



Jackson Heart Study Manuscript Proposal Form

Submission Date:
11/14/2016

Proposal ID: P0830

I. TITLE

I. Title Information

A. Proposal Title:

The association of obesity markers on CVD prevalence and incidence modified by physical activity: Jackson Heart Study

B. Abbreviated Title:

Obesity markers on CVD prevalence and incidence

C. Suggested Keywords

obesity, JHS, prevalence, incidence, CVD, physical activity

II. AUTHOR INFORMATION & CONTRIBUTIONS

Lead Author:

Vanessa Bland

Senior Author

Corresponding Author

a. Responsibilities:

Design & Concept of Study, Literature Review, Draft/Review

Is this manuscript proposal for a student/trainee research project?

Yes

Type of student/trainee:

Doctoral Student ▼

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 Mentor assurance letter: No File Uploaded

CoAuthors (9)

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Co-author(s) Agreement: Uploaded

III. MANUSCRIPT PROPOSAL OUTLINE

F. Is this manuscript proposal based on an Ancillary Study? No

If yes, please provide the ASC#:

A. Brief Overview

Provide a brief overview of the proposal including the nature of the problem to be addressed, scientific relevance, objectives/aims, research question/hypotheses, and methods/analytical plan (<250 words):

Obesity and cardiovascular disease (CVD) are public health concerns in the United States. Obesity defined as an excess of body fat that has a negative impact on health. Obesity is a leading cause of morbidity and mortality in the United States. Body mass index, (BMI), waist circumference (WC), waist-to-hip ratio (WHR) and skinfold thickness have been used to measure obesity, which has been defined by BMI > 30 kg/m². More than 30% of adults are obese, with African Americans disproportionately represented. Lack of regular physical activity (PA) is a risk factor of obesity and is particularly common among African American adults (Siceloff, Coulon, & Wilson, 2014). CVD refers to a variety of diseases associated with the cardiovascular system. Although there are multiple long-term deleterious

health effects of excess weight, obesity is associated with premature atherosclerosis, increased risk of myocardial infarction and heart failure, and decreased survival, largely because of cardiovascular deaths, particularly in extreme weight categories (Apovian & Gokce, 2012). However, the extent to which PA or lack thereof modifies the association of markers of obesity (BMI, waist circumference, visceral adiposity and subcutaneous adiposity) with CVD prevalence and incidence among African Americans in MS is unclear. To address this gap in literature, we propose to examine the association of obesity markers on CVD prevalence and incidence and whether this association is modified by physical activity among African American participants in the Jackson Heart Study (JHS).

B. Background/Rationale

(Please include discussion on relevance of African Americans to the proposed topic) (< 1000 words):

Cardiovascular diseases (CVD) are the leading cause of death among Americans in all racial and ethnic categories, accounting for 37.3% of all deaths and 58% when measured as a contributing cause (DeHaven et al., 2011). Lack of physical activity is an established modifiable risk factor for CVD and premature mortality (Archer, & Blair, 2011). The Physical Activity Guidelines for Americans (PAGA) recommend that adults obtain at least 150 minutes/week of moderate-intensity physical activity (MPA), 75 minutes/week of vigorous-intensity physical activity (VPA), or a combination of moderate and vigorous physical activity (MVPA) based on accumulating evidence that the health benefits from physical activity are primarily dependent on total energy expenditure (Tucker, Welk, & Beyler, 2011). Despite these benefits, less than half of U.S. adult men and women are sufficiently physically active, with African American men and women less active than their white counterparts. This disparity puts African-Americans at risk for increased morbidity and mortality and underscores the need to promote physical activity among this population (Leonard et al., 2013). Despite significant efforts with respect to cardiovascular disease (CVD) prevention globally, CVD remains the major challenge to public health. It is the leading cause of death worldwide and a major cause of reduced quality of life. According to the 2020 goals set by the American Heart Association (AHA), to improve cardiovascular health, seven major modifiable CVD risk factors, namely physical activity (PA), blood pressure, cholesterol, body weight, dietary habits, smoking and blood glucose, need to be addressed. Sedentary lifestyle is a critical risk factor associated with the development of chronic diseases including CVD, obesity, diabetes mellitus and some cancers. Whilst physical activity has been recognized as an effective lifestyle approach which reduces risk of the aforementioned conditions, reversing their negative impact on metabolic abnormalities and improving health (Tambalis, et al., 2016). Over the past two decades, obesity has become a global epidemic affecting both pediatric and adult populations. In the USA, 69 % of adults are either overweight or obese and 35 % are obese. The relationship between cardiovascular disease (CV) and obesity has been widely studied, but a number of questions still remain. For instance, obesity has been linked to development of cardiovascular diseases including atherosclerosis and symptomatic coronary artery disease (CAD), heart failure (HF), and atrial fibrillation (Mandviwala, T., Khalid, U., & Deswal, A., 2016). Parks, recreation, and public health experts have prioritized increasing leisure time physical activity (LTPA) among older adults as a path to improving quality of life and reducing healthcare expenditures. Increased LTPA could improve quality of life and assist with prevention of heart disease, Type II diabetes, obesity, and mortality. Further, understanding how each group of the older adult population views LTPA benefits and barriers is critical to increasing their levels of LTPA (Dorwart, C. E., 2016). The extent to which the association of obesity markers with CVD prevalence and incidence is modified by the lack of physical activity among African Americans is unclear and understudied. The Jackson Heart Study (JHS) is a large, community-based, observational study that contains a large sample of African Americans that is ideal for evaluating the association of obesity with CVD prevalence and incidence and how this association may be modified by physical activity. However, significant disparities persist in the prevalence, morbidity, and mortality associated with CVD and their major risk factors based on race and ethnicity. Compared to whites, blacks and Hispanics/Mexican Americans have a higher risk of developing disease and experiencing adverse CVD-related health outcomes, and blacks have a higher prevalence of stroke and stroke mortality, and a higher overall mortality rate from CVD and coronary heart disease. Additionally, blacks have a higher prevalence of established risk factors for disease, including hypertension, diabetes, obesity, and physical inactivity (DeHaven et al., 2011). The purpose of this study is to evaluate how the association of markers of obesity (BMI, WC, and WHtR) with CVD prevalence and incidence and how this association is modified by physical activity among African Americans in the Jackson Heart Study.

