



# Cardiovascular health among young men and women in Puerto Rico as assessed by the Life Essential 8 Metrics



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Cynthia M. Pérez, PhD<sup>1</sup>; Andrea López-Cepero, PhD<sup>2</sup>; Israel Almodóvar-Rivera, PhD<sup>3</sup>; Catarina Kiefe, PhD, MD<sup>4</sup>; Katherine L. Tucker, PhD<sup>5</sup>; Sharina Person, PhD<sup>4</sup>; Josiemer Mattei, PhD<sup>6</sup>; José Rodríguez-Orengo, PhD<sup>7</sup>; Polaris Torres, MS<sup>1</sup>; Claudia Boneu, MPH<sup>1</sup>; Krisyalie Morales<sup>1</sup>; Milagros C. Rosal, PhD<sup>4</sup>.

<sup>1</sup>Graduate School of Public Health, University of Puerto Rico, Medical Sciences Campus, San Juan, PR; <sup>2</sup>Rollins School of Public Health, Emory University, Atlanta, GA; <sup>3</sup>College of Arts and Sciences, University of Puerto Rico-Mayaguez Campus, Mayaguez, PR; <sup>4</sup>UMass Chan Medical School, Worcester, MA; <sup>5</sup>UMass Lowell Zuckerberg College of Health Sciences, Lowell, MA; <sup>6</sup>Harvard T.H. Chan School of Public Health, Boston, MA; <sup>7</sup>School of Medicine, University of Puerto Rico, Medical Sciences Campus, San Juan, PR.

## Abstract

**Introduction:** Cardiovascular health (CVH), as measured by Life's Essential 8 metrics, in young adults in the United States falls below ideal levels, with noticeable sex differences. While poor CVH in early adulthood is associated with later cardiovascular disease (CVD), research examining sex differences in CVH among young Puerto Ricans is scarce. This study compared CVH in a large cohort of young men and women residing in Puerto Rico, an understudied population where CVD prevalence in middle-aged and older adults is elevated.

**Methods:** We examined data from 2,162 adults aged 18-29 in the PR-OUTLOOK study conducted between 2020 and 2023. CVH scores, graded on a 0 (worst) to 100 (best) scale, were derived from survey responses, physical exams, and laboratory assays. Linear regression was employed to determine adjusted means for CVH scores by sex, controlling for age, marital status, education, childhood material deprivation, subjective social status, health insurance, and depressive symptoms.

**Results:** CVH was less-than-ideal (score < 80) in 72% of the cohort (70% of women, 76% of men,  $p < 0.05$ ). Men had significantly lower overall mean CVH scores than women (71 vs. 73) and lower scores for nicotine exposure (78 vs. 87), non-HDL cholesterol (81 vs. 87), and blood pressure (80 vs. 92). Women had significantly lower physical activity scores (50 vs. 60) compared to men.

**Conclusion:** Less-than-ideal CVH is notable among young men and women, with men having worse CVH than women. These identified sex differences warrant further investigation and the design of interventions to enhance and preserve CVH among men and women.

## Introduction

### Background

- Cardiovascular health (CVH), as measured by the American Heart Association (AHA) Life's Essential 8 (LE8) metrics, in young adults in the US falls below ideal levels, with noticeable sex differences<sup>1</sup>.
- Emerging evidence supports significant variation in CVH among Hispanic/Latino individuals in the US by sex and heritage group<sup>2</sup>.
- Men and those of Puerto Rican background are less likely to meet favorable CVH criteria.
- While poor CVH in early adulthood is associated with later cardiovascular disease<sup>3-5</sup>, research examining sex differences in CVH among young Puerto Ricans is scarce.

### Objective

- This study compared CVH metrics in a large cohort of young men and women residing in Puerto Rico, an understudied population where CVD prevalence in middle-aged and older adults is elevated<sup>6</sup>.

## Methods

### Design

- Cross-sectional analysis of PR-OUTLOOK baseline data collected between September 2020 and November 2023.
- 2,162 Puerto Rican adults aged 18-29 completed all study procedures.

