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Cultural Variables Underlying Obesity in Latino Men: Design, Rationale and Participant Characteristics from the *Latino Men's Health Initiative*

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Abstract

Overweight and obesity are associated with significant health problems and rates of obesity are high among Latino men. This paper describes the design, rationale and participant characteristics of the key demographic variables assessed in an NIH-funded study (R21-CA143636) addressing culture and several obesity-related variables (diet, physical activity, and body image) among Mexican and Puerto Rican men using a community-based participatory research framework. Participants completed objective measures (height, weight, body fat, hip, waist), a health and culture interview, a diet questionnaire, and used an accelerometer to measure their level of physical activity. A total of 203 participants completed the measures and the health and culture interview and 193 completed all study components. Puerto Ricans were older than Mexicans ($p < .0001$) and there were significant differences in marital status ($p < .05$), country of birth ($p < .05$), smoking ($p < .05$) and work status ($p < .001$). There were no significant differences in religion, education, health insurance, Body Mass Index (BMI), body fat, hip and waist measurements, and the language preference of the interview. Results have implications for the development of a future

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intervention that incorporates the role of cultural factors into a community participatory obesity intervention for Latino men.

Keywords

Latinos; Culture; Obesity; Community Based Participatory Research

Overweight and obesity are significant and common public health issues in the United States [1]. Obesity is a risk factor for a number of negative health outcomes including diabetes, cardiovascular diseases, and many different forms of cancer [2]. In addition to being widespread and associated with high mortality, overweight and obesity disproportionately affects ethnic minorities. For example, according to the *Hispanic Community Health Study/Study of Latinos*, the prevalence of obesity among Latino men and women is 36.5% and 42.6%, respectively [3]. Among Latinos, the prevalence of obesity varies by Hispanic/Latino ethnic group and sex [3]. For example, among Latino men, the prevalence of obesity ranges from 40.9% among Puerto Rican men to 26.8% among South American men [3]. Moreover, Mexicans- the largest Hispanic/Latino ethnic group in the nation- [4] also have high rates of obesity, as noted by a prevalence rate of 36.8% in men [3]. Due to the high prevalence and negative outcomes associated with obesity, studies that examine correlates of obesity in subgroups of Latinos are needed, particularly among Puerto Rican and Mexican men due to their high rates of obesity and the fact that these are the two largest Latino ethnic groups in the U.S. [4].

Obesity is often an outcome of complex interactions between individual and environmental factors [5]. A variety of correlates have been explored and are associated with overweight and obesity. Diet, physical activity, and body image are three of the many correlates that have been examined in relation to overweight and obesity. Overall, Latino men are noted to have a low intake of fruits and vegetables [6] and Latino men and women engage in less leisure time physical activity than non-Hispanic Whites [7]. Moreover, in one study, across every income category, the prevalence of leisure time inactivity was lower among Caucasian men and women than among Mexican Americans and African Americans [8]. Finally, a review article found that overall, the body image of Latino men did not differ from Whites [9]. However, this review also found that Hispanic men engage in normative and more extreme weight loss strategies to a greater extent than Whites [9]. Overall, it is important to examine body image in Mexican and Puerto Rican men so that culturally appropriate obesity interventions can be developed which take into account cultural attitudes about body image perceptions and preferences.

Although ethnic differences in correlates of obesity such as diet, physical activity, and body image have been examined, little research has been conducted to understand the factors that underlie these differences. Moreover, the notion of replacing the word 'race' as an explanatory construct in research with conceptual variables such as ethnic identity has also been emphasized [10]. Due to the importance of going beyond ethnic and racial categories, the current study sought to explore the deeper aspects of ethnicity and race by examining four potentially important cultural factors (acculturation, acculturative stress, biculturalism,

and cultural values) that may be related to diet, physical activity and body image in Latinos. As seen in the following sections, these cultural factors have been largely ignored among Mexican and Puerto Rican men.

Acculturation can be defined in many ways, but in general, it refers to the changes in behaviors and/or attitudes that occur in individuals from one culture due to their contact with a different culture [11]. Numerous studies have found an association between acculturation and obesity [12]. Finally, the relationship between biculturalism and diet, physical activity, and body image is also unknown. It is plausible that bicultural Latinos may exhibit a greater adaptability to diets emphasized in the United States, compared to those who are not bicultural.

Acculturative stress describes the stress that individuals experience as they undergo the process of cultural change associated with acculturation. Acculturative stress may play an important role in health behaviors and biological processes that may contribute to the development of obesity [13]. However, to date, little research has examined how cultural conflict or stress may affect correlates of obesity.