C. Research Hypothesis

Research question #1: How do obesity markers (BMI, WC and WHtR) affect the prevalence and incidence of CVD? Hypothesis 1: Obesity markers will be associated with increased prevalence and incidence of CVD. Research question #2: How does physical activity affect the prevalence and incidence of CVD? Hypothesis 2: PA will be inversely associated with prevalence and incidence of CVD. Research question #3: How does PA modify the associations of obesity markers with CVD prevalence and incidence? Hypothesis 3: Among obese individuals, the prevalence and incidence of CVD will be higher among individuals with lower (versus higher) PA. PA moderate the association between obesity and CVD prevalence and incidence

C. Study Design

Longitudinal

Other (specify):

D. Inclusions

Data for this proposed study will be obtained from the Jackson Heart Study (JHS), a single-site, longitudinal cohort study of the risk factors and causes of heart disease in AA adults. The JHS consists of 5301 African-American adults from urban and rural areas of the three counties (Hinds, Madison, and Rankin). Exam I, II and III data of the Jackson Heart Study will be utilized in this study.

D. Exclusions

Received TRANS data package

E. Data

Location of Statistical Analysis:

GTEC

Working
Group:

Vanguard
Center:

Other:

Will data be requested from JHSCC: Yes

Requested data: Uploaded

E. Brief Statistical Analysis Plan and Methods:

(Including power calculations, if necessary.)

Descriptive analyses will be performed to determine baseline characteristics of the sample by sex, obesity markers and by levels of physical activity. Multivariable logistic regression analysis will be used to estimate odds ratios (OR, 95%CI) of the cross-sectional associations of measures of obesity with prevalent CVD. To evaluate possible effect modification of the association of obesity markers with CVD prevalence by levels of physical activity, we will: • Assess the interaction between physical activity and markers of obesity by including an interaction term in the fully-adjusted regression models. • If p-value for interaction is significant, we will stratify the association of obesity with CVD by levels of PA [high physical activity (above median) vs low physical (below the median)]. Multiple variable models will be estimated sequentially – Model 1 will adjust for the measures of obesity, age, sex and education Model 2 will adjust for model 1 plus health behaviors (smoking, physical activity and diet) Model 3 will adjust for model 2 plus CVD risk factors (hypertension, diabetes, total cholesterol, triglycerides) Model 4 will adjust for model 3 and add the interaction between obesity measures(s) and two-category PA measure (intermediate/poor vs ideal)

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F. References:

(Maximum 15)

