Participants are then provided with methods to help reduce the chances of developing these chronic conditions. Following the family health history session, the participants are mailed a printed copy of their pedigree (produced by the Progeny© software) to share with other family members or health professionals as well as health information pertaining to the specific conditions present in their family.

4.3 DATA AQUISITION

In addition to the family tree, participants can volunteer to complete several surveys. There are a total of three surveys: the pre-session questionnaire, the post-session questionnaire, and the follow-up questionnaire. The pre-session is given prior to the drawing of the pedigree, the post-session is given after the drawing of the pedigree, and the follow-up survey is given over the telephone one month following the family health history session. These surveys ask questions regarding demographic information, body image perception, physical activity habits, disease risk

perception, opinions on medical research, and information seeking behavior. The data obtained in the pre-session questionnaire (see Appendix C for a copy of the survey) was used as part of this study.

4.4 BODY IMAGE PERCEPTION ASSESSMENT AND BMI

Body image perception was assessed using two tools: words and pictures. The specific question regarding body image in words can be found in the pre-session questionnaire in Appendix C. The pictorial scale used in this study was developed by Harris and colleagues (2008) and can be found in Figure 3.

The standards for weight category based on BMI used for this study are based on the standards set by the Centers for Disease Control and Prevention (CDC). BMI is a measurement of body fat. For adults 20 years and older, BMI is calculated using height and weight measurements:

$$BMI = weight(kg)/[height(m)]^2 \text{ or } BMI = weight(lb)/[height(in)]^2 \times 703$$

According to the CDC guidelines [CDC, 2009], Table 1 shows the relationship between BMI and weight categories used in this study.

Table 1. BMI and Weight Category (CDC Guidelines)

BMI	Weight Category
< 18.5	Underweight
18.5-24.9	Normal weight
25-29.9	Overweight
≥ 30	Obese

4.5 DATA ANALYSIS

All data were recorded using case numbers, therefore keeping all information anonymous. Responses from the surveys were entered into online versions of the surveys and retrieved from the Perseus Survey Solutions © Version 6 and then exported to Microsoft Excel ©. Some of the data was entered directly in Excel for convenience. Participants' calculated BMI's were entered in the BSDI database and exported into Excel for analysis. The data was then analyzed using the SPSS © 15.0 statistical software package. For this analysis, p-values of 0.05 or less were considered significant.

4.5.1 Body Image Perception

The body image perception data were analyzed using chi-square analysis and Fisher's Exact tests. When comparing the accuracy of the weight category chosen in words or pictures with the participants' calculated BMI (n=47), 2x3 tables were created for each method followed by chi-square analysis. Analysis of whether participants (n=45) chose the same picture and word to represent their weight category was done in the same manner. When comparing the accuracy of participants' (n=45) responses of their perceived weight categories in words versus pictures, a 2x2 table was created and Fisher's Exact test was performed. Of the participants who were not accurate in choosing the correct word (n=24) or picture (n=16) to represent their weight category, Fisher's Exact test was also used to determine whether there was a difference between those who over or underestimated their weight category versus the method that was used.

4.5.2 Social Network

The social network data were taken from the pre-session questionnaire (found in Appendix C). The social network in this study included male and female family members, friends, and community members. For this sub-analysis, the responses of 36 participants were used.

To determine whether the participants in the HBFP associated with social networks of similar size, several types of statistical analysis were used including ANOVA and linear regression. When comparing the BMI's of the social networks to the perceived BMI's of participants in words, ANOVA was done using the perceived BMI of individuals in the social networks as dependent variables and weight category in words as the factor. Each social network category was assessed separately. When comparing the perceived BMI's of the individuals in the social networks to the perceived BMI's of participants based on the pictorial scale, linear regression was done using the participants' perceived BMI's based on the pictorial scale as the dependent variable and the social network individual's perceived BMI's as the independent variables. When comparing the perceived BMI's of the individuals in the social networks to the measured BMI's of the participants, linear regression was also done using measured BMI's as the dependent variable and the perceived BMI's of the individuals in the social network as the independent variables. For both of the comparisons using linear regression analysis, each social network category was assessed separately.

4.5.3 Ethnic Differences

The participants in this study are predominately African American and were compared to a predominately Caucasian population studied by Harris and colleagues (2008) to determine if

differences exist between these two groups. Differences between perceptions of the pictorial scale were assessed by comparing the means of the smallest and largest bodies chosen for each weight category from the responses of the Harris participants to the responses of the HBFP participants using 95% confidence intervals (CI). Of note, standard errors were not provided for the Harris data, therefore limiting this analysis.

Next, Fisher's Exact test (using 2x2 tables) was used to determine whether differences in perceptions of ideal bodies existed between the two populations. Of note, only the difference between female perceptions of ideal bodies were examined due to the small sample size of male participants and the fact that the largest proportion of male participants in both studies chose the same body as ideal. In addition, results reported in the Harris paper were mostly summaries, thus statistical assessment of other aspects were not possible.

4.5.4 Disease Risks

Increased risk for three diseases associated with obesity examined in this study included cardiovascular disease (CVD) (n=40), adult onset diabetes (AODM) (n=35), and hypertension (HTN) (n=25). The perceived risk for each disease (low, moderate, or high) was assessed through participants' responses to questions in the pre-session questionnaire (found in Appendix C). Perceived disease risk and its association with weight category based on perceived BMI (based on words and pictures) and measured BMI was assessed using ANOVA and Fisher's Exact tests.

Association of disease risk and perceived BMI in words was assessed by creating 2x2 tables comparing perceived low risk versus moderate or high risk versus perceived normal weight versus overweight or obese. Fisher's Exact tests were used to determine whether a

significant difference existed between these categories. Analysis of the differences between perceived BMI based on the pictorial scale and disease risk perceptions was assessed through ANOVA analysis. For this analysis, BMI based on the pictorial scale was the dependent variable and disease risk as the factor. Analysis of differences between measured BMI and disease risk perceptions was assessed in the same manner using measured BMI as the dependent variable and disease risk as the independent variable.

5.0 RESULTS

5.1 DEMOGRAPHICS

All demographic information is self reported by the 65 participants recruited by the Center for Minority Health Healthy Black Family Project. The data in this study was collected through the pre-session questionnaire (which can be found in Appendix C) between June 5, 2008 and December 2, 2008. BMI data was collected and calculated during the initial Fitness assessment performed by the Healthy Black Family fitness coaches.

Table 2. Participant Demographics

Participant Characteristics (n = 65)		n	(% of participants)
Age			
	10 - 19	1	(2%)
	20 - 29	6	(9%)
	30 - 39	8	(12%)
	40 - 49	10	(15%)
	50 - 59	15	(23%)
	60 - 69	17	(26%)
	70 - 79	7	(11%)
	80 - 89	1	(2%)
Gender			
	Male	10	(15%)
	Female	55	(85%)
Ethnicity			
	African American	62	(95%)
	Caucasian	2	(3%)
	Ashkenazi Jewish	1	(2%)
Education			
	Grades 9 through 11 (Some high school)	3	(5%)
	Grade 12 or GED (High school)	9	(14%)
	College 1 year to 3 years (Some college or technical school)	31	(48%)
	College 4 years or more (College graduate or post-graduate)	12	(18%)
	Graduate level (Masters or PhD)	8	(12%)
Income			
	Less than $10,000	7	(11%)
	Between $10,000 and $20,000	9	(14%)
	Between $20,001 and $35,000	19	(29%)
	Between $35,001 and $50,000	15	(23%)
	Between $50,001 and $75,000	5	(8%)
	Greater than $75,000	5	(8%)

Table 2 presents the demographic information reported by the 65 participants in this study. The age of the participants ranged from 19 to 85, with an average age of 52.48. The majority (85%) of the participants were female, while 15% were male. Of the 65 participants, 95% were African American, 3% were Caucasian, and 2% were Ashkenazi Jewish. Ninety-two percent of the participants have a high school diploma or higher education, with the largest proportion (48%) of participants had 1 to 3 years of college experience or technical school training. Annual income levels ranged from less than $10,000 to greater than $75,000, with the largest proportion of participants (29%) with an income level between $20,001 to $35,000.

Table 3. BMI of Participants Based on Fitness Assessment Measurements

	Female		Male	
	n	(%)	n	(%)
Healthy (18.5-24.9)	8	19%	1	25%
Overweight (25-29.9)	12	28%	0	0%
Obese (≥30)	23	53%	3	75%

Of the 55 women in the study, 43 female participants had BMI measurements ranging from 21.58 to 49.08, with an average of 32.24. Of the 10 men in the study, 4 male participants had BMI measurements ranging from 24.51 to 38.06, with an average of 32.72. According to the CDC guidelines, the average BMI's of both the male and female participants fall in the obese weight category. Additionally, the largest proportion of both female (53%) and male (75%) participants were in the obese weight category.

5.2 BODY IMAGE PERCEPTION

Body image perception was assessed in participants based on their perception in words and pictures. Using the pictorial scale developed by Harris and colleagues (2008), the differences between current and ideal body sizes were compared to assess body image satisfaction. Finally, accuracy between the two methods was assessed.

Table 4. Weight Category Based on Words Selected by Participants

	Female		Male	
	n	(%)	n	(%)
Underweight	1	2%	0	0%
Healthy	16	30%	5	50%
Overweight	27	51%	4	40%
Obese	9	17%	1	10%

As seen in Table 4, participants' perceived weight category ranged from underweight to obese based on the word chosen to represent weight category (i.e. the four word options included underweight, healthy, overweight, and obese). Of the 63 participants, the largest proportion of female participants chose overweight to represent their weight category; whereas the largest proportion of male respondents chose healthy to represent their weight category.

