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Prevalence and Changes over Time of Ideal Cardiovascular Health Metrics among African-Americans: The Jackson Heart Study

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Abstract

Objectives—To assess the prevalence and changes over time of ideal Life's Simple Seven (LSS) in African-Americans.

Methods—Prospective cohort of 5301 African-Americans from the Jackson Heart Study (JHS) from 2000 to 2013. Each of the LSS metrics was categorized as poor, intermediate, or ideal.

Results—Among men, the prevalence of having 0, 1, 2, 3, 4, 5, 6, and 7 ideal LSS was 3.3%, 23.0%, 33.5%, 24.7%, 11.6%, 3.6%, 0.3%, and 0%, respectively. Corresponding values for women were 1.7%, 26.3%, 33.1%, 22.8%, 11.9%, 3.7%, 0.6%, and 0%. Prevalence of ideal diet was 0.9%. The proportions of those meeting LSS ideal recommendations for cholesterol and

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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%)].

Conclusions—Our data 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.

Keywords

Epidemiology; cardiovascular disease; risk factors; diet

Despite the identification of major cardiovascular risk factors in the early 1960s[1] and advances in biomedical research, cardiovascular disease (CVD) remains the leading cause of death in the US[2]. People who maintain ideal levels of physical activity, diet, adiposity, blood pressure, lipids, etc, have fewer adverse health outcomes (i.e., CVD)[3–5]. Hence, the American Heart Association (AHA)'s goal is to improve the cardiovascular health of all Americans by 20% by year 2020 while reducing deaths from cardiovascular diseases by 20%[6]. To monitor such goals, AHA developed a simple metric based on 4 health [adiposity, total cholesterol, blood pressure (BP) and fasting plasma glucose (FPG)] and 3 behavioral (smoking, exercise and diet) factors, subsequently referred to as life's simple seven (LSS). These 7 factors are then used to define the concept of poor, intermediate, and ideal cardiovascular health[6]. Recent data from a US representative sample showed that fewer than 1% of adult Americans met all 7 metrics, with ideal healthy diet met by the fewest[7]. Another report showed variations in the prevalence of meeting ideal LSS, with age-standardized prevalences varying from 1.2% to 6.6% across the 50 US states[8]. Of note is that Mississippi – home state of the JHS – was among the states with the lowest age-standardized prevalence of ideal LSS.

There is a disproportionate burden of CVD in the African-American population, with higher prevalences of major risk factors including hypertension, overweight/obesity, type 2 diabetes, and physical inactivity, compared with other ethnic groups[2,9]. While one publication from the National Health and Nutrition Examination Survey (NHANES)[2] reported comparable overall prevalences across ethnic groups, detailed data on the prevalence of poor, intermediate, and ideal dietary components among African-Americans have not been reported. In addition, there are no data on changes over time in LSS in a large cohort of African-Americans. Such data are critical in monitoring milestones towards achieving the AHA 2020 goals and reduce the burden of chronic diseases in a high-risk population. The JHS is unique in its ability to address the above gaps among middle-aged and elderly African Americans, given the availability of data on all seven health and behavioral factors and repeated measurements on most of those factors (BMI, cholesterol, FPG, BP, and physical activity) during its initial three clinic visits. Hence, the current project examines the prevalence and changes over time of LSS in a large cohort of African-Americans.

Methods

Population

The JHS is a prospective cohort study designed to investigate determinants of CVD among African-Americans living in the tri-county area (Hinds, Madison, and Rankin counties) of the Jackson, Mississippi metropolitan area. Detailed descriptions of the JHS have been previously published[10,11]. Of the 5,301 JHS participants who completed the baseline clinic visit (2000–2004), we excluded 1169 subjects who had missing data on one or more LSS. This resulted in a final sample of 4,132 individuals with complete data at the baseline JHS visit. The JHS visit two was conducted between 2005 and 2009, and visit three was completed from 2009 to 2013. Each participant gave written informed consent, and the study protocol was approved by the institutional review boards of each of the participating institutions.

Assessment of LSS

A definition of LSS (poor, intermediate, and ideal) based on AHA guidelines is provided in supplemental Table 1.