Apovian, C. M., & Gokce, N. (2012). Obesity and cardiovascular disease. *Circulation*, 125(9), 1178-1182. Siceloff, E. R., Coulon, S. M., & Wilson, D. K. (2014). Physical activity as a mediator linking neighborhood environmental supports and obesity in African Americans in the path trial. *Health Psychology*, 33(5), 481. Tambalis, K. D., Panagiotakos, D. B., Georgousopoulou, E. N., Mellor, D. D., Chrysohoou, C., Kouli, G. M., ... & ATTICA Study Group. (2016). Impact of physical activity category on incidence of cardiovascular disease: Results from the 10-year follow-up of the ATTICA Study (2002–2012). *Preventive Medicine*, 93, 27-32. Tucker, J. M., Welk, G. J., & Beyler, N. K. (2011). Physical activity in US adults: compliance with the physical activity guidelines for Americans. *American Journal of Preventive Medicine*, 40(4), 454-461. Leonard, T., Shuval, K., de Oliveira, A., Skinner, C. S., Eckel, C., & Murdoch, J. C. (2013). Health behavior and behavioral economics: economic preferences and physical activity stages of change in a low-income African-American community. *American Journal of Health Promotion*, 27(4), 211-221. Dorwart, C. E. (2016). Addressing the Health Disparity Gap: Perceptions of Barriers to and Benefits of Leisure Time Physical Activity in African-American and Latino Older Adults. Mandviwala, T., Khalid, U., & Deswal, A. (2016). Obesity and cardiovascular disease: a risk factor or a risk marker?. *Current atherosclerosis reports*, 18(5), 1-10. DeHaven, M. J., Ramos-Roman, M. A., Gimpel, N., Carson, J., DeLemos, J., Pickens, S., ... & Duval, J. (2011). The GoodNEWS (Genes, Nutrition, Exercise, Wellness, and Spiritual Growth) Trial: a community-based participatory

research (CBPR) trial with African-American church congregations for reducing cardiovascular disease risk factors—recruitment, measurement, and randomization. *Contemporary Clinical Trials*, 32(5), 630-640 Liu, J., Fox, C. S., Hickson, D. A., May, W. D., Hairston, K. G., Carr, J. J., & Taylor, H. A. (2010). Impact of abdominal visceral and subcutaneous adipose tissue on cardiometabolic risk factors: the Jackson Heart Study. *The Journal of Clinical Endocrinology & Metabolism*, 95(12), 5419-5426. Archer, E., & Blair, S. N. (2011). Physical activity and the prevention of cardiovascular disease: from evolution to epidemiology. *Progress in Cardiovascular Diseases*, 53(6), 387-396. Bastien, M., Poirier, P., Lemieux, I., & Després, J. P. (2014). Overview of epidemiology and contribution of obesity to cardiovascular disease. *Progress in Cardiovascular Diseases*, 56(4), 369-381. Menke, A., Muntner, P., Wildman, R. P., Reynolds, K., & He, J. (2007). Measures of adiposity and cardiovascular disease risk factors. *Obesity*, 15(3), 785-795. Welborn, T. A., & Dhaliwal, S. S. (2007). Preferred clinical measures of central obesity for predicting mortality. *European journal of clinical nutrition*, 61(12), 1373-1379.

IV. JHS MANUSCRIPT OVERLAP

Manuscript Overlap

The Lead Author has reviewed all existing JHS manuscripts / manuscript proposals and found: Found similarities

Manuscript/Proposal List (1)

PID:	P0024
Title:	Description and Validation of Physical Activity in African Americans: The Jackson Heart Study
Author:	Patricia Dubbert
Comments:	The author(s) proposes to provide a description of the cohort's physical activity (active living; sport/exercise; occupation; and home life scores), in relation to important demographic and health characteristics, such as gender, age, employment, socioeconomic status variables, overweight/obesity status, functional ability, and related variables. Similarly, the study we propose to conduct will look at measures of physical activity but from a different perspective (poor or intermediate health and ideal health). The differences are: (1) we wish to examine how obesity markers affect the prevalence and incidence of CVD, (2) how physical activity affect the prevalence and incidence of CVD and (3) how physical activity modify the associations of obesity markers with CVD prevalence and incidence. Although Dubbert et al proposal included similar key variables like PA and obesity, the hypotheses being tested in this paper is significantly different from their paper. NOTE: Although others may have included PA measures in a publication on the association between CVD risk factors and CVD events, this manuscript examines PA as a modifier in the association of obesity markers and CVD prevalence and incidence.

V. ADDITIONAL INFORMATION

H. Genetic Information:

1. Do you propose use of data from a participant's DNA? No
2. If yes, for a primary aim or secondary aim of JHS? (check one or both)
 - Primary Aim (heart, vascular disease)
 - Secondary Aim (other conditions)

I. Conflict of Interest

1. Are these analyses to involve a for-profit corporation? No

If yes, please describe the nature of conflict of interest:

Name of corporation:

2. Do you or any member of your Writing Group intend to patent any process, aspect of outcome of these analyses? No

Describe plans for such patents:

J. Manuscript Completion

Note: It is expected that the manuscript will be completed within two years. The manuscript proposal will expire if no manuscript is submitted for JHS review after two years from the date of approval.