Table 5. Weight Category Based on Pictures Selected by Participants

	Female		Male	
	n	(%)	n	(%)
Underweight (A)	1	2%	0	0%
Healthy (B-C)	11	21%	4	40%
Overweight (D)	12	23%	0	0%
Obese (E-J)	29	55%	6	60%

When the individual pictures representing BMI's are combined into four weight categories (based on CDC categories defined above – see Table 1), the largest proportion of

female (55%) and male (60%) participants chose obese pictures to represent their weight category. However, a different pattern is seen when the weight categories are separated by individual pictures.

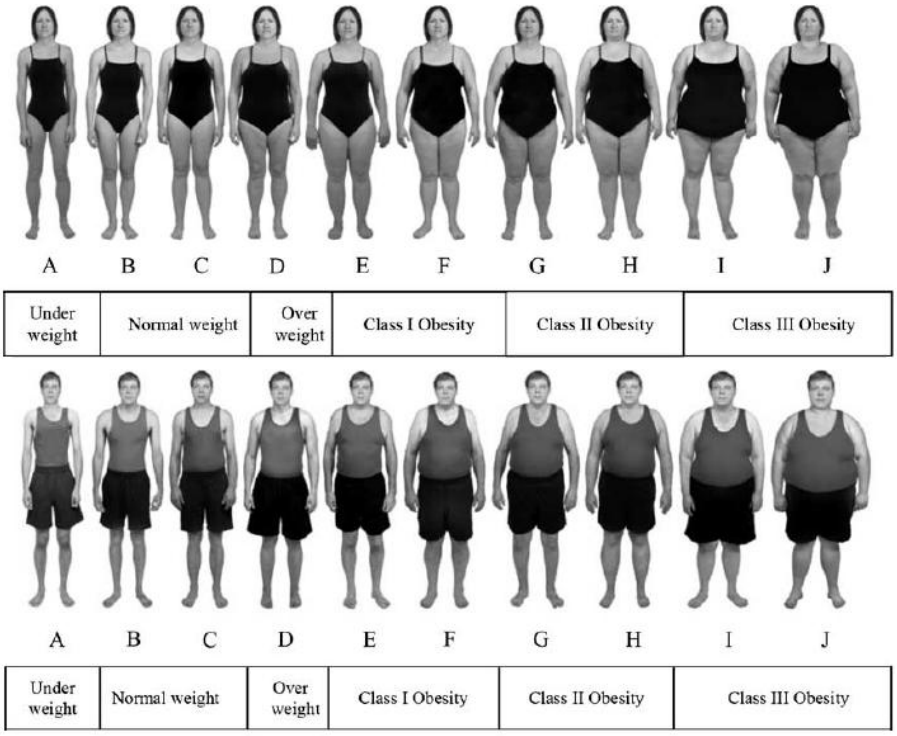

Figure 4. Harris and Colleagues (2008) Pictorial Scale with Weight Categories

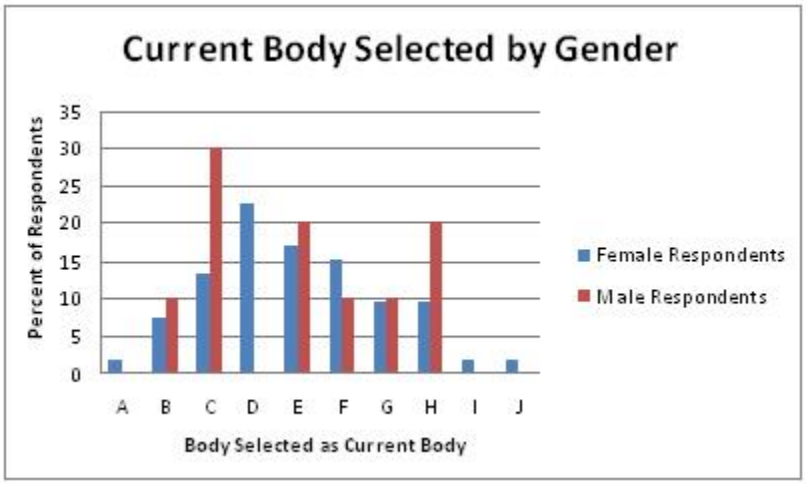

Figure 5. Current Body Selected by Gender Based on Pictorial Scale

Figure 4 is a review of the pictorial scale and weight categories which can be used as a reference to interpret the bodies selected in the following figures. As seen in Figure 5, the perceptions of current body size ranged from underweight to obese. Of the 63 participants, the largest proportion of female respondents chose the overweight picture (D) to represent their current body; while the largest proportion of male respondents chose a healthy picture (C) to represent their current body.

Besides current body selection, it is also important to look at the ideal bodies chosen by the participants. This allows for analysis of differences between the sexes as well as body image satisfaction.

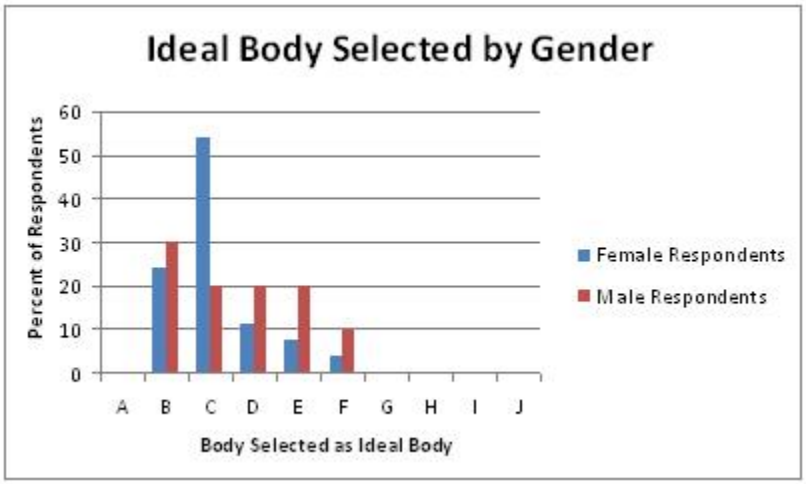

Figure 6. Ideal Body Selected by Gender Based on Pictorial Scale

As seen in Figure 6, there were a range of ideal bodies representing weight categories from normal weight to obese. Of the 63 participants, the largest proportion of female respondents chose a healthy picture (C) to represent their ideal body and the largest proportion of male respondents also chose a healthy picture (B) to represent their ideal body; indicating that both sexes were not happy with their current body size and chose a smaller body size as ideal.