Body mass index (BMI)—Standing height was measured without shoes and recorded to the nearest centimeter. Weight was measured at baseline on a scale. BMI was computed by dividing weight (kg) by height squared (m^2). Briefly, ideal, intermediate, and poor BMI were defined as BMI <25; 25 to 29.9; and ≥ 30 kg/m^2, respectively.

Physical activity—At baseline, participants completed an interviewer-administered physical activity survey. The instrument used was similar to the Kaiser physical activity survey, and derived from the Baeke physical activity and Atherosclerosis Risk in Communities (ARIC) surveys[12,13]. Reported activity was organized into four domains: sports and exercise; active living; occupational activity; and home, family, yard and garden activity. To maintain comparability with Bell et al.[14], who used ARIC physical activity survey data, only activity compiled by the sport and exercise component of the instrument was used in the current analysis. Sport and exercise was reported by named activity and the average amount of time per week spent at that activity. Metabolic equivalent (MET) levels for each named activity were taken from the most current version of the national Compendium of Physical Activity[15]. Activities identified as either vigorous (>6 METs) or moderate (3–6 METS)[16] contributed to the participant's physical activity score for the purpose of this analysis. The average time per week spent engaged in all activities at either a vigorous or moderate level was tallied for each participant. Each participant was then scored as having one of the three AHA recommended levels of physical activity[6]: 1) *Recommended* : ≥150 min/wk of moderate activity or ≥ 75 min/wk of vigorous activity or ≥150 min / wk of moderate + vigorous activity; *Intermediate*: 1–149 min/wk of moderate activity or 1–74 min/wk of vigorous activity or 1–149 min/wk of moderate + vigorous activity; *Poor*: 0 min/wk of physical activity.

Dietary assessment—Dietary intakes in the JHS were assessed using a regional and culturally appropriate, 158 food item, semi quantitative food frequency questionnaire (FFQ) that was designed specifically for the study population[17]. The FFQ has been validated in a subset of the JHS cohort using multiple 24-hr recalls and nutrient biomarkers[18,19]. We had FFQ information for 5065 of the 5301 JHS participants at baseline. We excluded 304 participants with extreme energy intakes (defined as ≤ 600 kcal/d or ≥ 4800 kcal/d) and included 4761 participants for the computation of diet score based on AHA guidelines. Individuals were given one point for each of 5 dietary goals. These included: 1) At least 4.5 cups/day of fruit and vegetables (fruit included whole fruit and 100% fruit juice; vegetables included orange and green leafy vegetables, root and starchy vegetables (including sweet potatoes and potatoes), tomatoes, and other vegetables such as peppers and onions—however, fried preparations including French fried potatoes and fried onion rings were excluded); 2) at least two 3.5 oz servings/week of fish (shellfish and any fried or fast food preparations such as fried catfish and fish sandwiches were excluded); 3) at least three 1oz servings/day of fiber rich whole grains (estimated by identifying all foods on the FFQ which contained grains, and calculating the total exposure to whole grains); 4) no more than 36 fluid oz/week of sugar-sweetened beverages (including non-diet soda, fruit drinks sweet tea and sweetened coffee); 5) less than 1500 mg of sodium/day [from direct nutrient analysis of the FFQ, using the Nutrition Data System for Research, NDS-R, version 4.04, 2001 (Nutrition Coordinating Center, University of Minnesota, Minneapolis, MN)].

Smoking—At baseline, participants were asked if they had smoked at least 400 cigarettes in their life, if they currently smoked cigarettes, and the number of years since they last smoked, if participants indicated that they no longer smoked cigarettes. Participants were then classified as a current, former, or never smoker. Former smokers were further divided into those who had quit smoking less than 12 months or ≥ 12 months prior to the interview. Ideal smoking was defined as never smokers or former smoker who had quit ≥ 12 months ago. Intermediate smoking was defined as former smokers who had quit within the past year, and poor smoking was defined as current smokers.

