Highlights of JHS New Findings for 2015-2016

1. Hypertension

i. Masked Hypertension Prevalence and Subclinical Cardiovascular Disease

Studies consisting mostly of whites have shown that the prevalence of masked hypertension differs by prehypertension status. This study evaluated the association of masked hypertension and prehypertension with left ventricular mass index and common carotid intima media thickness. This study defined masked hypertension as mean systolic/diastolic CBP <140/90 mm Hg and mean daytime systolic/diastolic ambulatory blood pressure ≥135/85 mm Hg; and clinic hypertension as mean systolic/diastolic CBP ≥140/90 mm Hg. Normal CBP was defined as mean systolic/diastolic CBP <120/80 mm Hg and prehypertension as mean systolic/diastolic CBP 120 to 139/80 to 89 mm Hg. This study found that among participants with systolic/diastolic clinic blood pressure (CBP) <140/90 mm Hg, the prevalence of masked hypertension and prehypertension was 27.5% and 62.4%, respectively. The prevalence of masked hypertension among those with normal CBP and prehypertension was 12.9% and 36.3%, respectively. Left ventricular mass index was 7.94 g/m\(^2\) lower among those without masked hypertension compared to participants with masked hypertension. Left ventricular mass index was also 4.77 g/m\(^2\) lower among those with clinic hypertension. There were no significant differences in left ventricular mass index between participants with and without masked hypertension, or clinic hypertension. Masked hypertension was common among African Americans with prehypertension and also normal CBP, and was associated with subclinical cardiovascular disease.


ii. Masked Hypertension Prevalence and Target Organ Damage

The disproportionate rates of cardiovascular disease in African Americans may, in part, be due to suboptimal assessment of blood pressure (BP) with clinic BP measurements alone. To date, however, the prevalence of masked hypertension in African Americans has not been fully delineated. The purpose of this study was to evaluate masked hypertension prevalence in African Americans in the Jackson Heart Study and examine its determinants and association with indices of target organ damage (TOD), including carotid artery intima-media thickness, left ventricular mass index, and the urinary albumin:creatinine excretion ratio. This study found that masked hypertension prevalence was 25.9% in the overall sample and 34.4% in participants with normal clinic BP. All indices of TOD were significantly higher in masked hypertensives compared to sustained normotensives and were similar
between masked hypertensives and sustained hypertensives. Male gender, smoking, diabetes, and antihypertensive medication use were independent determinants of masked hypertension in multivariate analyses. In this community-based cohort of African Americans, approximately one-third of participants with presumably normal clinic BP had masked hypertension when BP was assessed in their daily environment. Masked hypertension was accompanied by a greater degree of TOD in this cohort.


iii. White-coat Effect on Blood Pressure Among Older Adults

Many adults with elevated clinic blood pressure (BP) have lower BP when measured outside the clinic. This phenomenon is known as the "white-coat effect" and may be larger among older adults, a population more susceptible to the adverse effects of low BP. This study analyzed data from participants in the Jackson Heart Study with elevated clinic BP (systolic/diastolic BP [SBP/DBP] ≥140/90 mm Hg) who underwent ambulatory BP monitoring (ABPM). The white-coat effect for SBP was larger for participants 60 years and older vs those younger than 60 years in the overall population and among those without diabetes or chronic kidney disease. Clinic SBP ≥150 mm Hg vs <150 mm Hg was associated with a larger white-coat effect. Further studies are needed to investigate the role of ABPM in guiding the initiation and titration of antihypertensive treatment, especially among older adults.


2. Psychosocial Factors

i. Psychosocial Factors and Hypertension

African American (AA) populations have an increased prevalence of hypertension compared to the general population. Although several risk factors for hypertension among African Americans have been identified, including diet, body weight, and chronic kidney disease, little is known about the potential impact of psychosocial factors on the development of hypertension among AAs. This study used data from the Jackson Heart Study to examine associations of negative affect and stress with incident hypertension and progression of blood pressure (BP) from one to the next
higher stage of PB among AAs and showed that from examination 1 to examination 2 psychosocial factors, particularly number of stressful events, were associated with BP progression, but not with the development of hypertension.


ii. Psychosocial Factors and Nocturnal Blood Pressure Dipping

African Americans exhibit a lower degree of nocturnal blood pressure (BP) dipping compared with Whites, but the reasons for reduced BP dipping in this group are not fully understood. This study examined the association of psychosocial factors with BP dipping in a population-based cohort of African Americans and found that the prevalence of nondipping was 64%. Only perceived support was associated with BP dipping percentage in fully adjusted models. Lower perceived support was associated with reduced BP dipping in this study. The role of social support as a potentially modifiable determinant of nocturnal BP dipping warrants further investigation.