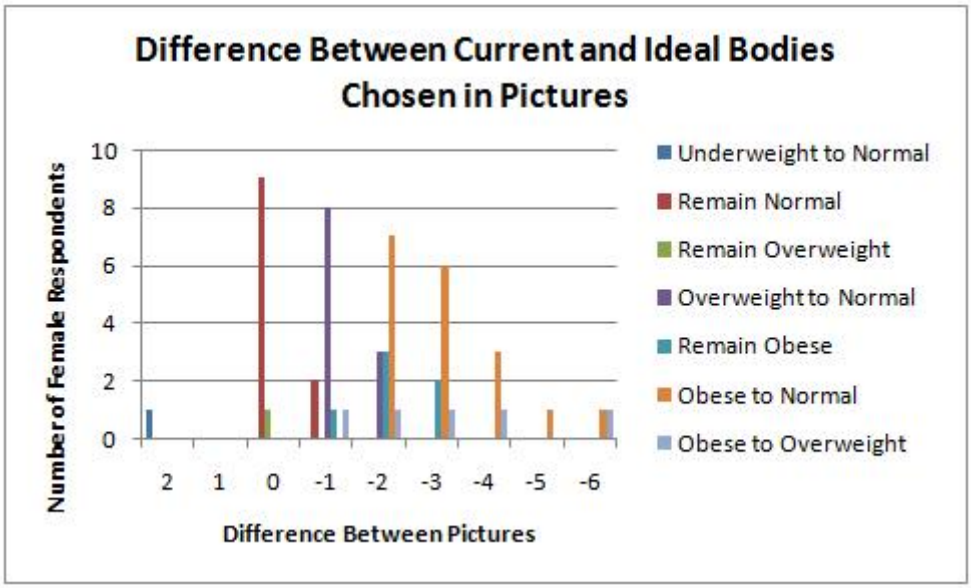

Figure 7. Difference Between Current and Ideal Bodies by Female Respondents

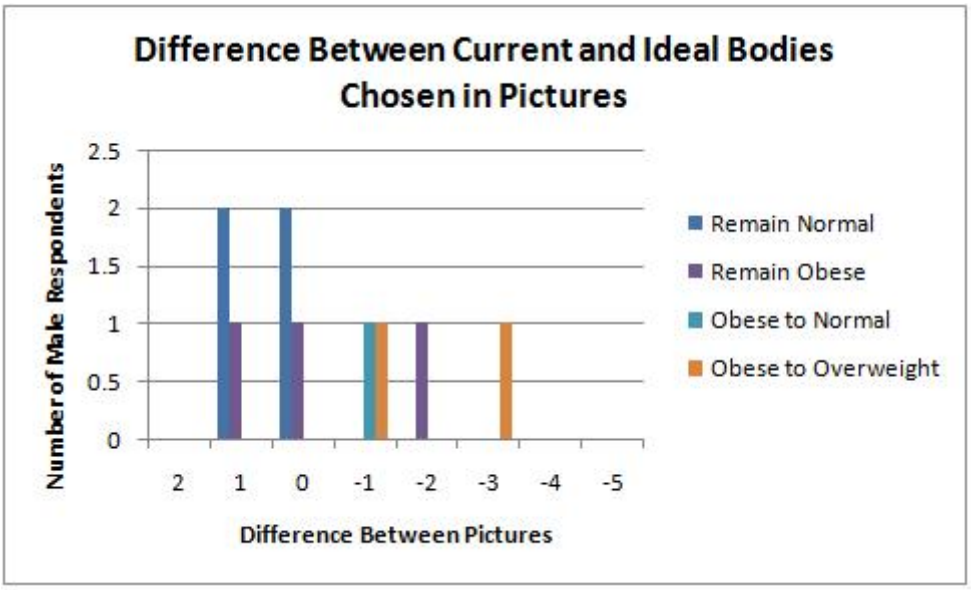

Figure 8. Difference Between Current and Ideal bodies by Male Respondents

Figures 7 and 8 represent the differences that participants chose between their current and ideal bodies based on the pictorial scale. On the X-axis, the positive numbers indicate participants wishing to gain weight (a larger picture than current body was selected on the pictorial scale), 0 indicates participants content with their current size (no difference between current and ideal bodies chosen on the pictorial scale), and the negative numbers indicate participants wishing to lose weight (a smaller picture than the current body was selected on the pictorial scale). While the Y-axis represents the number of participants in each category. The color of each bar indicates the change in weight category.

As seen in Figure 7, female participants chose differences between their current and ideal bodies ranging from a gain of 2 pictures to a loss of 6 pictures. The largest proportion of female participants (26%) chose a difference of 2 pictures between their current body and ideal body. Of those 14 participants, 7 (50%) selected a change from an obese to a normal weight picture, 3 (21%) selected a change from an overweight to a normal weight picture, 3 (21%) selected an ideal picture that remained in the obese weight category, and 1 (7%) selected a change from an obese to an overweight picture. Overall, the largest proportion of female participants (79%) wanted to lose weight, 19% wanted to remain the same, and 2% wanted to gain weight. Of the participants who wanted to lose weight, the largest proportion (43%) wanted a change from the obese weight category to normal weight. Of those who did not choose a different body for current and ideal, the majority (90%) wanted to remain within the normal weight category. Of those who wanted to change weight categories, the majority of participants (86%) wanted to change to a normal weight.

As seen in Figure 8, male participants chose differences between their current and ideal bodies ranging from a gain of 1 picture to a loss of 3 pictures. An equal proportion of male

participants chose a gain of 1 picture or chose to remain the same (30%). Of those 3 participants in each category, 2 (67%) chose to remain at a normal weight and 1 (33%) chose to remain at an obese weight. Overall, the largest proportion of male participants (70%) wanted to lose weight, while 30% did not want a change between current and ideal bodies. Of those who wanted to lose weight, 29% of participants wanted to remain within the normal weight category, 29% wanted to remain within the obese weight category, and 29% of participants wanted a change from the obese to overweight category. Of those who did not choose a different body between current and ideal, the majority of participants (67%) wanted to remain within the normal weight category. Of those who wanted to change weight categories, 67% wanted to change to the overweight category.

After examining the participants' perceptions of their weight category based on words and pictures, it is important to compare the accuracy between the two methods. The analysis revealed that 67% of the participants chose the correct picture to represent their weight category whereas, 49% of the participants chose the correct word to represent their weight category ($p=0.135$, Fisher's Exact test). In order to investigate this borderline effect further, an analysis was done to determine whether there was a difference between weight categories.

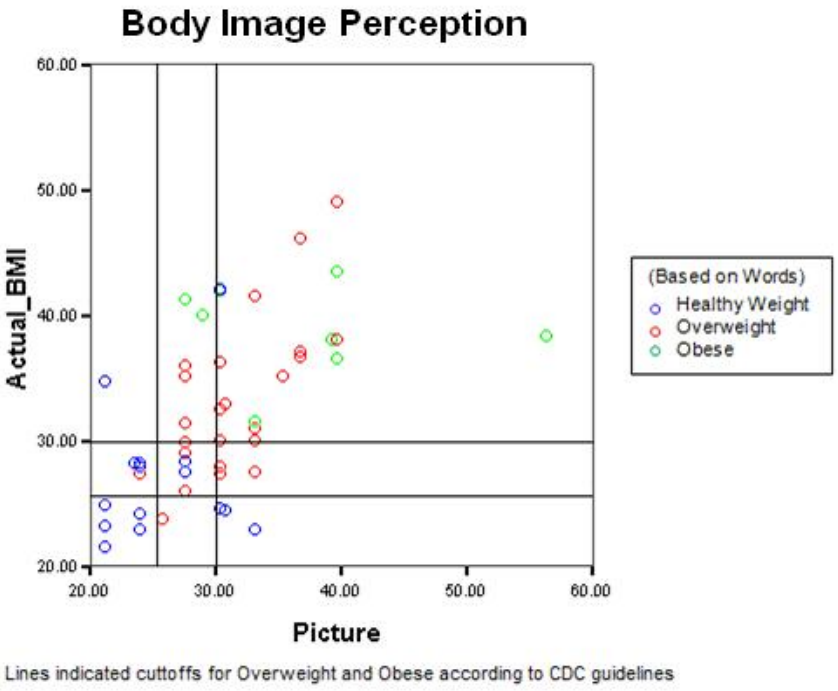

Figure 9. Body Image Perception

Figure 9 represents the perceptions of body image based on words and pictures in comparison to measured BMI. The y-axis represents the measured BMI of each participant, while the x-axis represents the picture (converted to the equivalent BMI) chosen by each participant to represent their perceived weight category. The color of each circle represents the word chosen to represent their perceived weight category. The black lines indicate the cutoffs for overweight and obese according to the CDC guidelines defined above (see Table 1).

As observed from Figure 9, there is a general relationship between actual BMI and perceived BMI based on the pictorial scale, but there are differences between the words and pictures that participants chose to represent their actual BMI. Of the participants who are normal weight (based on measured BMI 18.5-24.9), weight category is most accurately chosen in words. Of the 9 participants with a measured BMI 18.5-24.9, 8 (89%) participants self-described themselves as normal weight in words, whereas 5 (63%) participants chose a picture in the

normal weight range. Of paticipants who are obese (based on measured BMI ≥ 30), weight category is most accurately chosen by picture. Of the 26 participants with a measured BMI ≥ 30, 20 (77%) participants chose a picture in the obese weight range, whereas, 8 (31%) participants self-described themselves as obese. There is not a clear pattern for overweight participants. Of the 12 participants with a measured BMI 25-29.9, 7 (59%) self-described themselves as overweight and 5 participants (42%) chose a picture in the overweight range.

Chi-square analysis showed a significant difference (p=0.001) between measured BMI weight categories and the word selected to represent weight category. Of the 14 participants who chose healthy to describe their perceived weight category, 57% were correct and of the 25 participants who chose overweight to describe their weight category, 28% were correct. In contrast, of the 8 participants who chose obese to describe their weight category, 100% were correct. Chi-square analysis did not show a significant difference (p=0.139) between measured BMI weight categories and the picture selected to represent weight category. Of the 10 participants who chose the healthy pictures to represent their weight category, 50% were correct and of the 10 participants who chose the overweight picture to represent their weight category, 50% were correct. Of the 27 participants who chose the obese pictures to represent their weight category, 78% were correct.

Chi-square analysis also revealed a significant difference (p=0.001) between the word and picture chosen by participants to represent their weight category. In fact, a trend was noticed; participants were less consistent in choosing the same word and picture when the larger body size pictures were chosen. Of the 10 participants who chose the healthy pictures to describe their weight category, 90% were consistent between word and picture, while of the 9 participants who chose an overweight picture to describe their weight category, 67% were

consistent, and of the 26 participants who chose obese pictures to describe their weight category, 23% were consistent.

Furthermore, participants who incorrectly chose a picture and/or word to represent their weight category were more likely to underestimate their weight category when choosing the word to represent their weight category. Of the 24 participants who were incorrect in choosing the word to represent their weight category, 96% underestimated their weight category; whereas, of the 16 participants who were incorrect in choosing the picture to represent their weight category, 63% underestimated their weight category (p=0.011, Fisher's Exact test).

5.3 SOCIAL NETWORK

The social network assessed in this study included female and male family members, friends, and community members. The social network of the HBFP participants was assessed using several comparisons. The perceived BMI of each social network was chosen by HBFP participants based on the pictorial scale. This perceived BMI of the social network was then compared to the participants' perceived BMI based on words and pictures as well as measured BMI to determine whether the HBFP participants associated with a social network of similar size.