Assessment of blood pressure (BP), fasting plasma glucose (FPG), and cholesterol

BP was calculated the average of two sitting BP measures using an appropriate cuff size[20]. FPG was measured by glucose oxidase colorimetric method using a Vitros 950 or 250, Ortho-Clinical Diagnostics analyzer at baseline and by Roche Modular P Chemistry analyzer at clinic visits 2 and 3. Total cholesterol was measured by the cholesterol oxidase method as described previously[21].

Participants were asked to bring all medications they had been taking during the two weeks prior to each clinic visit. Medications were defined as antihypertensive, hypoglycemic, or statin, based on the Therapeutic Classification System. Medication accountability was also assessed to determine if all medications were brought to the clinic visit. If needed, follow-up telephone calls were performed to obtain medication information.

Poor blood pressure was defined as systolic BP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg; intermediate as systolic BP ≥ 120 and < 140 mmHg or diastolic BP ≥ 89 and < 90 mmHg, untreated, or systolic BP < 120 mmHg and diastolic BP < 80 mmHg if treated; and ideal as systolic BP < 120 and diastolic BP < 80 mmHg, if untreated. Poor glucose was defined as

FPG ≥ 126 mg/dL or HbA1c ≥ 6.5% or reported diabetes medication use; intermediate as FPG ≥ 100 mg/dL and < 126 mg/dL, or HbA1c ≥ 5.7% and < 6.5%,untreated; and ideal as FPG < 100 mg/dL and HbA1c < 5.7% untreated. Poor cholesterol was defined as total cholesterol ≥ 240 mg/dL; intermediate as ≥ 200 mg/dL and < 240 md/dL untreated, or < 200 mg/dL treated; and ideal as < 200 mg/dL untreated.

Repeated assessment of LSS over time

Assessments of BMI, BP, FPG and total cholesterol were repeated during the JHS Visit 2 (2005–2009) and Visit 3 (2009–2013), while physical activity was reassessed only during the JHS Visit 3. Dietary intake information was available only at the JHS baseline examination.

Other important variables

Information on demographics, education, occupation, alcohol intake, healthcare access, and anthropometrics was obtained during the baseline clinic visit and during the JHS Visit 2 and Visit 3, for some factors. Waist circumference was measured at each visit in cm, at the iliac crest.

Statistical analysis

Baseline characteristics are presented for men and women as means ± standard deviations, for continuous variables, or as proportions, for categorical variables. The prevalence of ideal cardiovascular health metrics was defined as the total number of metrics that met AHA recommendations. Results were calculated among participants with complete information for all seven metrics, and were stratified by age at a given JHS visit (< 40 years, 40 – < 65 years, or ≥ 65+ years). This means that participants were allowed to age into or out of an age group for these analyses. For JHS visits 2 and 3, prevalence of poor, intermediate, and ideal metrics were calculated while accounting for missing data on each metric. Specifically, we used logistic regression to generate the odds of a missing value according to age group. Cluster probability was then used to create a weighted probability for missing. Finally, generalized estimating equations, weighted by missing probability, were used to generate probabilities with (95% CI) for ideal adjusted for gender, age group, and visit. Analysis was completed using SAS version 9.3 (SAS Institute, Cary, North Carolina), and Stata version 13 (StataCorp, College Station, TX).

Results

We analyzed data from 5301 participants of the JHS of whom (63.5%) were women. The mean age was 55.3±12.7 years at baseline, and 60.0±12.3 during the JHS visit 3. A total of 4194 subjects provided data during JHS visit 2 and 3815 during JHS visit 3. Table 1 presents baseline characteristics. Only 88.0% of the JHS participants were ideal on smoking, followed by having ideal levels of FPG (45.3%), cholesterol (45.2%), physical activity (19.3%), BP (17.8%), BMI (13.7%), and healthy diet (0.9%) (supplemental Fig. 1). The median number of ideal LSS components was only two (out of seven) in this population. Overall, only 7.3% participants were ideal on all three health factors [4.9% of men and 8.7%

of women] and almost none were ideal on all four behavioral factors [0.07% of men and 0.04% of women].