Ethnic identity is a multidimensional construct that is a component of one's self-concept and reflects one's identity or sense of self as a member of an ethnic group [14]. Ethnic pride has been noted to be a protective factor for certain health behaviors in ethnic minorities [15]. Overall, there is a dearth of research that examines the role of ethnic identity as it relates to correlates of obesity in Latino men.

Cultural Values

It has been argued that Latino cultural values and worldviews may represent the latent variable of acculturation, and therefore, should be measured [16]. Commonly cited Latino cultural values include: *familism* (family), *personalismo* (personal relationships), *fatalism* (fatalistic beliefs), folk illness beliefs, spirituality, and *machismo* (an exaggerated sense of masculinity) [17].

Due to the dearth of research examining cultural factors underlying disparities in correlates of obesity, we conducted an NIH-funded study called the *Latino Men's Health Initiative* (Iniciativa de Salud para Hombres Latinos) (R21-CA143636). The Latino Men's Health Initiative sought to explore the role of four cultural variables (acculturation, acculturative stress, ethnic identity, and cultural values) that may help to explain the disparities in correlates of overweight/obesity (diet, physical activity, and body image) among Mexican and Puerto Rican men. This study also examined whether Mexican and Puerto Rican men differ in the logistical, practical, and cultural considerations regarding diet, physical activity, and body image interventions. Additional exploratory aims will examine the relationships between age, income/SES, weight, nativity, years in the U.S., stage of change, social support, language, and ethnicity, and the role of diet, physical activity, and body image. Qualitative data from a subset of Latinos will help to identify cultural messages to use in a future obesity intervention.

The conceptual framework guiding this study derived from the PEN-3 Theoretical Model [18] and models of conducting culturally sensitive research [19; 20]. According to James [21], the PEN-3 model emphasizes culture as the center of health promotion programs [21] and this model has been used in previous studies to aid in the development of culture-centered interventions [21; 22]. Models of conducting culturally sensitive research emphasize the role of culture throughout the research process.

This study was also conducted within a community-based participatory research (CBPR) framework, which emphasizes the collaborative role of community partners throughout various phases of the research study and in the dissemination of the results [23]. By utilizing a CBPR framework, this allowed us to integrate the expertise and input of community partners who worked with Latinos on a daily basis and whom were willing to share their knowledge, skills and experience in working with Latinos who were overweight/obese. For purposes of this research, “community” was defined as those who were physically located in Latino communities and community partners were selected based on their interest or expertise in various areas of health and wellness in Mexican and/or Puerto Rican communities. Certain community partners were also selected based on their expertise in developing bilingual health materials and physical activity and wellness programs.

The first aim of this paper is to describe the overall study design and rationale of the *Latino Men’s Health Initiative* (R21-CA143636). The second aim is to describe the participant characteristics of some of the key demographic variables assessed in the *Latino Men’s Health Initiative*. The test of the study hypotheses and a detailed description of the diet, physical activity, body image and cultural variables will be described in future publications.

Methods

The sample included 203 Latino men (99 Mexicans and 104 Puerto Ricans). The plan was to recruit approximately 60 subjects in each of three weight categories: normal weight (BMI 18.5), overweight (BMI 25), and obese (BMI 30), with equal numbers of Mexicans and Puerto Ricans within each weight category.

Inclusion and exclusion criteria were as follows: *Inclusion:* a) Mexican and Puerto Rican men. They could be biracial, but they had to identify as Mexican or Puerto Rican. b) Adult men between the ages of 18 and 65 because of their high rates of overweight. c) Those who agreed to provide informed consent. *Exclusion:* a) Those with a lower BMI limit: <18.5 kg/m², because this study included only those who were normal weight or overweight, and not those who were underweight or Anorexic. No Upper BMI limit. b) Those who were not able to speak/read English or Spanish. c) Those with an eating disorder (Bulimia Nervosa, Anorexia Nervosa, Binge Eating Disorder). d) Plans to move from the Illinois area during the course of the study (i.e. 6 weeks).