Table 6. Female Social Network

	Women in the Family (n)	(%)	Female Friends (n)	(%)	Women in the Community (n)	(%)
Underweight	0	0	0	0	0	0
Healthy	10	28	8	22	10	28
Overweight	6	17	10	28	7	19
Obese	20	56	18	50	19	53

Table 7. Male Social Network

	Men in the Family (n)	(%)	Male Friends (n)	(%)	Men in the Community (n)	(%)
Underweight	1	3	0	0	0	0
Healthy	9	25	3	8	2	6
Overweight	7	19	4	11	6	17
Obese	19	53	29	81	28	78

As can be seen in Tables 6 and 7, it is clear that majority of male and female individuals in the family, community, and friends are perceived as either overweight or obese by the HBFP participants. The calculated means of BMI's (based on the pictorial scale) of the female family members (30.04±0.88), male friends (31.55±0.72), and male community members (31.45±0.64) places these individuals in the obese weight category. The calculated means of BMI's (based on the pictorial scale) of the female friends (29.46±0.82), female community members (29.92±0.91), and male family members (28.63±0.84) places these individuals in the overweight category.

Next, the weight categories of the HBFP participants and members of the social networks were compared. The BMI's of the social network (based on the pictorial scale) were compared to the perceived (based on words and pictures) and measured BMI's of the participants.

Table 8. Female Social Network Data Based on Weight Category Chosen in Words

*Female Family Members**		
	Mean	**SE**
Healthy	25.62	0.75
Overweight	31.38	1.24
Obese	34.45	2.16
Female Friends		
	Mean	**SE**
Healthy	27.34	0.93
Overweight	30.63	1.34
Obese	29.50	1.63
Female Community Members		
	Mean	**SE**
Healthy	27.46	1.09
Overweight	31.90	1.46
Obese	28.53	1.55

SE=Standard Error, *p=0.002

Table 9. Male Social Network Data Based on Weight Category Chosen in Words

Male Family Members		
	Mean	**SE**
Healthy	26.97	1.39
Overweight	29.08	1.27
Obese	29.96	1.78
Male Friends		
	Mean	**SE**
Healthy	29.99	1.51
Overweight	32.86	1.07
Obese	30.55	0.78
Male Community Members		
	Mean	**SE**
Healthy	32.07	1.28
Overweight	32.82	0.97
Obese	29.10	0.80

Tables 8 and 9 represent the means and standard error of the social network members (based on the pictorial scale) by the self-reported weight category chosen in words by the HBFP participants. Using ANOVA, there is a significant (p=0.002) difference between the means of the female family members' BMI (based on the pictorial scale) and the weight category chosen in words by the participants. In other words, as weight category of the HBFP participants increases, so does the perceived BMI of female family members. Although not significant, there is a similar trend for perceived BMI of male family members (based on the pictorial scale) and the weight category chosen in words by the participants. There were no significant differences between means of the other groups.

Table 10. Social Network Regression Analysis Based on Pictorial Scale

	r^2 value	p-value
Female Family Members	0.282	0.001*
Female Friends	0.196	0.004*
Female Community Members	-0.008	0.398
Male Family Members	0.031	0.156
Male Friends	-0.029	0.982
Male Community Members	-0.026	0.730

*Significant

Next, regression analyses were employed to compare perceived BMI of the HBFP participants and members of their social networks using the pictorial scale for both. As seen in Table 10, there was a significant positive relationship between perceived BMI of the HBFP participants and their female family members and friends ($p<0.004$ for both). As perceived BMI (based on the pictorial scale) of the HBFP participants increases, so does the perceived BMI of female family members and friends (based on the pictorial scale) and this relationship accounted for 28.2% and 19.6%, respectively, of the covariation in perceived weight assessed by the pictorial scale.

Similar results were obtained when comparing measured BMI of HBFP participants and pictorial BMI of members of the social networks (Table 11). As measured BMI of HBFP participants increases, so does the perceived BMI of female family members ($p<0.001$) and this relationship accounted for 28.2% of the covariation between the two traits.

Table 11. Social Network Regression Analysis Based on Measured BMI

	r^2 value	p-value
Female Family Members	0.282	0.001*
Female Friends	0.007	0.272
Female Community Members	-0.022	0.611
Male Family Members	0.072	0.063
Male Friends	0.001	0.313
Male Community Members	<0.001	0.325

*Significant

5.4 ETHNIC DIFFERENCES

The results from participants of the HBFP were compared with the results found by Harris and colleagues (2008) to determine whether there were differences between the two populations. The participants in the HBFP are predominately African American, whereas the participants in the study conducted by Dr. Harris and colleagues are predominately Caucasian. Section 5.1 describes the specific demographic characteristics of the participants in this study.

The demographics of the sample obtained by Harris and colleagues (2008) differ greatly from that obtained through the Healthy Black Family Project. The participants in the study done by Harris and colleagues (2008) were recruited as part of an obesity prevention trial, a structured exercise program, or through a survey of health beliefs. Of these participants, 335 were women

(84%) and 65 (16%) were men. The age of the participants ranged from 19 to 77 years with an average of 36.8 years. The participants were predominantly Caucasian (98%). Education levels ranged from less than high school (29%) to college or graduate degree completion (42%). BMI values of the participants were calculated from direct measurement (30%) or from self-reported height and weight (70%). Of these respondents, 1% were classified as underweight, 28% had a healthy weight, 26% were overweight, and 45% were obese based on calculated BMI values.

Two main aspects were compared between the two populations in this study. The first comparison assessed possible differences in the perception of the body scale developed by Harris and colleagues (2008). In the literature [Allan et al., 1993; Anderson et al., 1997; Lieberman et al., 2003], it has been said that the African American community values larger body sizes. Therefore, the second aspect that was examined in this study was differences between the perceptions of ideal body size in each of the populations.

Table 12. Perceptions of the Pictorial Scale by Normal Weight Participants

	Healthy (n=8)		*Underweight* (n=7)		*Normal Weight* (n=8)		*Overweight* (n=9)		*Obese* (n=9)	
	Smallest	Largest	Smallest	Largest	Smallest	Largest	Smallest	Largest	Smallest	Largest
Means of Harris Data	20.49	24.34	17.49**	17.49**	21.23	23.89**	33.14	54.50	37.93*	54.94*
Means of HBFP Data	21.49	24.70	17.20	17.20	21.31	22.15	39.57	50.10	50.62	56.30
95% CI of HBFP Data	(17.69, 25.29)	(21.75, 27.65)	(17.20, 17.20)	(17.20, 17.20)	(19.57, 23.06)	(20.94, 23.36)	(28.20, 50.93)	(39.71, 60.49)	(43.68, 57.56)	(56.30, 56.30)

CI=Confidence Interval, *Mean<CI, **Mean>CI

Table 13. Perceptions of the Pictorial Scale by Overweight Participants

	Healthy (n=12)		*Underweight* (n=11)		*Normal Weight* (n=12)		*Overweight* (n=12)		*Obese* (n=12)	
	Smallest	Largest	Smallest	Largest	Smallest	Largest	Smallest	Largest	Smallest	Largest
Means of Harris Data	20.60	24.38*	17.74	17.74	21.62	24.05*	31.31	51.64	37.86	55.25*
Means of HBFP Data	20.18	28.80	18.14	22.07	22.15	27.93	36.01	52.74	41.74	56.30
95% CI of HBFP Data	(18.36, 21.99)	(24.50, 33.11)	(16.05, 20.22)	(14.29, 29.86)	(20.26, 24.04)	(24.16, 31.71)	(29.48, 42.54)	(47.31, 58.17)	(35.72, 47.76)	(56.30, 56.30)

CI=Confidence Interval, *Mean<CI, **Mean>CI

Table 14. Perceptions of the Pictorial Scale by Obese Participants

	Healthy (n=27)		*Underweight* (n=25)		*Normal Weight* (n=28)		*Overweight* (n=28)		*Obese* (n=28)	
	Smallest	Largest	Smallest	Largest	Smallest	Largest	Smallest	Largest	Smallest	Largest
Means of Harris Data	21.31	25.79	18.21**	18.21	22.80	25.35	33.96	53.25**	37.96*	55.28
Means of HBFP Data	21.91	25.67	17.36	18.72	23.11	25.26	34.57	48.74	43.34	54.77
95% CI of HBFP Data	(20.63, 23.19)	(23.90, 27.44)	(17.03, 17.68)	(17.84, 19.60)	(22.05, 24.17)	(23.86, 26.66)	(31.20, 37.94)	(44.24, 53.24)	(39.40, 47.28)	(52.59, 56.96)

CI=Confidence Interval, *Mean<CI, **Mean>CI

Tables 12, 13, and 14 represent the differences in perceptions of the pictorial scale developed by Harris and colleagues (2008) between the participants in the HBFP and those in the Harris study. Because of the direct relationship between BMI and the pictorial scale developed by Harris and colleagues (2008), the BMI value of each picture was used to calculate the means of the smallest and largest bodies representing perceptions of each weight category. The means were compared between the two populations using 95% confidence intervals (CI).

As seen in Tables 12, 13, and 14, there are several differences between the perceptions of each body type between the HBFP participants and the Harris participants. For example, the 95% CI containing the mean of largest bodies perceived as healthy (28.80) by overweight participants in the HBFP (24.50, 33.11), did not contain the mean of the largest bodies selected by the Harris participants (24.38). The mean ± 95% CI was higher than the mean of the Harris participants, indicating that the overweight participants in this study view a larger body as healthy when compared to the Harris participants. Similarly, several of the means ± 95% CI's regarding perceptions of obese bodies were higher than the means of the Harris participants. These included:

- The largest bodies perceived as normal weight by overweight participants
- The smallest and largest bodies perceived as obese by normal weight participants
- The largest bodies perceived as obese by overweight participants
- The smallest bodies perceived as obese by obese participants

This would indicate that the participants in this study, regardless of weight category, perceive larger bodies as obese as compared to the Harris participants.