Among men, the prevalence of having 0, 1, 2, 3, 4, 5, 6, and 7 ideal cardiovascular health metrics was 3.3%, 23.0%, 33.5%, 24.7%, 11.6%, 3.6%, 0.3%, and 0%, respectively (Fig 1). Corresponding values for women were 1.7%, 26.3%, 33.1%, 22.8%, 11.9%, 3.7%, 0.6% and 0% (Fig 1). There was a shift toward fewer LSS being met with age (the median ideal LSS was 4 for those < 40, and 3 for those ≥ 65 years at baseline, Fig 1). The prevalence of ideal diet (meeting 3–5 dietary components) was extremely low (<2%) across all age groups, in both men and women (Fig 2). Among individual dietary factors, recommendations for sodium (0.2%) and whole grains (4.1%) were the least likely to be achieved (supplemental Fig 2).

From JHS visit 1 through JHS visit 3, the prevalence of being ideal for cholesterol and FPG declined, while the prevalence of being ideal on BMI declined only among participants aged <40 y (Table 2). Over time, there was a slight increase in prevalence of ideal physical activity in both men and women aged 40+ years and no change in prevalence of ideal blood pressure (Table 2).

Discussion

In this cohort, the prevalence of meeting most of the seven LSS was low at baseline, especially among older adults (65+ years). While only 88.0% of JHS participants were ideal for smoking, fewer than half met the ideal for FPG (45.3%) or total cholesterol (45.2%); and fewer than a quarter for physical activity (19.3%), blood pressure (17.8%); or BMI (13.7%). Meeting ideal dietary intakes was rare (0.9%) in this cohort, with extremely low prevalence of achieving sodium (0.2%) and whole grain (4.1%) recommendations. We observed mixed results over time of LSS. From the baseline clinic visit (2000–2004) through the JHS visit 3 (2009–2013), the proportions of participants that were ideal on total cholesterol and FPG declined across all ages, whereas a decline in prevalence of ideal BMI was mostly observed in people aged <40 y. While the prevalence of ideal BP was stable over time, we observed a slight increase in prevalence of ideal physical activity among participants aged 40+ y.

Few data are available on the prevalence of LSS in African-Americans. In the Heart Strategies Concentrating on Risk Evaluation study[22], none of the 855 African-American participants was ideal on all seven cardiovascular health metrics. Other investigators have reported similarly low prevalence of ideal LSS from other ethnic groups. In the 2003–2008 NHANES data[7], none of the African-American adults met all 7 LSS, and the number of ideal LSS was inversely related with age, consistent with the pattern reported here in the JHS. The prevalence of meeting all seven LSS has also been shown to be low in a variety of predominantly non-Hispanic white populations ranging from 0% to 1% only[23–26]. Studies in Chinese populations also show low prevalence of meeting all 7 LSS (0.1% to 1.5%)[27–29].

Among individual LSS, having an ideal dietary score was the least achieved among JHS participants (0.9%), partly due to 0.2% and 4.1% prevalence for meeting sodium and whole grain recommendations, respectively. This observation is not unique to the JHS, as data from the NHANES 2003–2008 reported a low prevalence for ideal diet score among Americans (range of 0.2% to 2.6% across various sex-, ethnic-, and age groups)[7]. Data from the ARIC cohort also showed that being ideal on diet score was least likely to be met [5.3% among total ARIC participants and 4.4% among African-American participants of ARIC study][30]. In a Spanish cohort of 11,408 adults, the prevalence of having an ideal diet score was 0.4% in men and 0.6% in women and did not vary by age or educational attainment[31]. Consistent with JHS data, sodium was the item least likely to be met in the Young Finns study (~4%)[25] or Spanish cohort (<10%)[31]. Other investigators have reported prevalences of ideal diet score from 0% to 5%[32,33].

This is the first study to examine longitudinal changes in LSS in a large cohort of African-Americans. We observed a decline over time in the likelihood of meeting most LSS ideals, including BMI, cholesterol, and FPG while prevalence of ideal BP did not change. Given that many of these health changes are consistent with expectation during this period of aging, it is encouraging that the measure of physical activity tended to improve during the same period of time in adults aged 40+. Unfortunately, the JHS did not have repeated data on diet or smoking to assess changes in those factors. A low prevalence of being ideal on diet, especially sodium intake underscores the need for future repeated dietary assessment in JHS.