iii. Depressive Symptoms and Metabolic Syndrome

Depression and the metabolic syndrome (MetS) are both risk factors for cardiovascular disease and type 2 diabetes mellitus. Prior studies in predominantly White populations demonstrated that individuals with depressive symptoms at baseline are more likely to develop future MetS. This study evaluated whether depressive symptoms would contribute to a more pronounced increase in MetS severity among African Americans in the Jackson Heart Study (JHS) and found that there was a relationship between depressive symptoms and severity of MetS over an 8-year period of follow-up among African American women but not among men. These findings may have implications for targeting of MetS-associated lifestyle changes among individuals with depressive symptoms.

iv. **Perceived Discrimination and Health Behaviors**

This study examined associations of multiple measures of perceived discrimination with health behaviors among African-Americans and found that higher levels of perceived discrimination were associated with more smoking and greater percentage of dietary fat consumption and fewer hours of sleep among men and women. These findings suggest that health behaviors offer a potential mechanism through which perceived discrimination affects health in African Americans.


v. **Depressive Symptoms and Cardiovascular Disease**

Although depression has been found to be associated with cardiovascular disease, most studies of depression and cardiovascular risk have been conducted in white populations. This study investigated this association in a community-based cohort of blacks and found that major depressive symptoms were associated with greater risks of incident stroke and coronary heart disease (CHD). There is a need for greater understanding of associations between depressive symptoms and cardiovascular disease in blacks, particularly in light of racial disparities in disease severity, timely diagnosis, and use of medications for secondary prevention. Future work is warranted to characterize the burden of depression over time and risk of adverse cardiovascular events in blacks.


vi. **Lifecourse Socioeconomic Position and Cardiovascular Disease**

Few studies have examined the impact of lifecourse socioeconomic position (SEP) on cardiovascular disease (CVD) risk among African Americans. This study examined multiple measures of SEP in the Jackson Heart Study and found that adult SEP is an important predictor of CVD events in African American women and in younger
African Americans. Childhood SEP was not associated with CVD events in this population.


3. Chronic Kidney Disease

i. Risk Factors for Chronic Kidney Disease

Racial differences in rapid kidney function decline exist, but less is known regarding factors associated with rapid decline among African Americans. This study documented that 12% of the Jackson Heart Study participants exhibited a rapid decline in kidney function, and that such individuals were older, were more likely to be of low/middle income, and had higher systolic blood pressures and higher prevalence of diabetes those with nonrapid decline. Interventions targeting potentially modifiable factors may help reduce the incidence of kidney failure.


ii. Blood Pressure and Chronic Kidney Disease

In addition to having an increased risk of chronic kidney disease (CKD), African Americans also have an increased prevalence of hypertension. While decreased nocturnal blood pressure dipping and elevated morning blood pressure surge are associated with an increased risk of cardiovascular events, the utility of ambulatory blood pressure measurements to predict renal events is unclear. This study examined the association of ambulatory blood pressure parameters with incidence of CKD among Jackson Heart Study participants and found that 10% higher nocturnal dipping was significantly associated with a decreased risk of incident CKD. Morning surge was not associated with the incidence of CKD. Loss of nocturnal blood pressure dipping, but not morning blood pressure surge, may promote the decline in renal function and increase the risk for development of CKD in high-risk individuals.
iii. Blood Pressure Variability and Chronic Kidney Disease

Studies suggest 24-h blood pressure (BP) variability has prognostic value for cardiovascular disease. Several factors associated with high 24-h BP variability are also common among individuals with chronic kidney disease (CKD). This study evaluated whether 24-h BP variability would be higher for individuals with CKD versus individuals without CKD. Findings from this study suggest that CKD is associated with higher 24-h BP variability, but this association is primarily explained by higher mean BP among individuals with CKD.


iv. Periodontal Disease and Kidney Function Decline

Chronic kidney disease (CKD) remains a prevalent public health problem that disproportionately affects African Americans, despite intense efforts targeting traditional risk factors. This study examined the extent to which periodontal disease, a chronic bacterial infection of the oral cavity, is associated with kidney function decline among Jackson Heart Study participants. This study found that severe periodontal disease is prevalent among a population at high risk for CKD and is associated with clinically significant kidney function decline, suggesting that treatment of periodontal disease may have specific benefits for maintaining good kidney function.


4. Obesity

i. Obesity, Mortality and Heart Failure
Higher rates of obesity and heart failure have been observed in African Americans, but associations with mortality are not well-described. This study examined clinical implications of obesity in African Americans and associations between obesity and all-cause mortality, heart failure, and heart failure hospitalization. Obesity and morbid obesity were common in a community sample of African Americans, and both were associated with increased heart failure and heart failure hospitalization.