In contrast, several of the means ± 95% CI's were lower than the means of the Harris participants in certain weight categories. These included:

- The smallest and largest bodies perceived as underweight by normal weight participants
- The smallest bodies perceived as underweight by obese participants
- The largest bodies perceived as normal weight by normal weight participants
- The largest bodies perceived as overweight by obese participants

This would indicate that the participants in this study perceive smaller bodies as compared to the Harris participants in these weight categories.

After examining differences in body perception, it was important to determine whether there were differences in ideal body image. Among the HBFP participants, 24% chose body B on the pictorial scale as their ideal body, whereas, 43% of the participants in the Harris paper chose body B as their ideal body ($p=0.011$, Fisher's Exact test). In contrast to the Harris participants, the highest proportion of female participants in the HBFP (54%), as seen in Figure 6, chose body C as ideal. While these are different bodies on the pictorial scale, they are both within the normal weight category.

5.5 DISEASE RISK PERCEPTION

As stated in the Background and Significance section, there is a significant increase in risk of cardiovascular disease (CVD), adult onset diabetes (AODM), and hypertension (HTN) associated with obesity. This association was assessed in this study based on perceived BMI (based on words or pictures) and measured BMI.

There are several relationships between perceived disease risk and perceived weight category based on words. Using Fisher's Exact tests, participants who chose moderate or high

CVD risk, 92% perceived themselves as overweight or obese, while 8% perceived themselves as having a healthy weight (p=0.002). Of those who chose low CVD risk, 53% perceived themselves as having a healthy weight, while 47% perceived themselves as overweight or obese. Thus, as perceived weight category increases, so does perceived CVD risk

A similar significant result was observed for perceived HTN risk, that is as perceived weight category increases, so does perceived HTN risk (p=0.017). Participants who chose moderate or high HTN risk, 88% perceived themselves as overweight or obese, while 12% perceived themselves as having a healthy weight. Of those who chose low HTN risk, 62.5% perceived themselves as having a healthy weight, while 37.5% perceived themselves as overweight or obese.

Table 15. Means of BMI's Based on Pictorial Scale for Perceived Disease Risk Analysis

CVD Risk		
	Mean BMI	**SE**
Low	29.74	2.30
Moderate	31.73	1.43
High	31.22	0.94
AODM Risk		
	Mean BMI	**SE**
Low	28.87	1.47
Moderate	34.32	3.41
High	28.37	1.33
HTN Risk		
	Mean BMI	**SE**
Low	29.53	4.04
Moderate	32.26	2.92
High	30.89	1.30

In contrast, there were no differences in mean pictorial BMI in the three perceived risk categories for CVD, AODM, or HTN (Table 15). Finally, although there were no significant

differences in mean measured BMI by disease risk category (Table 16), there was a trend, as perceived risk for all three diseases increased, so does measured BMI.

Table 16. Means of Measured BMI's for Perceived Disease Risk Analysis

CVD Risk		
	Mean BMI	**SE**
Low	30.00	1.94
Moderate	33.65	1.67
High	34.46	1.91
AODM Risk		
	Mean BMI	**SE**
Low	30.81	2.07
Moderate	30.97	2.12
High	34.11	1.63
HTN Risk		
	Mean BMI	**SE**
Low	28.90	2.61
Moderate	33.17	3.29
High	34.95	2.14

6.0 DISCUSSION

6.1 BODY IMAGE PERCEPTION

Based on measured BMI, the largest proportion of male and female participants fit into the obese weight category. However, the perceptions of weight category differ from actual BMI. In both words and pictures, female participants perceived themselves as overweight, while male participants perceived themselves as normal weight. This suggests that HBFP participants perceive themselves smaller than their actual BMI. Similar comparisons cannot be made in other studies due to the fact that they did not use a body scale with a precise relationship to BMI such as the scale developed by Harris and colleagues (2008).

Of note, similar results between measured BMI and body image perception were observed using the pooled pictures (all pictures were pooled into weight categories, i.e. underweight, normal, overweight, and obese). The largest proportion of both female and male participants chose obese bodies to represent their weight category. This could be due to the fact that more obese bodies are represented on the pictorial scale than any other weight category. In fact, the obese bodies account for 60% of the pictorial scale, while underweight and overweight account for 10% each of the pictorial scale, and normal weight bodies account for 20% of the pictorial scale.

When participants were asked to choose an ideal body based on the pictorial scale, the largest proportion of both male and female participants chose bodies smaller than those selected as current bodies. Females selected a change from the overweight category to normal weight. Males selected a change for a smaller body, but not a change in weight category since both bodies chosen on the pictorial scale were within the normal weight category. Overall, both sexes wished to have a body within the normal weight category.

Interestingly, men chose smaller bodies than women for both current and ideal bodies. Typically this has not been seen in other populations; perhaps this represents an ethnic difference between populations. This also raises the question of whether this is due to preference or perhaps men in the African American population tend to be smaller than women. However, the sample size of men (n=10) was quite small in this analysis which could affect the accuracy of this comparison.

Differences were also observed in current and ideal bodies chosen by male and female participants. Among female participants, the largest proportion chose ideal pictures 2 sizes smaller the chosen current body size. In contrast, among male participants, the largest proportion chose ideal pictures 1 size larger than their current body or chose to remain the same. This follows the documented trend that women tend to diet more often and wish to lose weight, whereas men wish to gain weight and become more muscular [Fallon and Rozin, 1985; Silberstein et al., 1988].

When assessing the accuracy of methods to assess body image, a significant difference between methods was not detected, however a difference between weight categories was found. As shown in Figure 9, underweight individuals were more accurate in describing their weight category in words, while obese individuals were more accurate in describing their weight

category using the pictorial scale. This suggests that perhaps individuals who are obese have a more difficult time using the word obese, but can better identify with a picture. This notion is also supported by the analysis of those who were incorrect in choosing the word or picture that accurately represented their weight category; more participants underestimated their weight category when choosing the correct word than those choosing the correct picture. Additionally, this notion is supported by the analysis of consistency between the two methods; the highest percentage of normal weight participants was consistent between words and pictures, whereas the lowest percentage of obese participants was consistent. This demonstrates an inverse relationship, as weight category increases, consistency between methods decreases.

Some evidence that may seem contradictory to the trend above was seen in the chi-square analysis assessing the accuracy of using words to represent weight category. It shows that 28% of overweight participants, 57% of participants of normal weight, and 100% of obese participants were correct in assessing weight category in words. From this data, it would seem that a larger proportion of obese participants were more accurate in assessing weight category in words than overweight and normal weight participants. However, as illustrated in Figure 9, a large proportion (42%) of obese participants chose overweight as the word to represent their weight category. Therefore this analysis is consistent with the previous data. It simply shows that 8 obese participants who chose the word obese to represent their weight category were correct; while, the remaining obese participants inaccurately chose overweight to represent their weight category. Additionally, although not significant, the chi-square analysis comparing weight categories and the accuracy of choosing the correct picture to represent weight categories still supports the trend that obese participants were more accurate in choosing the correct picture than the normal and overweight participants.

6.2 SOCIAL NETWORK

Overall, it seems that the largest proportions of both the female and male social networks (including family members, friends, and community members) are within the obese weight category. In contrast, the largest proportions of the male and female participants perceive themselves within the normal and overweight categories, respectively. It is possible that the HBFP participants perceive their social networks as larger than themselves. This suggests that perhaps the social networks are indeed larger than the participants or perhaps the participants cannot accurately assess the body image of others because they are not accurately assessing their own body images.

The results of the ANOVA indicate that both male and female participants associate with female family members of similar size. This could be explained by the fact that the majority of participants are female and family members tend to share both environmental and genetic factors. Similar results were not seen for any other social network category. This could be explained by the small sample size (n=36) or perhaps participants do not associate with social networks of similar size outside of female family members. Another explanation that could account for this difference is the fact that the majority of participants are female, therefore possibly skewing these results.

One major limitation in the interpretation of the social network analysis is the manner in which the social network was assessed. The questions developed by Harris and colleagues (2008) that were used in this study (these can be found in Appendix C) only allow participants to choose one picture to represent the members of their social network. This does not take into account individuals whose social networks consist of a variety of sizes of individuals.

6.3 ETHNIC DIFFERENCES

Many similarities and differences were observed between the population in this study and the population in the research conducted by Harris and colleagues (2008). For both studies, there are similar proportions of male and female participants, the largest proportion of participants fit into the obese weight category, and the participants may be motivated to participate in research since they have been recruited from health-related programs. However, there are also differences between the two populations. The average age of the Harris participants was much lower than the age of the HBFP participants. In addition, the methods of obtaining measurements for the calculation of BMI for each participant are different. The BMI of each HBFP participant used in this study was calculated from height and weight measurements done as part of the initial fitness assessment. In contrast, 70% of the BMI's of the Harris participants were calculated from self-reported height and weight measurements. This could affect the accuracy of the BMI's used for analysis in the Harris study.

Besides demographics and method used in the studies, there were two analyses conducted in this study to determine whether there were differences between ethnicities. First, differences in perceptions of the body scale developed by Harris and colleagues (2008) were examined. Of the bodies perceived as obese on the pictorial scale, participants, regardless of weight category, within the HBFP population perceived larger bodies than participants within the Harris population. This suggests that the HBFP participants view larger bodies as obese when compared to the Caucasian population and possibly extending the normal and/or overweight categories to larger bodies. In support of this interpretation, overweight participants in the HBFP also viewed larger bodies as healthy and normal weights compared to the Harris participants. In contrast, another trend that was revealed was that normal and obese participants in the HBFP

perceived smaller bodies than the Harris participants in several weight categories. In particular, both of these weight categories perceived smaller bodies as underweight than the Harris participants. This may suggest that HBFP participants view a larger range of bodies as healthy.