### Measures

- CVH, measured by the AHA LE8 metric<sup>1</sup>, includes:
  - Behavioral factors** (online survey and food frequency questionnaire)
    - Diet quality (Mediterranean Eating Pattern for Americans tool), physical activity, nicotine exposure, and sleep duration
  - Health factors** (physical examination and laboratory measurements)
    - BMI, non-high-density lipoprotein cholesterol (non-HDL-C), blood pressure (SBP and DBP), and blood glucose
- Overall score was calculated by adding the scores for each component and dividing the total by 8, providing an average LE8 score ranging from 0 to 100. Higher scores indicate better CVH.
- CVH was further categorized as ideal (80-100), intermediate (50-79), and poor (0-49), as recommended by the AHA algorithm<sup>1</sup>.
- Covariates:** Age, marital status, education, childhood material deprivation, subjective social status (MacArthur Scale), health insurance, and depressive symptoms (CES-D-10 scale  $\geq 10$ ).

### Statistical analysis

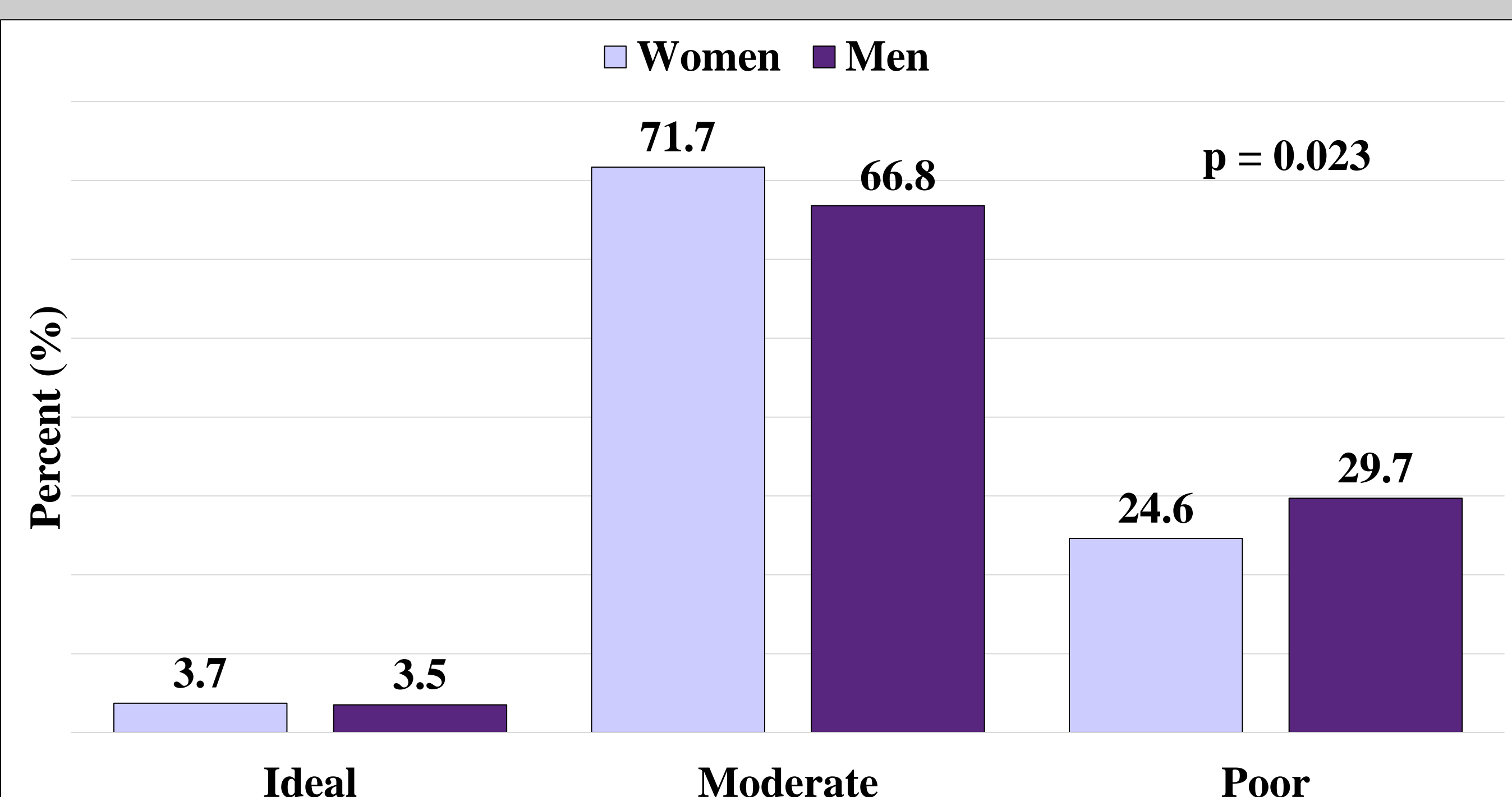
- Sex differences for baseline characteristics were assessed using Student's t or Chi-square tests.
- Linear regression models were employed to determine adjusted means for CVH metric scores by sex, controlling for covariates.