Recruitment Strategies

Direct (in-person) and indirect recruitment was simultaneously conducted. In terms of direct recruitment, potential participants were recruited using “intercept sampling” [24] where face-to-face recruitment was conducted at various locations with a high population of

Mexicans and/or Puerto Ricans. Study staff set up a table with flyers and publicized a free culture and health research study for Latino males. Direct recruitment was conducted at Hispanic/Latino organizations, churches, festivals and health fairs. Flyers were also given to community members, physicians, health care professionals, and other interested individuals, as well as posted in Latino neighborhoods, at various places within the University of Illinois at Chicago, and in the overall Chicagoland area. Indirect recruitment was conducted via newspaper advertisements placed in a Latino publication (*La Voz del Paseo Boricua*) as well as in the newsletters of various organizations (e.g., the Chicago Hispanic Health Coalition) and at the University of Illinois at Chicago. Recruitment was also conducted via postings to email listserves and websites from Latino organizations, health organizations, and other organizations in general. Finally, letters and flyers were given to doctors and other organizations focused on Latino and/or health issues. Snowball recruitment occurred as information about the study was disseminated through flyers or word of mouth.

Study Procedures

All study procedures occurred at various community locations in the Humboldt Park and Pilsen neighborhoods of Chicago, as well at the University of IllinoisChicago, and/or another location that was mutually convenient. Research assistants obtained oral consent to determine an individual's initial eligibility prior to conducting the 30-minute initial eligibility interview on the telephone or in-person. Potential participants who were not eligible for this study were given information about other health programs by mail, email, phone, or inperson. All participants who completed the eligibility interview in person received a healthy snack. For those who met the initial eligibility criteria, eligibility was confirmed by measuring their weight and height in person. During that in-person visit, the consent form was read to potential participants whom were asked to read and sign it before any measurements were taken. After informed consent was documented, then height and weight were measured to determine participants' eligibility. If subjects were not eligible and if eligibility was performed in-person, then they were given a small token of appreciation.

Participants who were eligible for the study completed the following procedures: First, they completed a two and a half hour health and culture interview and their body fat, hip and waist were measured. Participants received \$50 in cash for completing the health and culture interview. They also received small healthy snacks and water during the interview. Next, participants completed a 1-hour diet questionnaire (either in person or on the same day as the health and culture interview, or completed it on their own) and received \$10. Finally, participants used an accelerometer for seven days, recorded the results, and received \$15 when the results were returned. We planned to conduct in-depth qualitative interviews on 20% of the sample (equal numbers of Mexicans and Puerto Ricans), and restricted the interviews to overweight and obese participants, since a future intervention focused on those most at risk for health problems due to being overweight. We aimed to randomly select six participants from each BMI (overweight/ obese) — ethnicity (Mexican/ Puerto Rican) stratum. They received \$40 for participating in this interview.

Community Partners and Hispanic/Latino Health Community Advisory Board (HLH-CAB)

The PI of the study (the first author) actively collaborated with community partners who served as members of the Hispanic/Latino Health Community Advisory Board (HLH-CAB). Academic and community partners worked together to tailor the methodology, consent form, questionnaires, interview documents, and objective measures prior to the recruitment of participants. Community partners also helped to refine the recruitment plan and incentives, as well as provided feedback about the Spanish translation of documents [25]. The majority of community partners also provided a physical location to conduct the interviews and assessments and/or helped to disseminate flyers about the study. Finally, select HLH-CAB members reviewed the study findings presented in this paper, assisted with writing this manuscript, and helped to develop a dissemination plan.

History of Partnership

For the past 23 years, the first author has engaged in various types of community-based research with Latinos, with the last 13 years focused on community engaged research. During the initial partnering of three prior NIH-funded grants focused on Latinos (K01-CA098753, R21-CA131433, R21-CA143636), the first author held bi-weekly meetings with HLH-CAB members to make decisions about the design, development, and implementation of the project prior to and during recruitment. This study also paralleled one of the first authors' prior grants with Latina women (R21-CA131433) and as such, relevant decisions regarding that study also applied to this current study. For example, the translation of the consent form- although initially developed for women- was adjusted for men in this study and incentives differed for men versus women.

Several community partners for the current study were also previous members of the HLH-CAB for the first authors' prior studies. Certain community partners for the current study also served as co-authors on numerous conference presentations with the first author across various projects. The first author has also written a paper with select CAB members from one of the partner sites [25] and a number of community partners have also collaborated with the PI to write two NIH grants and a proposal development grant. Finally, the first author has participated in numerous community-based initiatives focused on health and wellness, which allowed her to interact with community partners in different capacities. For example, the first author was part of several past initiatives at the Puerto Rican Cultural Center (PRCC) such as the *Community Organizing for Obesity Prevention* program which allowed her to interact with individuals from the PRCC. Taken together, the study team had the skills, knowledge and expertise in Latino recruitment, retention and engagement, which was critical to the success of this study.