The second analysis that was performed examined the perception of ideal bodies between the two populations. There was not a difference between the perceptions of ideal bodies chosen by male participants in both studies. It is important to note that the number of male participants in the HBFP study was small and this may have affected the results. However, a difference between ideal bodies was seen between the two populations of female participants. The largest proportion of females in the Harris population chose body B as ideal, while the largest proportion of female participants in the HBFP population chose body C as ideal. Of note, both bodies B and C are classified as normal weight, suggesting that the normal weight category is the ideal for both populations of male and female participants. One slight difference is that the women in the African American population chose a slightly larger body than the Caucasian population which is consistent with the literature [Anderson et al., 1997; Lieberman et al., 2003].

There are several important factors to keep in mind regarding the accuracy of the comparisons between these populations. The first factor is that the Harris publication did not report standard errors for the means of the bodies representing the different weight categories on the pictorial scale. Therefore, this limited the accuracy of the comparison between the means and 95% confidence intervals calculated for the HBFP participants' to the means calculated for the Harris participants' perceptions of the pictorial scale. In addition, the exact percentage for each body of the pictorial scale chosen as ideal for both sexes were not published, limiting the comparison of choice of ideal bodies between the populations.

6.4 DISEASE RISK PERCEPTION

Increased disease risks for cardiovascular disease (CVD), adult onset diabetes (AODM), and hypertension (HTN) are associated with obesity [Colditz et al., 1995; Larsson, 1991; Stamler et al., 1978]. Therefore this study assessed whether perceived risk for these diseases increased with weight category. As with prior analyses, weight category was assessed through perceived BMI based on both words and the pictorial scale and measured BMI. Different results were observed among these three methods.

When weight category was based on words, significant differences between weight category and disease risks were seen for CVD and HTN, showing that as weight category increased, so did disease risk. A similar trend was seen when comparing measured BMI's to disease risks of all three conditions. However, when BMI based on the pictorial scale was compared to disease risk, no significant differences were found, nor were any trends observed. These results suggest that consistent disease risk perception is not associated with perceived or measured BMI. An important factor for consideration is that disease risk is based on many factors including family history, life style, and ethnicity. Therefore accurate analyses of disease risk should take into account all of these factors.

There are several other limitations related to the disease risk perception analyses. As seen earlier, many obese participants did not choose their weight category correctly (in particular, many obese participants chose overweight to represent their weight category in words), therefore, potentially skewing these results. However, due to small sample size, both overweight and obese participants were combined in this analysis, which may alleviate this issue. Another factor that may affect the accuracy of this analysis is the small sample sizes due to the

fact that many of these participants have been diagnosed with these conditions and were therefore excluded.

6.5 STUDY LIMITATIONS

Besides the limitations mentioned above, others still exist. One of the major concerns for this study is the overall small sample size (n=65). Additionally, many of the sub-analyses have even smaller sample sizes. Other limitations include the fact that the majority of the participants (85%) were women, the largest proportion of participants (almost 50%) were between the ages of 50 and 69, and the majority of participants were obese (53% of female participants and 75% of male participants) making it difficult to generalize these results to other populations.

Another important aspect of this study was the use of the pictorial scale to assess BMI. There are several drawbacks to using this scale. One drawback is that it is not ethnic specific. While this did not seem to be a problem for the participants in this study, it would be interesting to develop ethnic specific scales to see if there are differences in responses. As mentioned earlier, another major drawback was that more of the bodies on the scale were obese. Therefore, by chance, obese individuals have a better chance of guessing the correct body than other weight categories. This could skew the results of several analyses when comparisons are made to BMI based on this scale.

6.6 FUTURE STUDIES

Several future studies could be performed to expand upon the results of this project. One possible study could be a re-analysis of this study with a larger sample size to see if the same trends persist. In addition, research could be conducted to determine differences in body image perceptions between males and females with a larger sample size. Several other investigations could be extensions of this study, including assessment of associations between body image perception and physical activity habits or with the Multidimensional Health Locus of Control to determine whether internal or external controls are associated with body image perception and disease risk perception. Additionally, body image perceptions may change over time or with changes in weight. Therefore, analysis could be done to compare any changes in body image perceptions during different time periods during the participants' involvement in the HBFP.

Some of the limitations discussed in the previous section could also be addressed in future studies. For instance, 62% of participants are 50 years or older. Therefore, examining risk perception within this group may not be as helpful since many may have developed the health conditions. It may be more useful to study risk perception among individuals under the age of fifty. Additionally, disease risk perceptions could be assessed for accuracy by comparing perceptions to objective risk based on the information obtained from the family health history. Also, ethnic specific pictorial scales using profile pictures of participants to represent the differences in distribution of adiposity among different ethnicities could be developed. These scales could be used to determine whether more accurate body image perception could be achieved. To correct for the skewed number of obese bodies on the pictorial scale, a larger range of bodies could be used (more normal and overweight bodies). Lastly, at this time, participants

can only choose one body to represent the individuals in their social networks; to account for the variability of individuals, participants could choose a range of bodies instead of just one.

Finally, it has been proposed that BMI may not be the best measure to assess body fat and classify individuals into weight categories. Some literature suggests that waist-to-hip ratios are a more effective method to discern distribution of body fat [Rimm et al., 1995]. Perhaps this method may be more accurate for body image perception analysis. Another potential method to assess body fat is through bioelectric impedance. In addition, there are individuals near the cut-offs between weight categories, making the classification into one category or the other difficult. This raises the question, should there be a more continuous scale? Additionally, since there are differences between the manners in which ethnicities perceive different weight categories, should there be ethnic specific guidelines?

7.0 CONCLUSIONS

This study set out to examine body image perception in an African American population. As part of this examination, body image perception of the participants' social network, differences between ethnicities regarding body image perception, and the association of disease risk with body image perception were also studied. This was done through analysis of data collected from participants in the Healthy Black Family Project (HBFP), a community based program developed to provide access to health promotion and disease prevention services to individuals at risk of developing chronic health conditions.

Body image was assessed in Aim 1. In this population through perceptions of weight category in words (underweight, healthy, overweight, obese) and through the pictorial scale developed by Harris and colleagues (2008). The pictorial scale was also used to examine body image satisfaction. Lastly, the accuracy between the use of words or pictures in relation to body image perception was assessed by comparing the responses of the participants to their measured BMI's.

This analysis revealed that in both words and pictures, participants chose similar weight categories to describe their BMI. The largest proportion of women perceived themselves as overweight, while the largest proportion of men perceived themselves as healthy (or normal) weight. In contrast, based on measured BMI, the majority of both sexes fit into the obese weight category. These results show that participants were not accurate in their perceptions of body

image. In regards to body image satisfaction, similar results to other studies were found [Fallon and Rozin, 1985; Silberstein et al., 1988]. Females wished to lose weight, while males wished to gain weight or remain the same. Female participants support the hypothesis that participants would not be satisfied with their current body image and chose a body smaller than that chosen for their current body size, while males did not. Finally, the accuracy of the two methods (words and pictures) was compared. The hypothesis that participants would be more accurate in assessing their body image when using the pictorial scale than words was partially supported. The results suggest that there are differences in body image perception between weight categories. Participants within the normal weight category were more accurate in choosing the correct word to represent their weight category, whereas participants within the obese weight category were more accurate using the pictorial scale.

Aim 2 assed the body image perceptions of the social network including female and male family members, friends, and community members to determine whether participants associated with a social network of similar size. The perception of body image perception of the social network was assessed according to the responses of the participants based on the pictorial scale. The majority of the social networks were perceived as obese, which was larger than the participants' body image perceptions of self. The only result that was consistent when comparing the perceived and measured BMI's of the participants with the perceived BMI's of the social networks was that participants of both sexes tended to associate with female family members of similar size. This partially supports the hypothesis that participants would associate with a social network of similar body types.

Aim 3 examined the differences in body image perception between Caucasians and African Americans. Two main aspects were examined including differences in perceptions of

the pictorial scale and differences in ideal body size. The two populations that were compared were the participants in the HBFP, a predominately African American population and the participants in the Harris study (2008), a predominately Caucasian population. Differences between the populations' perceptions of the pictorial scale were assessed using a 95% confidence interval for the means of the smallest and largest bodies perceived in each weight category (healthy, underweight, normal, overweight, and obese) by the HBFP and comparing to the means published by the Harris study. Across all weight categories, participants in the HBFP perceived larger bodies as obese as compared to the Harris participants. This could suggest that the African American community may have a different view of obesity than the Caucasian population. This did not support the hypothesis that participants in this study would choose larger images from the pictorial scale to represent health weights. It has also been suggested in the literature that the African American community prefers a larger body size than other ethnicities [Allan et al., 1993; Anderson et al., 1997; Lieberman et al., 2003]. This was supported by the choice of ideal body size of female participants in this study. While both bodies were within the normal weight category, female participants in the HBFP chose a larger body than Harris participants. This supported the hypothesis that participants in this study would choose larger bodies as ideal than the Harris participants. However, no differences were observed between male participants.

