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Comparison of cardiometabolic risk between African-American & Caucasian women in a worksite wellness program

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Objective

- The learner will be able to:
  - Describe the racial differences in cardiometabolic risk (CMR) among women within a university worksite wellness program.
  - Discuss comparisons of CMR, or the interplay of risk for diabetes leading to heart disease, between African-American and Caucasian women.
Background

- Cardiovascular disease (CVD)- Leading cause of death & chronic illness.
  - Obesity, poor glycemic control, mixed dyslipidemia, hyperinsulinemia, uncontrolled blood pressure and high levels of c-reactive protein (hs-CRP) are CMR factors.
  - CMR factors are strongly associated with inflammation in the blood vessels that predispose to excessive blood clot formation.

- Worksite health and wellness program focused on advancing the health and well-being of employees can reduce health risk and prevent CVD disease.
## Common Definitions of MetS

<table>
<thead>
<tr>
<th>National Cholesterol Education Program Adult Treatment Panel III</th>
<th>International Diabetes Federation</th>
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</thead>
<tbody>
<tr>
<td>Any 3 or more of the following</td>
<td>Abdominal obesity: waist circumference for Asians (only): &gt;94 cm for men and &gt;80 cm for women</td>
</tr>
<tr>
<td>Abdominal obesity: waist circumference &gt;40 in (102 cm) in men and &gt;35 in (88 cm) in women</td>
<td>Must have either central obesity or an increased BMI plus 2 of the following:</td>
</tr>
<tr>
<td>Triglycerides ≥150 mg/dL</td>
<td>Triglycerides ≥150 mg/dL</td>
</tr>
<tr>
<td>HDL-C &lt;40 mg/dL in men and &lt;50 mg/dL in women</td>
<td>HDL-C &lt;40 mg/dL in men &amp; &lt;50 mg/dL in women</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Blood pressure</td>
</tr>
<tr>
<td>≥130/85 mm Hg</td>
<td>≥130/85 mm Hg</td>
</tr>
<tr>
<td>Fasting glucose</td>
<td>Fasting glucose</td>
</tr>
<tr>
<td>≥100 mg/dL</td>
<td>≥100 mg/dL or previously diagnosed diabetes</td>
</tr>
</tbody>
</table>
A quarter of the world’s adults have MetS
People with MetS are 2X as likely to die from, and 3X as likely to have a MI or stroke compared with people without MetS
People with MetS have a five-fold greater risk of developing type 2 diabetes (T2D)
Up to 80% of the 200 million people with diabetes globally will die of CVD
Ahead of HIV/AIDS in morbidity and mortality; yet the problem is not as well recognized (IDF, 2007)
Literature

- Recommendations from Healthy People 2020: identify the need to eradicate racial health disparities in CVD
- AA women experience
  - higher prevalence of obesity, hypertension, coronary heart disease, stroke, T2D compared to other groups of women
  - higher BMI; Increased levels of circulating insulin; lower insulin sensitivity; higher acute response of insulin to glucose compared with white women
Cardiometabolic Risk

Global Diabetes / CVD Risk

- Age
- Race
- Gender
- Family History
- Genetics
- Insulin Resistance
- Lipids
- BP
- Glucose
- Overweight / Obesity
- Abnormal Lipid Metabolism
  - LDL ↑
  - ApoB ↑
  - HDL ↓
  - Trigly. ↑
- Smoking
- Physical Inactivity
- Unhealthy Eating
- Hypertension
- Inflammation
- Hypercoagulation
Method

**Purpose**: Examine racial differences in CMR among women from a worksite wellness program, “WellBAMA,” at the University of Alabama.

**Specific aims**:
- **1**: Determine the relative importance of the racial differences of CMR factors and insulin resistance (e.g., calculation of a Homeostatic Model of Assessment – insulin resistance).
  - (HOMA-ir = Fasting :Glucose x Insulin/ 22.5 {Molar units: mmol/L}), dyslipidemia, central obesity, C-reactive protein, hypertension, A1c and acanthosis nigricans score.
- **2**: Ascertain the best markers of insulin resistance
  - insulin, HOMA-ir or acanthosis nigricans score.
CMR Profile/Variables

- Dyslipidemia = HDL, LDL, triglycerides
- Central obesity = waist circumference, BMI
- Degree of inflammation = hs-C-reactive protein
- Hypertension = blood pressure
- Glycemic status = glucose and A1c
- Insulin resistance =
  - Insulin level
  - Homeostatic Model of Assessment – insulin resistance (HOMA-ir) = Fasting :Glucose x Insulin/ 22.5 9Molar units: mmol/L
  - Acanthosis nigricans score
Methods (cont)

- Sample: Cross-sectional design
- Analysis of CMR profiles – N = 50 women
  - Inclusion: n = 25 African-American/ 25 Caucasian women; participants in WellBAMA
  - Exclusion: CVD, diabetes, on diabetic meds, steroids
- Power calculations: A sample size of 46 achieves 81% power to detect an R-Squared of 0.15 variable(s) using an F-Test with a significance level (alpha) of 0.05.
- Recruitment: Women at annual WellBAMA employee health screenings sessions
Data Collection

- Demographic/ Clinical characteristics and CMR factors
  - Personal data
    - Age, race, smoking status, hormone use
  - Anthropomorphic/ Physiologic measures
    - weight & height (BMI calculation), waist circumference, and blood pressure
  - Biochemical parameters
    - WellBAMA data: BP, glucose, lipids (fasting fingerstick)
    - Blood draw @ UMC (fasting): insulin, A1c, glucose, lipids, hs-CRP
Acanthosis Nigricans
Grading: Acanthosis Nigricans

Excellent Proxy for **Hyperinsulinemia** or **Insulin Resistance** precursor to frank Type 2 Diabetes and a major risk factor for CVD (Appel, 2009).
Data Analysis

- Significant multivariate main effect of race, Wilks’ $\Lambda = .58$, $F (10, 32) = 2.28$, $p = .04$
  - suggesting significant differences between AA and Caucasian participants on measures of CMR
- Stepwise regression revealed overall model was significant, $R^2 = .57$, $F (6, 38) = 8.36$, $p < .001$ for predicting insulin resistance.
  - Indicating that BMI, fasting triglycerides, fasting HDL, and fasting hemoglobin A1c were significant predictors of insulin resistance.
Conclusions

- Findings from this study provided valuable insights to guide the early identification of CMR among women which differ by race.
  - AA women manifested significant higher levels of insulin resistance or predisposition toward development of T2DM.
  - Caucasian women were less insulin resistant but manifested higher levels of mixed dyslipidemia (e.g., hypertriglyceridemia and low HDL-c).
- Findings inform providers how to tailor assessments and screening among AA versus Caucasian women, as risks for heart disease and stroke have been found to differ by race.
Acknowledgement

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Questions
References

References