## Results

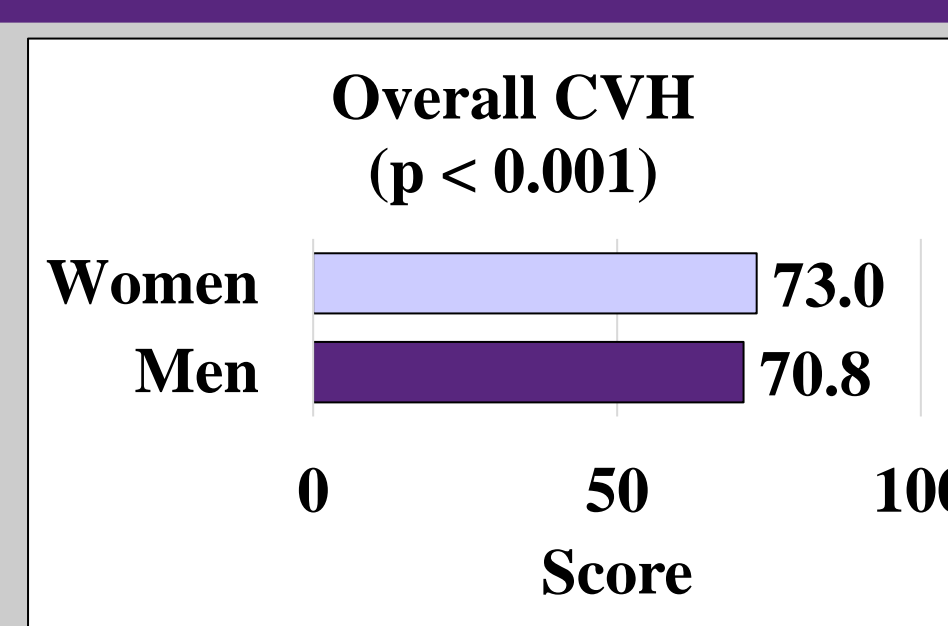
**Table 1.** Baseline characteristics of the sample of young adults by sex, PR-OUTLOOK 2020-2023 (n=2,162)\*

Characteristic	Women n=1,317	Men n=845	P value
Age, mean (sd)	22.7 (3.1)	22.5 (3.1)	0.15
Not married	1,141 (86.6)	752 (89.0)	0.11
College graduate or higher	610 (46.4)	319 (37.8)	<0.001
Childhood material deprivation	460 (34.9)	247 (29.2)	0.006
Subjective social status (range: 1-10)	5.2 (1.6)	5.2 (1.6)	0.62
Private health insurance	790 (60.0)	542 (64.1)	0.001
Depressive symptomatology	844 (64.1)	426 (50.4)	<0.001
Overweight/Obesity	663 (50.3)	438 (51.8)	0.40
Blood pressure $\geq 120/80$ mm Hg	216 (16.4)	430 (50.9)	<0.001
Total cholesterol $\geq 200$ mg/dl	132 (10.0)	84 (9.9)	0.88
HDL cholesterol <40 mg/dl in men & <50 mg/dl in women	576 (43.7)	258 (30.5)	<0.001
LDL cholesterol $\geq 100$ mg/dl	498 (37.7)	372 (44.0)	0.01
Triglycerides $\geq 150$ mg/dl	86 (6.5)	113 (13.4)	<0.001