Lastly, Aim 4 assessed the association between disease risk and body image perception. Increasing risk for chronic health conditions including cardiovascular disease, diabetes, and hypertension have been associated with obesity. The disease risk perceptions were compared to perceived and measured BMI's of the participants. Consistent results were not seen when disease risks were compared to perceived BMI's, indicating that disease risk and body image

perception are not associated in this population. This did not support the hypothesis that participants with a larger body image perception would choose higher risks.

Together, this study has several public health implications. It shows that better education of body image perception is needed and the use of representation of weight categories in words and pictures is important. This analysis also shows that body image perception differs between weight categories as well as ethnicities, suggesting that weight management and disease prevention programs should be tailored differently for participants of different weight categories and ethnicities. In addition, by including components of body image perception in such programs may allow individuals to accurately assess risk for common chronic health conditions and seek appropriate preventative care.

Additionally, this study has relevance to both the fields of Genetics and Genetic Counseling. The results of this study suggest that differences in perceptions exist between ethnicities and therefore it is important to address these differences in counseling sessions as well as research studies. In addition, this study touches on the perceptions of risk for chronic conditions such as cardiovascular disease, diabetes, and hypertension and their relationship to obesity. Many research studies are underway which are trying to elucidate the many genetic and environmental factors influencing the predisposition to these complex diseases. As this research continues, this will allow individuals to more accurately assess disease risk and seek preventative care.

APPENDIX A

IRB APPROVAL LETTER

University of Pittsburgh
Institutional Review Board

3500 Fifth Avenue
Ground Level
Pittsburgh, PA 15213
(412) 383-1480
(412) 383-1508 (fax)

MEMORANDUM

TO: Stephen B. Thomas, PhD

FROM: Sue R. Beers, PhD, Vice Chair

DATE: June 5, 2008

SUBJECT: IRB #0403125: The Healthy Black Family Project: Assessing the Response of African Americans to Family Health Histories

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The Institutional Review Board reviewed the recent modifications to your protocol and consent form(s) and find them acceptable for expedited review. These changes, noted in your submission of May 16, 2008, are approved.

Please include the following information in the upper right-hand corner of all pages of the consent form(s), if modifications were made to the consent form(s):

Current Approval Date: February 21, 2008
Modification Approval Date: June 5, 2008
Renewal Date: February 20, 2009
University of Pittsburgh
Institutional Review Board
IRB #0403125

The protocol and consent forms, along with a brief progress report must be resubmitted at least **one month prior** to the renewal date noted above as required by FWA00006790 (University of Pittsburgh), FWA00006735 (University of Pittsburgh Medical Center), FWA00000600 (Children's Hospital of Pittsburgh), FWA00003567 (Magee-Womens Health Corporation), FWA00003338 (University of Pittsburgh Medical Center Cancer Institute).

If this research study is subject to FDA regulation, please forward to the IRB all correspondence from the FDA regarding the conduct of this study.

Please be advised that your research study may be audited periodically by the University of Pittsburgh Research Conduct and Compliance Office.

SRB:dj

APPENDIX B

BODY SIZE GUIDES PERMISSION LETTER

Body Size Guides©

User Agreement

USER'S NAME:	DATE OF REQUEST
Stephen B. Thomas	April 9, 2008
TITLE:	**INSTITUTION OR COMPANY**
Philip Hallen Professor of Community Health & Social Justice and Director, Center for Minority Health	Center for Minority Health Graduate School of Public Health University of Pittsburgh
ADDRESS:	**EMAIL, PHONE, FAX**
Street or PO: 130 DeSoto Street	Email: sbthomas@cmh.pitt.edu
Center for Minority Health	
Graduate School of Public Health, University of Pittsburgh	Phone: 412-624-5665
City, State, Zip Pittsburgh, PA 15261	
Country: USA	Fax:

CONTEXT OF USE:

A. Individual Clinical Practice: ☐ Duration of use: _____12_____ Months or Years

Requested number of copies: 200

Pupose:

B. Research Study: X☐ Funded: ☐ Unfunded: x☐ Clinical Trial: ☐

Title of Study: **The Healthy Black Family Project: A Community Based Intervention to Eliminate Health Disparities**

Description of Subject Population: African American residents in Greater Pittsburgh

Number of expected subjects (total): 200 -500	Age range of subjects: 18 – 80 (mean= 51)
Number of administrations of BSG per subject: two	Time between administrations: one year
Planned study dates: April 12, 08_ to _May 2009	**Please attach brief abstract describing study**

USER AGREEMENT – page 2

REQUESTED SCALES:	
Women's BSG: X☐	Men's BSG: X☐

This agreement is between Carole V. Harris, PhD and Andrew S. Bradlyn, PhD (Authors and Developers)

And **Stephen B. Thomas, Ph.D., Dir. Center for Minority Health** ("user(s)").

Drs. Harris and Bradlyn shall deliver the original **Body Size Guide(s)©** requested by "User" subject to the following conditions:

- The present contract is duly completed and signed by "User", and
- User fees have been received.

The use of the Body Size Guides© in the afore mentioned context is subject to the following conditions:

1.This user agreement is for the use of the Body Size Guides© and related treaty, convention and common law rights pertaining thereto, with all rights reserved to Drs. Carole V. Harris and Andrew S. Bradlyn, authors and developers of the Body Size Guides©.

2. Fee: the use of the Body Size Guides© for approved, unfunded academic research purposes is free. The use of the Body Size Guides© for any funded academic research, large non commercial organization research and evaluation (e.g., States, Nations, Hospitals, Healthcare Systems) or commercial purpose and large non commercial organization unlimited research/evaluation/clinical use is subject to a royalty fee payable to the authors.

3. "User" shall not modify, abridge, condense, translate, adapt, recast or transform the questionnaires in any manner or form, including but not limited to any minor or significant change in wordings or organization in the Body Size Guides© questionnaires, **without the prior written agreement of the authors (Drs. Carole V. Harris and Andrew S. Bradlyn)**. If permission is granted, any improvements, modifications, or enhancements to the Body Size Guides© which may be conceived or developed, including translations and modules, shall become the property of Drs. Harris and Bradlyn.

4. "User" shall not reproduce the Body Size Guides© questionnaires except for the limited purpose of generating sufficient copies for use in the above mentioned clinical investigations and shall in no event distribute copies of the Body Size Guides© questionnaires **OR the BMI values associated with the figures in the questionnaires** to third parties by publication, sale, rental, lease, lending, or any others means.

5. In case of publication, "User" shall cite the following Body Size Guides® publication(s) in the reference section of the publication. It is requested that a copy of all published and presented papers and abstracts using the Body Size Guides® be provided to Drs. Carole V. Harris and Andrew S. Bradlyn.

> Harris, C.V., Bradlyn, A.S., Coffman, J., Gunel., E., & Cottrell, L. (2008). BMI-based Body Size Guides for Women and Men: Development and Validation of a Novel Pictorial Method to Assess Weight-related Concepts. International Journal of Obesity, 32, 336-342.

6. All data, results and reports obtained by, or prepared in connection with, the authorized use of the Body Size Guides™ shall remain the "User's" property. However, in consideration for use of the Body Size Guides®, the "user" agrees to provide a copy of the de-identified raw data containing subject variables (e.g., age, gender, race, height, weight) and Body Size Guides® scores to Drs. Harris and Bradlyn for use in further exploration of the questionnaires' properties.

7. Confidentiality: All and any information related to the Body Size Guides® including but not limited to the following: information concerning clinical investigations, creations, systems, materials, software, data and know-how, translations, improvements ideas, specifications, documents, records, notebooks, drawings, and any repositories or representation of such information, whether oral or in writing or software stored, are herein referred to as confidential information. In consideration of the disclosure of any such confidential information to the other, each party agrees to hold such confidential information in confidence and not divulge it, in whole or in part, to any third party except for the purpose specified in this agreement.

8. If, at any time during the term of this agreement, either party hereto learns of any infringement by a third party of any Intellectual Property Rights in connection with any of the Body Size Guides®, the party first learning of such infringement shall promptly notify the other.

9. This agreement holds for the above mentioned study only. The use of the Body Size Guides® in any additional study of the "User" will require a separate agreement.

10. This agreement shall be effective as the date signed and shall continue for the term described. Either party may terminate this Agreement immediately upon providing written notice to the other party in the event of the other party's unexcused failure to fulfil any of its material obligations under this. Upon termination, "User" shall cease all use of the services of the Body Size Guides®.

11. For funded academic research, as soon as this agreement is received, Drs. Harris and Bradlyn shall promptly provide "User" with a fee schedule. If "User" wishes to proceed with use, Drs. Harris and Bradlyn will execute agreement and provide a definitive invoice., "User" shall pay such invoice within thirty (30) days of the date of the invoice.

12. This agreement may not be altered, amended or modified except by written document signed by all parties.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed by their duly authorised representatives as of the date first above written.

AGREED

_____	April 9, 2008
Signed	Date
_____	_____
Signed	Date
_____	_____
Signed	Date
_____	_____
Signed	Date

APPENDIX C

HBFP PRE-SESSION QUESTIONNAIRE

An important aim of genetic counseling is to provide risk information so that individuals and families can make better informed decisions about their health and that of their families. The purpose of this survey is to explore your perceptions of risk for developing certain health conditions. We want to understand whether family health histories (i.e., sharing information about diseases in your family) can help provide you with a more accurate assessment of your risk for developing particular health conditions.

If there is a question that you do not feel comfortable answering, you can skip it and continue on.

Please answer the following questions to the best of your ability.