As noted above, we only had baseline data on smoking (without information on duration since quitting smoking) and dietary habits for current analyses. This precludes us from evaluating any possible changes in dietary and smoking habits among JHS participants over time. Furthermore, self-reported physical activity was only assessed at baseline and during the JHS visit 3 and we were not able to collect data on all domains of physical activity. We cannot exclude misclassification of LSS measured via self-report. Nonetheless, it is less likely that such misclassification would change the conclusion of our report as subjects might have been more likely to report the desirable behavior (ideal factor) more often than the poor behavior. In addition, several individuals had missing data on LSS. Although we used a statistical approach to account for missing data, we acknowledge the fact that such approach is not perfect and cannot exclude an under- or overestimation of LSS prevalence in this study. The apparent contradiction between observed decline in CVD rates and outcomes over time in the US in all ethnic groups and our extreme low prevalence of ideal LSS in JHS could be due to inaccuracy associated with LSS assessment. Alternatively, drug treatment (i.e., statin use) and other treatments may be more related to CVD outcomes than LSS.

Strengths of this study include a large sample size, availability of repeated measurements on many of the LSS, use of standardized protocol to collect key data, and generalizability of the results among African-Americans in the southern US.

Our data are consistent with a low prevalence of ideal LSS in the JHS. Because adherence to LSS has been associated with lower incidence of CVD[30], cancer[32], mortality[26,34,35], and lower risk of subclinical disease[24,25], it is likely that improvement of LSS in the African-American community could help reduce the burden of CVD. Future endeavors to improve LSS, including dietary patterns and various measures of adiposity, are necessary to improve cardiovascular health in African-Americans.

Perspectives

The very low prevalence of ideal cardiovascular health among participants of the JHS, in particular extremely low prevalence of ideal BMI, physical activity, and diet, underscores the need for reassessment of tools and strategies available to achieve the AHA 2020 goal among African-Americans; provides specific targets for clinical and public health interventions (i.e., diet, physical activity, and adiposity); and might help explain the burden of CVD in stroke-belt regions of the US. The current findings of extremely low attainment of ideal diet score (<1%) may inform the design and implementation of novel strategies that are unique to African-Americans. The high prevalence of sodium intake above 1.5 g/d and the very low consumption of whole grains in this cohort also provide a second prevention target and emphasize the need for repeated assessment of sodium intake (i.e. via urine collection) and other dietary components during future JHS examination cycles.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviation list

AHA	American Heart Association
BMI	Body mass index
BP	blood pressure
CI	Confidence interval
CVD	Cardiovascular disease
FFQ	Food frequency questionnaire
FPG	Fasting plasma glucose
JHS	Jackson Heart Study
LSS	Life’s simple seven
MET	Metabolic equivalent

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Highlights

- About 60% of African-Americans from the Jackson Heart Study met <3 ideal LSS
- Prevalence of ideal diet was only 0.9%
- Prevalence of ideal BMI declined only in participants <40 years at a given visit
- Prevalence of ideal blood pressure did not change over time
- Being ideal on physical activity improved from the first to third visit