5. Heart Failure

i. Magnesium Intake, Cardiac Function and Heart Failure

Little is known about magnesium intake and risk of heart failure (HF) hospitalizations, particularly in blacks. This study examine the association between magnesium intake and HF hospitalization in blacks. Magnesium intake <2.3 mg/kg was related to increased risk of subsequent HF hospitalizations. Future studies are needed to test whether serum magnesium levels predict risk of HF.


6. Subclinical Disease

i. Diagnostic Value of Coronary Artery Calcium Score for Cardiovascular Disease in African Americans

The role of coronary artery calcium (CAC) as a screening tool for cardiovascular disease (CVD) risk in African Americans (AAs) is unclear. This study compared the diagnostic accuracy for CVD prevalence using the CAC score and the Framingham Risk Score (FRS) in an adult population of AAs and found that CAC is independently associated with prevalent CVD and improves the diagnostic accuracy of FRS for prevalent CVD by 14%. Determination of CAC may be useful in CVD risk stratification in AAs.

ii. Ventricular Conduction, Mortality and Heart Failure

Prolongation of ventricular conduction (QRS complex) is associated with adverse outcomes in mostly white populations, but its clinical significance is not well established for other groups. This study investigated the association between QRS duration and mortality in African Americans and found that QRS prolongation in African Americans was associated with increased mortality and heart failure hospitalization. Factors associated with developing QRS prolongation included age, male sex, prior myocardial infarction, and left ventricular structural abnormalities.


iii. Subclinical Disease Markers and Diabetes, Metabolic Syndrome, and CVD

The presence of subclinical cardiovascular disease (CVD) measures (e.g., peripheral arterial disease, left ventricular hypertrophy, microalbuminuria, high coronary artery calcium (CAC) score, and low left ventricular ejection fraction) has been directly associated with the development of CVD in whites. Although African Americans in the U.S. are at higher risk of CVD compared with non-Hispanic whites, information on the prevalence of subclinical CVD measures in African Americans and their association to clinical CVD has been more limited. This study found a moderately high prevalence of subclinical CVD disease among Jackson Heart Study participants, and a greater risk of clinical CVD, especially among participants with diabetes and metabolic syndrome.


iv. Clinical Correlates and Prognostic Significance of Change in Left Ventricular Mass
Although left ventricular mass (LVM) predicts cardiovascular events (CVD) and mortality in African Americans, limited data exist on factors contributing to change in LVM and its prognostic significance. This study examined whether baseline blood pressure (BP) and body mass index (BMI) and change in these variables over time were associated with longitudinal increases in LVM and that such increases are associated with an increased incidence of CVD among JHS participants. This study found that baseline BMI and BP, and change in BP on follow-up were key determinants of increase in LVM, which in turn carried an adverse prognosis for CVD, underscoring the need for greater control of BP and weight among JHS participants.


7. Diabetes

i. Low-grade Inflammation and Diabetes

Previous studies on the association between markers of chronic low-grade inflammation such as high-sensitivity C-reactive protein (hs-CRP) and development of type 2 diabetes among African Americans have been inconclusive. This study examined the association between hs-CRP and development of diabetes among Jackson Heart Study participants. This study found that among individuals who are not obese or have lower levels of insulin resistance low grade inflammation may be associated with an increased risk of developing type 2 diabetes.


8. Life Simple 7 Cardiovascular Health Metrics

i. Prevalence of Ideal Life Simple Seven Cardiovascular Health Metrics

This study examined the prevalence and changes over time of the American Heart Association Life's Simple Seven (LSS) cardiovascular health metrics (i.e., smoking, diet, physical activity, body mass index [BMI], blood pressure, cholesterol, and
fasting blood glucose) in African-Americans and found that among men [and women], the prevalence of having 0, 1, 2, 3, 4, 5, 6, and 7 ideal LSS was 3.3% [1.7%], 23.0% [26.3%], 33.5% [33.1%], 24.7% [22.8%], 11.6% [11.9%], 3.6% [3.7%], 0.3% [0.6%], and 0% [0%], respectively. Prevalence of ideal diet was 0.9%. The proportions of those meeting LSS ideal recommendations for cholesterol and fasting glucose declined from the first through third JHS visits across all age groups, whereas prevalence of ideal BMI declined only in participants <40 years at a given visit. Prevalence of ideal blood pressure did not change over time and being ideal on physical activity improved from the first [18.3% (95% CI: 17.3% to 19.3%)] to third visit [24.8% (95% CI: 23.3% to 26.3%)]. These findings show a low prevalence of ideal LSS (especially diet, physical activity, and obesity) in the JHS and a slight improvement in adherence to physical activity recommendations over time, and suggest opportunities for prevention intervention in this high risk population.