Training

In terms of research training, we adhered to the *Guidelines on Multicultural Education, Training, Research, Practice, and Organizational Change for Psychologists* [19] that emphasize the awareness, knowledge, and skills needed to conduct culturally competent research. This training was conducted with project staff and included an overview of culturally competent research and a discussion of methods for increasing multicultural

awareness, knowledge, and skills. Certification to conduct the interviews and anthropometric measures was conducted by the PI and senior staff members.

Measures

Measures were translated and adapted as recommended by several guidelines [26–28]. Measures were translated from English into Spanish through a back translation procedure [26; 27] using a professional translation company that the first author has used in numerous prior studies. Committee and pre-test translation procedures were used, and differences in wording based on Latino ethnicity were assessed. All translations were reviewed by the first author's bilingual research assistants and select members of the HLH-CAB (for further information, see [25]).

Eligibility Interview—In-person or phone interviews assessed initial eligibility for the current study. Participants were also asked to self-report their weight and height so initial eligibility could be determined and this was later confirmed through objective measures. The Eating Disorder Examination Questionnaire (EDE-Q) [29; 30] was used to exclude those with an eating disorder and was modified to be administered by the interviewer.

Anthropometric Measures—Level of obesity was assessed using objectively measured weight and height to compute BMI (weight [kg]/height [m]²) [31]. Height was assessed using a stadiometer. Weight was assessed using a Seca company digital scale with participants wearing light clothes and no shoes. Weight was classified as follows: Normal Weight: BMI= 18.5–24.99; Overweight: BMI= 25–29.99; Obese Class I: BMI=30–34.99; Obese Class II: BMI= 35–39.99), and Obese Class III: BMI= >40 or more) [32]. Body fat percentage was measured via Bioelectrical Impedance Analysis, using a Tanita BF 682 scale [33]. Fat distribution was measured by waist and hip circumference, and waist-to-hip ratio was calculated.

Health and Culture Interview—A demographic questionnaire was used to gather data on ethnicity, race, marital status, number of children, education, occupation and work status, date of birth, nativity, parents' race and ethnicity, preferred language, literacy questions, length of U.S. residence, health insurance, income, religion, spirituality, and contact information for tracking purposes. Socio-economic status was assessed with the Hollingshead Four Factor Index of Social Status [34] which combines information on sex, marital status, education, and occupation. Social Desirability was measured by the Marlowe-Crowne 2 (10) Social Desirability Scale [35] and social desirability measures have been used in prior studies to assess for possible biases in responses [36]. It will be used for descriptive purposes. Questionnaires measuring stages of change for fruit and vegetable intake [37–39], fat intake [40; 41], exercise [42; 43] and weight [44] were also administered and were based on the Transtheoretical Model (TTM) [45; 46]. These questionnaires will be used for descriptive purposes to characterize individuals into various stages of change with respect to their dietary intake, weight, and physical activity based on the TTM model.

Social Support was measured by the Multidimensional Scale of Perceived Social Support [47], which assesses social support related to family, friends, and significant others. Social

support specific to diet and exercise was measured by the Social Support and Exercise Survey and the Social Support and Eating Habits Survey, respectively [48].

Acculturation was assessed by the bi-directional Acculturation Rating Scale for Mexican Americans-II (ARMSA-II) [49]. Acculturation was assessed through a multidimensional approach by measuring cultural orientation toward the Mexican culture and the Anglo culture independently. For purposes of this research, “Mexican” was replaced with the word “Latino” so that both Mexican and Puerto Rican participants could respond appropriately to this scale. The Anglo orientation scale (AOS) and Latino Orientation Scale (LOS), as well as the overall score (AOS mean minus LOS mean) was computed. Biculturalism was assessed by the ARMSA-II and bicultural identity integration was assessed by the Bicultural Identity Integration (BII) Scale-Version 1 [50; 51]. The BII measures perceptions of cultural distance (vs. overlap) and cultural conflict (vs. harmony) between two cultural orientations.

Acculturative Stress was assessed by the Multidimensional Acculturative Stress Inventory, which measures stress associated with the acculturation process [52]. This questionnaire has four factors: Spanish Competency Pressures, English Competency Pressures, Pressure to Acculturate, and Pressure Against Acculturation. The overall score and score from each of the four factors were used.

Ethnic Identity was assessed by the original Multigroup Ethnic Identity Measure [53]. Results from a factor analyses [54] revealed that this measure can be thought of as comprising two factors: Ethnic identity search (a developmental and cognitive component) and Affirmation, belonging, and commitment (an affective component). The original MEIM also included a scale called the “Other-group orientation scale” [53]. This scale was also administered, but it will be analyzed as a separate construct.