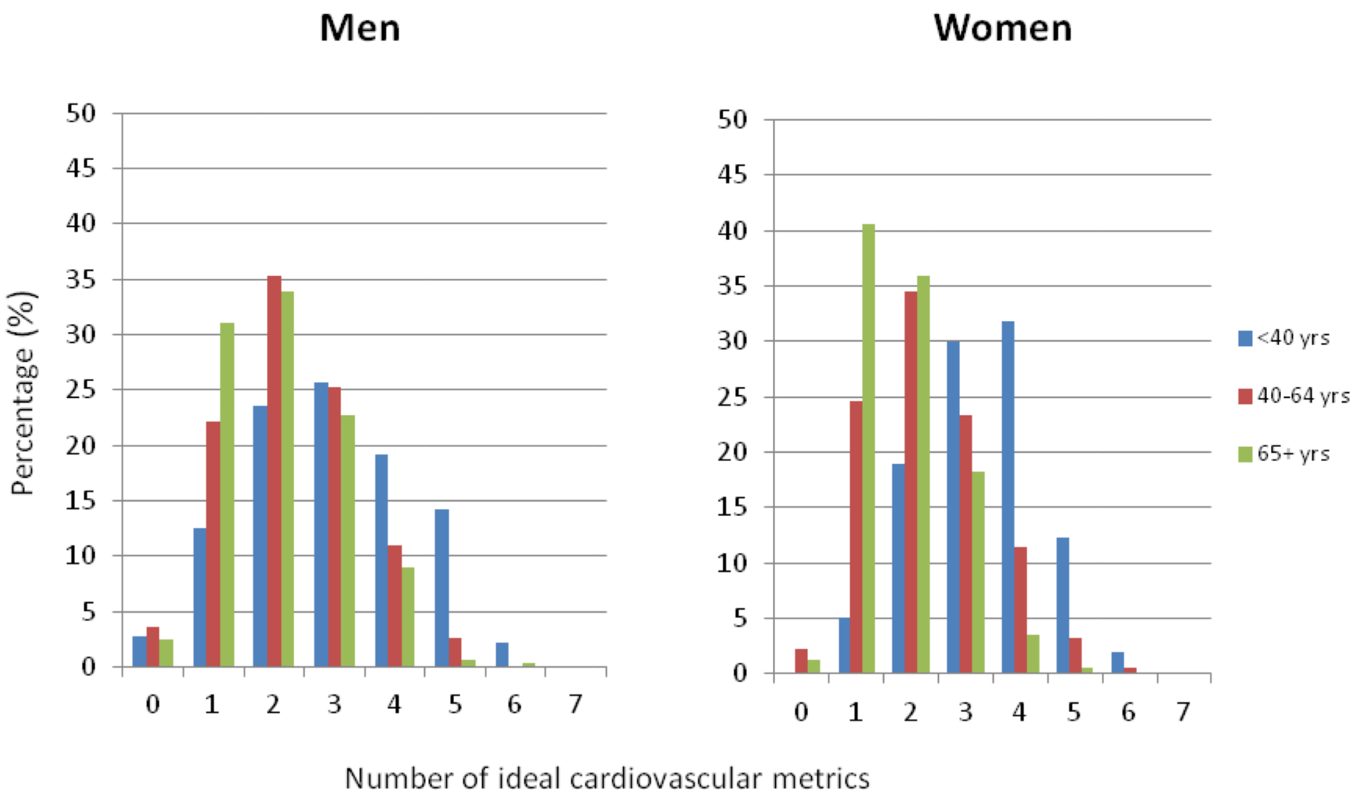

Figure 1.
Number of ideal cardiovascular health components in the JHS

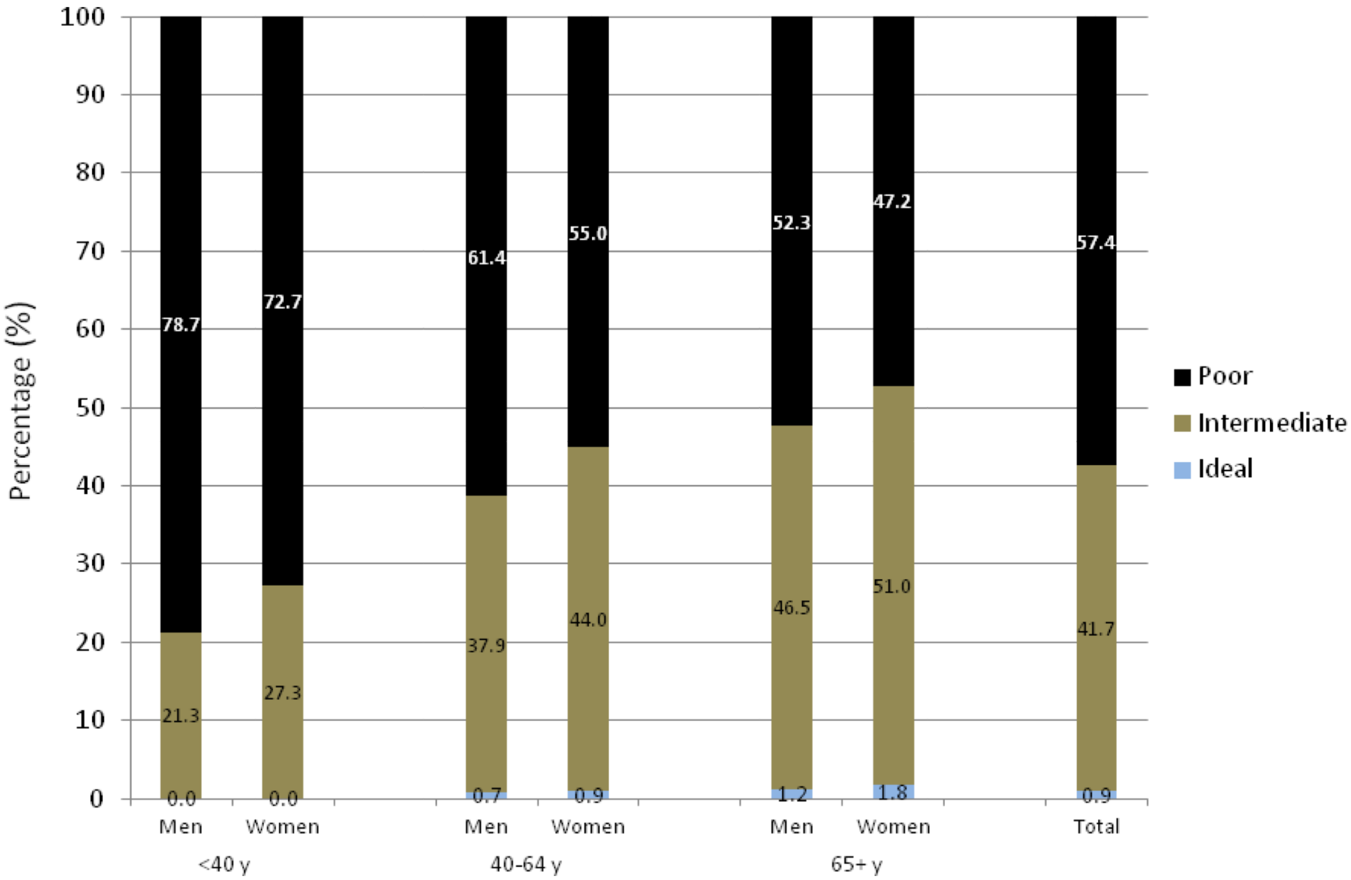

Figure 2.
Prevalence of ideal, intermediate, and poor dietary score by age and sex

Table 1

Baseline Characteristics of African Americans adults in the Jackson Heart Study*

Characteristics	Men N=1934	Women N=3367	Total N=5301
Age (y)	54.6 ± 13.0	55.8 ± 12.8	55.4 ± 12.8
Body mass index (kg/m^2)	29.9 ± 6.1	32.8 ± 7.6	31.8 ± 7.2
Waist circumference (cm)	101 ± 15	100 ± 17	101 ± 16
Education (%)			
Less than high school	21.0	19.9	20.3
High school graduate/GED	17.7	18.8	18.4
>High School but < Bachelor’s degree	29.1	28.4	28.6
Bachelor degree or higher	31.9	32.6	32.3
Current alcohol use (%)	58.7	38.1	45.6
Current smoking (%)	18.1	10.2	13.1
Comorbidity			
Prevalent coronary heart disease (%)	9.5	6.4	7.6
Prevalent type 2 diabetes (%)	20.2	22.6	21.7
Prevalent hypertension (%)	58.4	63.1	61.4
Occupation (%)			
Production	23.6	9.8	14.8
Service	16.0	30.5	25.2
Management/professional	30.9	38.1	35.4
Have health insurance (%)	86.0	86.3	86.2