DO NOT PROVIDE ANY NAMES OF FAMILY MEMBERS.

The survey should take approximately 10 minutes.

We would like to thank you in advance for your willingness to participate in this survey.

Section 1: General Information

1) What is your age?

__ __ age in years

2) What is your gender?

1 - Male
2 - Female

3) Are you Hispanic or Latino?

1 - Yes
2 - No
3 - Don't know

3a) Which one or more of the following would you say is your race? **(Check all that apply)**

1 - White
2 - Black or African American
3 - Asian
4 - Native Hawaiian or Other Pacific Islander
5 - American Indian, Alaska Native
6 - Other [specify] _____

4) What was the total household income from all sources last year?

1 - Less than $10,000
2 - Between $10,000 and $20,000
3 - Between $20,001 and $35,000
4 - Between $35,001 and $50,000
5 - Between $50,001 and $75,000
6 - Greater than $75,000

5) What is the highest grade or year of school you completed?

1 - Grades 8 or less (Elementary)
2 - Grades 9 through 11 (Some high school)
3 - Grade 12 or GED (High school graduate)
4 - College 1 year to 3 years (Some college or technical school)
5 - College 4 years or more (College graduate or post-graduate)
6 - Graduate level (Masters or PhD)

6) How would you rate your knowledge on genetics?

1 - Excellent
2 - Very good
3 - Good
4 - Fair
5 - Poor

7) How would you describe your general health?

1 - Excellent
2 - Very good
3 - Good
4 - Fair
5 - Poor

8) Do you smoke?

1 - Yes
2 – No

9a) How would you describe your weight?

1 - Underweight
2 - Healthy weight
3 - Overweight
4 - Obese

9b)

1. For each of the questions below, please write the letter for only **ONE** body. Select the body that is the best choice.

   (a) Which body looks most like the adult women in your family? _____

   (b) Which body looks most like your women friends? _____

   (c) Which body looks most like the adult women in your community? _____

2. For each of the questions below, please circle the letters for **ALL** bodies that fit the description.

   (a) Which bodies look healthy? A B C D E F G H I J none

   (b) Which bodies look underweight? A B C D E F G H I J none

   (c) Which bodies look normal weight? A B C D E F G H I J none

   (d) Which bodies look overweight? A B C D E F G H I J none

   (e) Which bodies look obese? A B C D E F G H I J none

3. **For women only** – men should not complete this section:

   (a) Which body looks most like yours? _____

   (b) Which body would you most like to have? _____

9c)

1. For each of the questions below, please write the letter for only **ONE** body. Select the body that is the best choice.

   (a) Which body looks most like the adult men in your family? _____

   (b) Which body looks most like your male friends? _____

   (c) Which body looks most like the adult men in your community? _____

2. For each of the questions below, please circle the letters for **ALL** bodies that fit the description.

   (a) Which bodies look healthy? A B C D E F G H I J none

   (b) Which bodies look underweight? A B C D E F G H I J none

   (c) Which bodies look normal weight? A B C D E F G H I J none

   (d) Which bodies look overweight? A B C D E F G H I J none

   (e) Which bodies look obese? A B C D E F G H I J none

3. **For men only** – women should not complete this section:

   (a) Which body looks most like yours? _____

   (b) Which body would you most like to have? _____

10) Do you have one person you think of as your personal doctor or health care provider?

1 - Yes, only one
2 - Yes, more than one
3 - No
4 - Don't know / Not sure

11) Was there a time in the past 12 months when you needed to see a doctor but could not because of the cost?

1 - Yes
2 - No
3 - Don't know / Not sure

12) Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?

1 - Yes
2 - No
3 - Don't know / Not sure

Section 2: Physical Activity Habits

Definition of Physical Activity: The national recommendation for physical activity is engaging in moderate physical activity (walking briskly, mowing the lawn, dancing, bicycling) for 30 minutes a day 5 or more days a week OR engaging in vigorous physical activity (jogging, high-impact aerobics, swimming) for 20-30 minutes a day 3 or more days a week.

11) Based on this definition, are you physically active?

1 - Yes, I have been for more than 6 months
2 - Yes, I have been for less than 6 months
3 - No, but I am planning on starting in the next 30 days
4 - No, but I am thinking about starting in the next 6 months
5 - No, and I don't plan to start in the next 6 months

12) If you answered **NO** to question 11, do you get some physical activity but not enough to fit the definition?

1 - Yes
2 - No

Section 3: Risk Perception

13) In your opinion, how often do you believe each of the following factors increases (or contributes to) an individual's chance or risk for developing a disease?

(**Please respond for each item listed**)

1=Never
2= Sometimes
3=Always
4=Don't know / Not sure

Smoking	_____
Having a poor diet	_____
Lack of exercise	_____
Family history (other family members with a disease)	_____

14) What do you think the chances are of a **healthy woman the same age as you** to develop the following health conditions sometime in her life?

(**Please respond for each condition listed**)

1=Low (<10%)
2=Moderate (10-50%)
3=High (>50%)
4=Don't know / Not sure

Breast cancer	_____
Ovarian cancer	_____
Colon cancer	_____
Heart disease	_____
Lung cancer	_____
Diabetes	_____
Alzheimer's disease	_____
High Blood Pressure	_____

15) What do you think the chances are of a **healthy man the same age as you** to develop the following health conditions sometime in his life? (**Please respond for each condition listed**)

(**Please respond for each condition listed**)

1=Low (<10%)
2=Moderate (10-50%)
3=High (>50%)
4=Don't know / Not sure

Breast cancer	_____
Colon cancer	_____
Prostate cancer	_____
Heart disease	_____
Lung cancer	_____
Diabetes	_____
Alzheimer's disease	_____
High Blood Pressure	_____

16) Have you ever been concerned about your chances for developing any of these health conditions?

1 - Yes
2 - No

16a) If yes, which condition(s)? _____

17) On a scale from 1 (not concerned) – 5 (extremely concerned), how would you rate your concern about developing any of the above health condition(s)? _____

18) Do you have a blood relative (mother, father, sister, brother, uncle, aunt, grandmother, grandfather) who had or has a health condition that you are concerned about developing sometime in your life?

1 - Yes
2 - No
3 - Don't know / Not sure

18a) If **YES**, who had the condition and what was it?

***DO NOT INCLUDE NAMES OF FAMILY MEMBERS, ONLY THE RELATIONSHIP TO YOU**

_____
_____
_____
_____

19) Have you ever talked to a health provider about your concern for developing that particular health condition?

1 - Yes
2 - No
3 - Don't know / Not sure

19a) If yes, which condition (s)? _____

20) At this time, what do you think your chances are of developing any of the following health conditions sometime in your life? (**Please respond for each condition listed**)

1=Low (<10%)
2=Moderate (10-50%)
3=High (>50%)
4=Don't know / Not sure
5=I already have the condition

Breast cancer	_____
Ovarian cancer (Females Only)	_____
Colon cancer	_____
Prostate cancer (Males Only)	_____
Heart disease	_____
Lung cancer	_____
Diabetes	_____
Alzheimer's disease	_____
High Blood Pressure	_____

21) At this time, what do you think your chances are of developing any of the following health conditions someday, compared with most individuals your age?

(**Please respond for each condition listed**)

ML=Much lower
SL=Somewhat lower
S=Same
SH=Somewhat higher
MH=Much higher
DK=Don't know / Not sure
AH=I already have the condition

Breast cancer	_____
Ovarian cancer (Females Only)	_____
Colon cancer	_____
Prostate cancer (Males Only)	_____
Heart disease	_____
Lung cancer	_____
Diabetes	_____
Alzheimer's disease	_____
High Blood Pressure	_____

Section 4: Multidimensional Health Locus of Control

Questions 22- 39:
Each item below is a belief statement about your medical condition with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree(1) to strongly agree(6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with that statement. The more you agree with a statement, the higher the number you circle. The more you disagree with a statement, the lower will be the number you circle. Please make sure that you answer **EVERY ITEM** and that you circle **ONLY ONE** number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1= STRONGLY DISAGREE **(SD)**	4= SLIGHTLY AGREE **(A)**
2= MODERATELY DISAGREE **(MD)**	5= MODERATELY AGREE **(MD)**
3= SLIGHTLY DISAGREE **(D)**	6= STRONGLY AGREE **(SA)**

		SD	MD	D	A	MA	SA
22	If I get sick, it is my own behavior which determines how soon I get well again.	1	2	3	4	5	6
23	No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
24	Having regular contact with my physician is the best way for me to avoid illness.	1	2	3	4	5	6
25	Most things that affect my health happen to me by accident.	1	2	3	4	5	6
26	Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6
27	I am in control of my health.	1	2	3	4	5	6
28	My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6
29	When I get sick, I am to blame.	1	2	3	4	5	6
30	Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
31	Health professionals control my health.	1	2	3	4	5	6
32	My good health is largely a matter of good fortune.	1	2	3	4	5	6
33	The main thing which affects my health is what I myself do.	1	2	3	4	5	6
34	If I take care of myself, I can avoid illness.	1	2	3	4	5	6
35	Whenever I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	1	2	3	4	5	6
36	No matter what I do, I 'm likely to get sick.	1	2	3	4	5	6
37	If it's meant to be, I will stay healthy.	1	2	3	4	5	6
38	If I take the right actions, I can stay healthy.	1	2	3	4	5	6
39	Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6

Thank you for taking the time to answer these few questions.
Your participation is greatly appreciated.

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