Cultural Values were assessed by the Multiphasic Assessment of Cultural Constructs [55], which measures familism, fatalism, personalism, machismo, and folk illness beliefs. High scores indicate greater adherence to Latino cultural values.

Body image was measured in several ways. Participants were presented with two sets of body image silhouettes/drawings (Card A and Card B) and asked the same series of questions pertaining to Card A and B, respectively. The Figure Rating Scale is a visual scale that displayed nine schematic figures of men ranging from underweight to overweight [56]. This scale was presented on Card A and was used to assess current and ideal body image. This scale has been used in numerous studies with Latinos and other ethnic groups [57; 58]. A body image discrepancy score was calculated by subtracting ideal body image minus current body image. Card B silhouettes were developed for a prior research study on African Americans [59] and used as an initial step as part of the first author’s plan to develop Latino-centered body image silhouettes/ drawings. Both cards were shown to men to assess differences in their preference of the images on Card A versus Card B, as well as to assess which drawings they thought looked most like their ethnic group and other questions pertaining to body image. Body image was also assessed with the Body Areas Satisfaction Subscale of the Multidimensional Body-Self Relations Questionnaire [60]. The MBSRQ measures body image, defined as personal attitudes toward one’s physical self, which

includes evaluative, cognitive, and behavioral components. Higher scores indicated greater body satisfaction.

Weight loss patterns and attempts, as well as participants' personal descriptions of their own weight and how they thought others would describe their weight were also assessed. These questions were used for descriptive purposes.

Physical activity was assessed by asking participants whether they engaged in any regular activity designed to improve or maintain their physical fitness, either on their own or in a class. Participants were also asked to report the frequency and duration of an activity designed to improve their physical fitness during the last week, as well as they were asked to report the average number of hours per day that they watched television. Exercise intensity was assessed by the Borg Exercise Intensity scale [61]. In addition, the interviewer-administered long form of the International Physical Activity Questionnaire [62] measured leisure time and non-leisure time physical activity. Finally, participants were asked to use a piezo-electric accelerometer (New Lifestyles NL-2000) for seven consecutive days using an accelerometer provided to them.

The Block 2005 Food Frequency Questionnaire (Berkeley, CA; nutritionquest.com) [63] was used to assess usual intake of nutrients and food groups. Group differences in calories, fat, fiber, fruit, and vegetable intake will be explored in a future paper. Prior versions have established its validity with Latinos [64].

Logistical/Practical/Cultural Considerations Related to Development of an Intervention. Specific components of a future culture-based intervention was assessed through structured and open-ended qualitative questions that assessed logistical (e.g., location and frequency of meetings), practical (e.g., preferences regarding types of physical activity, music, incentives) and cultural questions (e.g., cultural considerations and cultural messages) as it pertains to the development of a future intervention. Feasibility of recruitment for participants in the *Latino Men's Health Initiative* will be assessed in the future by examining the number of contacts, response rate, and recruitment methods.

Qualitative Interview—An in-depth qualitative interview was conducted on a subset of the overweight and obese participants. The interview was adapted from James [21] and assessed cultural aspects and barriers to healthy eating/diet, physical activity, and body image, so that Latino-specific intervention messages can be developed in the future. The qualitative interviews were audiotaped and transcribed and will be analyzed in a future paper.

Data Analyses

Sample Size

The sample size calculations were based on the estimations and statistical testing of correlation coefficients between the acculturation and lifestyle variables. All computations used Fisher's z-transformation of the correlation coefficient [65], and were based on achieving 80% power when performing a two-sided test (unless noted otherwise) at the 0.05

level. The sample size estimates revealed that a sample size of 176 would be needed to detect a true correlation of 0.21, with 80% power. *Within* Mexican and Puerto Rican men ($n = 88$ each) we shall have 80% power to detect a true correlation of 0.30. Since multivariable models will also be fit to the data, we repeated our calculations using the *partial correlation* between acculturation and lifestyle variables, assuming that we are controlling for 10 covariates. For the combined sample ($n = 176$), we shall have 80% power to detect a partial correlation of 0.20 when the total R^2 contributed by the covariates is 0.05, and this decreases to 0.15 for a total R^2 of 0.5. Within each subsample ($n = 88$), we shall have 80% power to detect partial correlations from 0.28 to 0.21 for a total R^2 contributed by the covariates of 0.05 and 0.5, respectively. Thus, our sample size will permit us to detect and estimate the relationships of interest both within each ethnic subgroup and among the combined group.