*Few participants had missing data: BMI (n=9), waist circumference (n=9), education (n=20), current alcohol use (n=30), smoking (n=48), prevalent diabetes (n=61), hypertension (n=6), occupation (n=6), health insurance (n=25)

Table 2

Prevalence of ideal LSS at each JHS visit according to attained age at a given visit and accounting for missing data

	Men			Women		
	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3
Ideal physical activity*						
Age (y)						
<40	36.4 (30.8–42.0)	-	34.5 (25.3–43.7)	22.5 (18.4–26.6)	-	17.1 (8.6–25.7)
40–<65	22.5 (20.3–24.7)	-	31.6 (28.6–34.6)	17.7 (16.1–19.3)	-	23.4 (21.1–25.6)
65+	15.9 (12.9–19.0)	-	26.7 (23.4–29.8)	12.4 (10.3–14.5)	-	19.7 (17.5–21.9)
Ideal body mass index						
Age (y)						
<40	19.5 (15.7–23.3)	10.8 (5.8–15.7)	†	17.2 (14.2–20.2)	10.7 (6.3–15.1)	†
40–<65	17.9 (16.1–19.8)	14.5 (12.6–16.4)	14.7 (12.7–16.7)	11.7 (10.5–12.9)	10.6 (9.3–11.8)	9.7 (8.3–11.1)
65+	19.5 (16.6–22.4)	18.6 (16.0–21.1)	20.7 (18.2–23.2)	11.5 (9.6–13.4)	12.9 (11.2–14.6)	13.9 (12.3–15.6)
Ideal fasting glucose						
Age (y)						
<40	59.0 (53.7–64.3)	40.4 (32.4–48.4)	34.9 (25.2–44.6)	69.0 (65.0–72.9)	51.0 (43.9–58.1)	46.1 (37.0–55.3)
40–<65	43.4 (40.9–45.9)	27.1 (24.4–29.9)	20.9 (18.2–23.6)	46.2 (44.2–48.2)	30.6 (28.3–32.8)	25.0 (22.8–27.3)
65+	32.7 (29.2–36.2)	24.7 (21.6–27.9)	23.9 (21.2–26.7)	29.1 (26.5–31.7)	21.8 (19.7–24.0)	21.6 (19.7–23.6)
Ideal cholesterol						
Age (y)						
<40	52.3 (46.8–57.7)	52.0 (43.9–60.1)	48.2 (39.4–57.0)	61.5 (57.3–65.7)	62.6 (55.6–69.6)	58.9 (51.0–66.9)
40–<65	49.6 (46.9–52.3)	45.6 (42.3–48.9)	40.5 (37.3–43.6)	45.3 (43.2–47.3)	42.7 (40.1–45.3)	37.6 (35.2–40.1)
65+	41.7 (37.7–45.8)	41.1 (36.8–45.5)	33.4 (30.0–36.8)	32.2 (29.3–35.2)	33.1 (30.0–36.1)	25.4 (23.0–27.7)
Ideal blood pressure						
Age (y)						
<40	28.6 (23.4–33.88)	28.4 (21.0–35.8)	25.5 (16.4–34.5)	43.5 (39.1–47.9)	39.3 (32.5–46.0)	36.7 (28.0–45.5)
40–<65	15.3 (13.5–17.04)	15.5 (13.3–17.6)	14.1 (12.0–16.3)	18.7 (17.1–20.2)	14.9 (13.2–16.6)	14.0 (12.2–15.7)
65+	5.9 (3.8–8.1)	9.7 (7.7–11.7)	8.3 (6.6–10.1)	7.1 (5.8–8.4)	6.8 (5.6–8.1)	5.9 (4.8–7.0)

* Physical activity was assessed at JHS visit 1 and 3 only; data restricted to LSS assessed at more than one visit to assess any change over time. Smoking and diet were only assessed at visit 1.

† Unable to estimate confidence interval due to very small numbers.

Sample sizes included 1934 male participants at JHS visit 1 (2000–2004); 1474 participants at JHS visit 2 (2005–2009); and 1377 people at JHS visit 3 (2009–2013).

Corresponding numbers for female were 3367, 2720, and 2438, respectively.