We will also have reasonable power for comparisons *between* Mexican and Puerto Rican men. With a sample size of 88 in each group, we shall have 80% power to detect a difference between correlations of 0.30 vs. 0.63, or of 0.50 vs. 0.75. In terms of comparison of means between the two ethnic groups—for example, the overall or subscale scores on the Bicultural Identity Integration (BII) Scale—88 subjects per group will provide 80% power to detect a 0.42 standard deviation (SD) difference in the means. In the PI's small, mixed sample of 20 Latinos [66], the mean (SD) was 3.0 (1.4) and 2.9 (1.0) for BII conflict and cultural distance subscales, respectively (modified 6-point scale) [66]. Assuming a SD of 1.1 for the conflict subscale and 0.9 for the distance subscale in our ethnic cohorts, we will have 80% power to detect 0.46 and 0.38 mean differences between groups.

For data reported here, continuous variables were compared between ethnic groups using independent sample t-tests. Categorical variables were compared between groups using chi-square tests.

Results

The enrollment results and initial analyses of participant characteristics are described below. Data analysis to test the specific study hypotheses, as well as to describe the results from the other variables not reported here will be described in future papers. This study was approved by the Institutional Review Board at the University of Illinois at Chicago (IRB-2011-0187) and by the research review board at Alivio Medical Center.

Participant Study Enrollment

As seen in Figure 1, 435 participants contacted the study staff members, and 344 eventually completed the oral consent and initial eligibility interview. Of those 344, 133 participants did not continue with the written consent for various reasons (e.g., ineligible; eligible, but refused participation; or lost to follow-up). A total of 211 participants eventually completed the written consent, with 203 completing the “Health and Culture” interview, and 193 completing all study components (“Health and Culture” interview; diet questionnaire; accelerometer use). Finally, 26 participants completed the in-depth qualitative interview. Data reported in Tables 1–3 are from the 203 participants who completed the “Health and Culture” interview.

Ethnicity by Weight Categories

As seen in Table 1, of the 203 participants who completed the “Health and Culture” interview, there were no significant differences in weight categories between Mexican and Puerto Rican men. In addition, as seen in Table 2, there were also no significant differences in BMI and obesity class categories between Mexicans and Puerto Ricans.

Demographic and Background Characteristics

As seen in Table 3, Puerto Rican men were older than Mexicans and there were higher rates of smoking in Puerto Ricans versus Mexicans. There were significant differences in marital status, country of birth and work status. There were no significant ethnic differences in the highest grade that Mexican and Puerto Rican men completed, the percent of men who had health insurance, religion, and the language in which the interview was completed. Finally, there were no significant differences in BMI, body fat, hip and waist measurements.

Qualitative Interview

As seen in Table 4, a total of 26 participants completed the qualitative interview. We exceeded the target of six interviews per category for two of the categories (obese Mexicans and obese Puerto Ricans). Data are currently being prepared for the qualitative analyses that will be presented in a future paper.

Discussion

Rates of overweight or obesity among Mexicans and Puerto Rican adults in the U.S. are increasing at alarming rates. The *Latino Men’s Health Initiative* was an NIH-funded study that was designed to provide information about the complex role of cultural variables underlying obesity so that culture-based obesity programs for Mexican and Puerto Rican men can be developed. Results examining the demographic and background characteristics revealed that while there were many similarities between Mexicans and Puerto Ricans enrolled in this study, there were also significant differences.

Results revealed that there were no significant differences in weight status between Mexican and Puerto Rican men. However, rates of smoking differed between Mexican and Puerto Rican men. The overall rate of smoking was 46% among Puerto Rican men and 29% among Mexican men. These rates were higher than what was described in the *Hispanic Community Health Study/Study of Latinos*, which reported smoking rates of 34.7% among Puerto Rican men and 23.1% among Mexican men. [3]. The data from our study was from a regional sample of Latino men in Chicago and further analyses of differences in smoking across regions of the U.S. are needed. Regardless, results from the current study point to the need to develop smoking cessation interventions, in addition to weight loss interventions among both Puerto Rican and Mexican men.

While there was not a significant difference in insurance coverage, there was a trend of lower rates of health insurance coverage overall for Mexicans versus Puerto Ricans. This trend suggests that there is a need to explore methods of payment for weight loss programs,

as well as smoking cessation programs for Mexicans due to lower rates of health insurance coverage overall for Mexicans versus Puerto Ricans.

The *Latino Men's Health Initiative* was designed to help identify cultural considerations regarding the development of culturally proficient overweight/ obesity interventions. Identifying the relationships between correlates of obesity (diet, physical activity and body image) and acculturation, acculturative stress, ethnic identity and cultural values will aid in developing culturally appealing content for Mexican and Puerto Rican men. For example, data from the acculturation and ethnic identity variables may help in targeting a future intervention to certain subgroups of Latinos. Data may reveal a subgroup of Puerto Rican men, who may be highly acculturated, but still strongly identify as Puerto Rican. For these men, their diet and exercise preferences may be “traditionally Puerto Rican”, but they may have a body image that is more typical of mainstream America. Future interventions would be developed to target these particular Latino subgroups. Understanding the role of acculturation and health behaviors within Latino subgroups is also an important area of investigation, which will be a priority for future analyses. Data from this study will also provide us with a better understanding of how Latino worldviews and cultural values affect health behaviors so that cultural strengths and protective factors can be emphasized during an intervention. Results from this initial analyses revealed that Mexicans and Puerto Ricans differ in certain aspects of their background characteristics and future analyses will further explore these differences as a function of acculturation, acculturative stress, ethnic identity, cultural values, and weight levels, among other possible mediators, moderators and covariates. Future studies will also examine differences in logistical, practical and cultural considerations related to development of a healthy eating, physical activity and body image intervention within and across Latino ethnic groups.

There are three aspects of the community engaged approach used in this study that are unique. First, we believe that the community engagement strategies utilized in this study helped with the successful recruitment and retention of Latino men. Our community partners not only helped to refine the measures used in this study, but they also assisted with selecting the optimal recruitment strategies. Our future papers will further explore the recruitment and interview locations in order to determine the best practices for future enrollment of Latino men into overweight/ obesity research studies.

The second unique aspect of our community engaged approach is that health information was disseminated to the community during and after the study. Due to the high rates of overweight/ obesity in Latinos, culturally tailored and targeted brochures focused on overweight/obesity in Latinos and physical activity in Latinos were developed in English and Spanish and disseminated throughout various areas in the Chicagoland community. In addition, due to the high rates of smoking found in this study, the first author and her community partners developed two brochures focused on Puerto Ricans and smoking in English and Spanish. These brochures were disseminated as part of seminars on smoking in Latinos that the first author gave at various community locations and health centers. The seminars were also used as an opportunity to disseminate the current study findings throughout various locations in Chicago.

A final unique aspect of our community engaged approach is that this study paralleled the health topics that were already identified as priority areas for several community partners. For example, several of our community partners which whom we worked closely had already identified that obesity in Latinos was a high priority area. For example, the Puerto Rican Cultural Center's Diabetes Empowerment Center was already developing health programming for Latino men and this study fit nicely within the portfolio of projects focused on men. In addition, by partnering with this community-based organization, we were able to strengthen their programming in this area as well as apply for funding to analyze additional data through the Chicago Cancer Health Equity Collaborative (U54CA202995, U54CA202997 and U54CA203000). Various community partners are also continuing to collaborate with the first author on developing a grant application focused on overweight/obesity in Latino men, so this important relationship and partnership will continue.

Conclusions

Numerous prior studies have grouped all Latino ethnic groups together, despite the fact that there may be significant within- and between-group differences underlying ethnicity and race in variables such as acculturation level, biculturalism, ethnic identity, and cultural values. Results from the initial data analysis from the *Latino Men's Health Initiative* have revealed important differences between Mexican and Puerto Rican men that should be borne in mind when developing interventions. Future analyses is expected to aid in understanding the independent and interactive influences of cultural variables and correlates of overweight/obesity, and will identify cultural factors to consider when designing interventions for Mexican and Puerto Rican men. The results will lead to the development of an intervention that incorporates the role of acculturation, acculturative stress, ethnic identity, and cultural values into a community participatory intervention addressing diet, physical activity, and body image for Mexican and Puerto Rican men.

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Figure 1.
Study Enrollment and Completion: Latino Men's Health Initiative

Table 1Ethnicity by Weight Categories ^{a, b}

<u>Weight Category N (%)</u>	<u>Ethnicity N (%)</u>			
	Mexican	Puerto Rican	<u>TOTAL</u>	<u>Significance Level</u>
Normal Weight (BMI= 18.5–24.99)	31 (31.31%)	37 (35.58%)	68	
Overweight (BMI= 25–29.99)	36 (36.36%)	34 (32.69%)	70	
Obese (BMI ≥ 30)	32 (32.32%)	33 (31.73%)	65	
<u>TOTAL</u>	99	104	203	<i>p</i> =.79

^aPercentage reported is % within each ethnic group.^bBMI's were based on the means of the two closest weights and two closest heights taken during the in-person eligibility confirmation.

Table 2Ethnicity by BMI and Obesity Class Categories ^{a, b}

<u>Weight Category N (%)</u>	<u>Ethnicity N (%)</u>			
	Mexican	Puerto Rican	<u>TOTAL</u>	<u>Significance Level</u>
Normal Weight (BMI= 18.5–24.99)	31 (31.31%)	37 (35.58%)	68	
Overweight (BMI= 25–29.99)	36 (36.36%)	34 (32.69%)	70	
Obese Class I (BMI= 30–34.99)	21 (21.21%)	22 (21.15%)	43	
Obese Class II (BMI= 35–39.99)	7 (7.07%)	7 (6.73%)	14	
Obese Class III (BMI= >40)	4 (4.04%)	4 (3.85%)	8	
<u>TOTAL</u>	99	104	203	<i>p</i> =.97

^a Percentage reported is % within each ethnic group.

^b BMI's were based on the means of the two closest weights and two closest heights taken during the in-person eligibility confirmation.

Table 3Demographic and Background Characteristics ^a

	Mexican n= 99	Puerto Rican N= 104	Significance Level
Age , mean (SD)	34.45 (12.39)	44.13 (12.23)	$p<.0001$
BMI , mean (SD)	28.68 (5.79)	28.25 (5.73)	$p=.59$
% Body Fat , mean (SD)	25.35 (8.77)	24.70 (8.61)	$p=.60$
Hip measure , mean (SD)	105.1 (9.45)	104.9 (9.50)	$p=.87$
Waist measure , mean (SD)	99.47 (13.81)	97.92 (14.64)	$p=.44$
Country Born , N (%)			$p<.05$
U.S., except Puerto Rico	52 (52.53%)	62 (59.62%)	
Puerto Rico	0	42 (40.38%)	
Mexico	47 (47.47%)	0	
Highest Grade Completed , N (%)			$p=.38$
Some grammar or high school (H.S.)	20 (20.20%)	27 (25.96%)	
Graduated H.S./H.S.equivalent/GED	27 (27.27%)	26 (25%)	
Some College 1 year to 3 years	30 (30.30%)	29 (27.88%)	
Graduated 4 year college	14 (14.14%)	8 (7.69%)	
Other	8 (3.03%)	14 (3.85%)	
Work Status , N (%)			$p<.001$
Yes, working	69 (69.70%)	48 (46.15%)	
No, not working	30 (30.30%)	56 (53.85%)	
Marital Status , N (%)			$p<.05$
Single/Never married	63 (63.64%)	44 (42.31%)	
Married once	19 (19.19%)	19 (18.27%)	
Living with someone	8 (8.08%)	10 (9.62%)	
Separated	2 (2.02%)	7 (6.73%)	
Divorced	2 (2.02%)	14 (13.46%)	
Divorced, remarried	5 (5.05%)	7 (6.73%)	
Other	0	3 (2.91%)	
Have Health insurance , N (%)			$p=.31$
Yes	52 (52.53%)	62 (59.62%)	
No	47 (47.47%)	42 (40.38%)	
Smoking Status , N (%)			$p<.05$
Current smoking	29 (29.29%)	48 (46.15%)	
Never smoked	38 (38.38%)	37 (35.58%)	
Quit more than 6 months ago	24 (24.24%)	16 (15.38%)	
Quit within the last 6 months	8 (8.08%)	3 (2.88%)	

	Mexican n= 99	Puerto Rican N= 104	Significance Level
Religion, N (%)			<i>p</i> =.38
Catholic	51 (51.52%)	47 (45.19%)	
Seventh- Day Adventist, Buddhist, Presbyterian, Protestant	2 (2.02%)	4 (3.88%)	
Christian	8 (8.08%)	20 (19.23%)	
Agnostic	5 (5.05%)	2 (1.92%)	
Atheist	2 (2.02%)	2 (1.92%)	
No preference	9 (9.09%)	7 (6.73%)	
More than 1	15 (15.15%)	15 (14.42%)	
Other	7 (7.07%)	7 (6.73%)	
Language Completed			
Spanish	27 (27.27%)	24 (23.08%)	
English	72 (72.73%)	80 (76.92%)	<i>p</i> =.49

^aPercentage reported is % within each ethnic group.

Table 4

Participants who were Randomized and Completed the Qualitative Interview ^a

	<u>Ethnicity</u>		<u>TOTAL</u>
<u>Weight Category</u>	<u>Mexican</u>	<u>Puerto Rican</u>	
Overweight	6	6	12
Obese	7	7	14
<u>TOTAL</u>	13	13	26

^aBMI's were computed during the in-person confirmation visit using a SECA BMI scale.