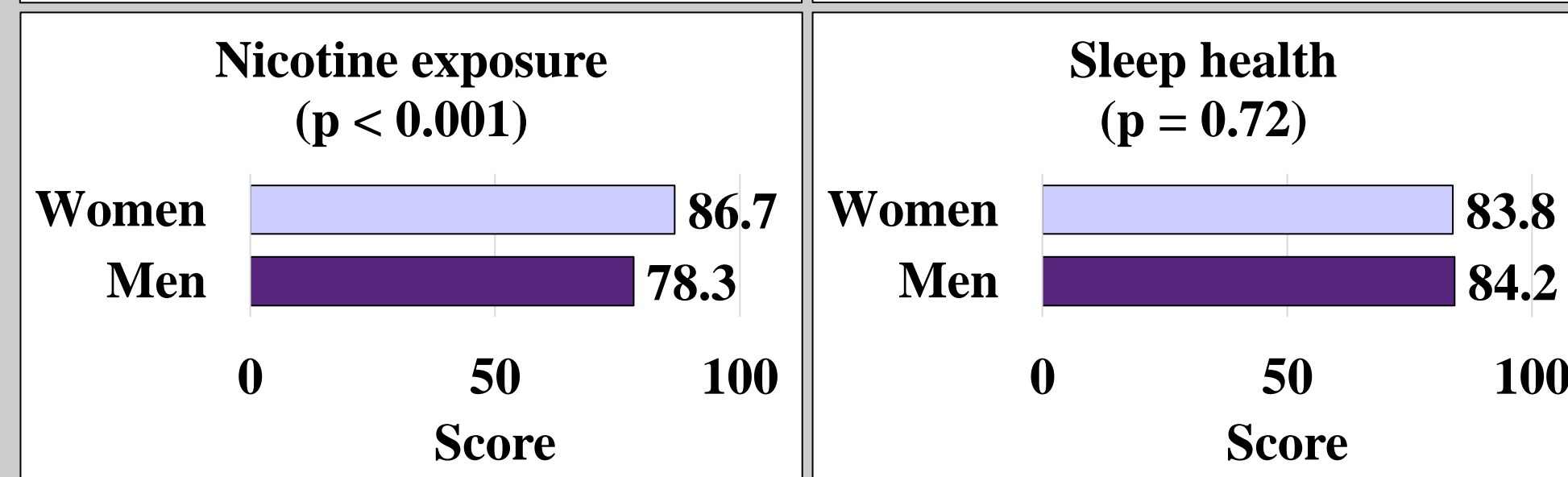
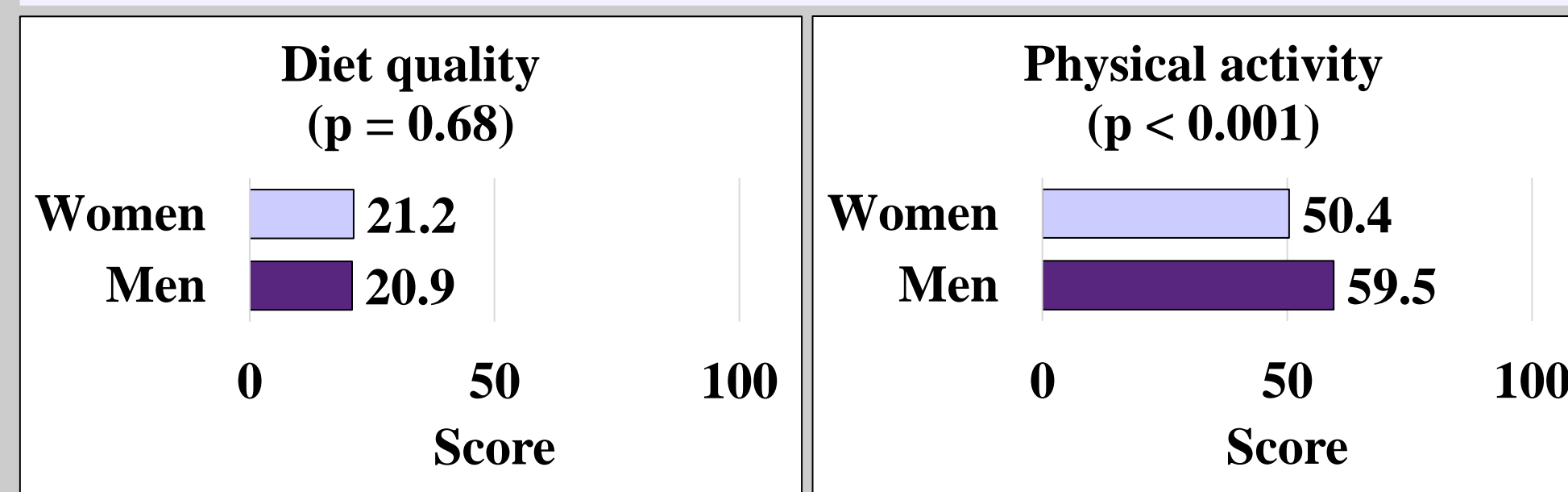
\*Data are presented as mean (SD) or n (%).



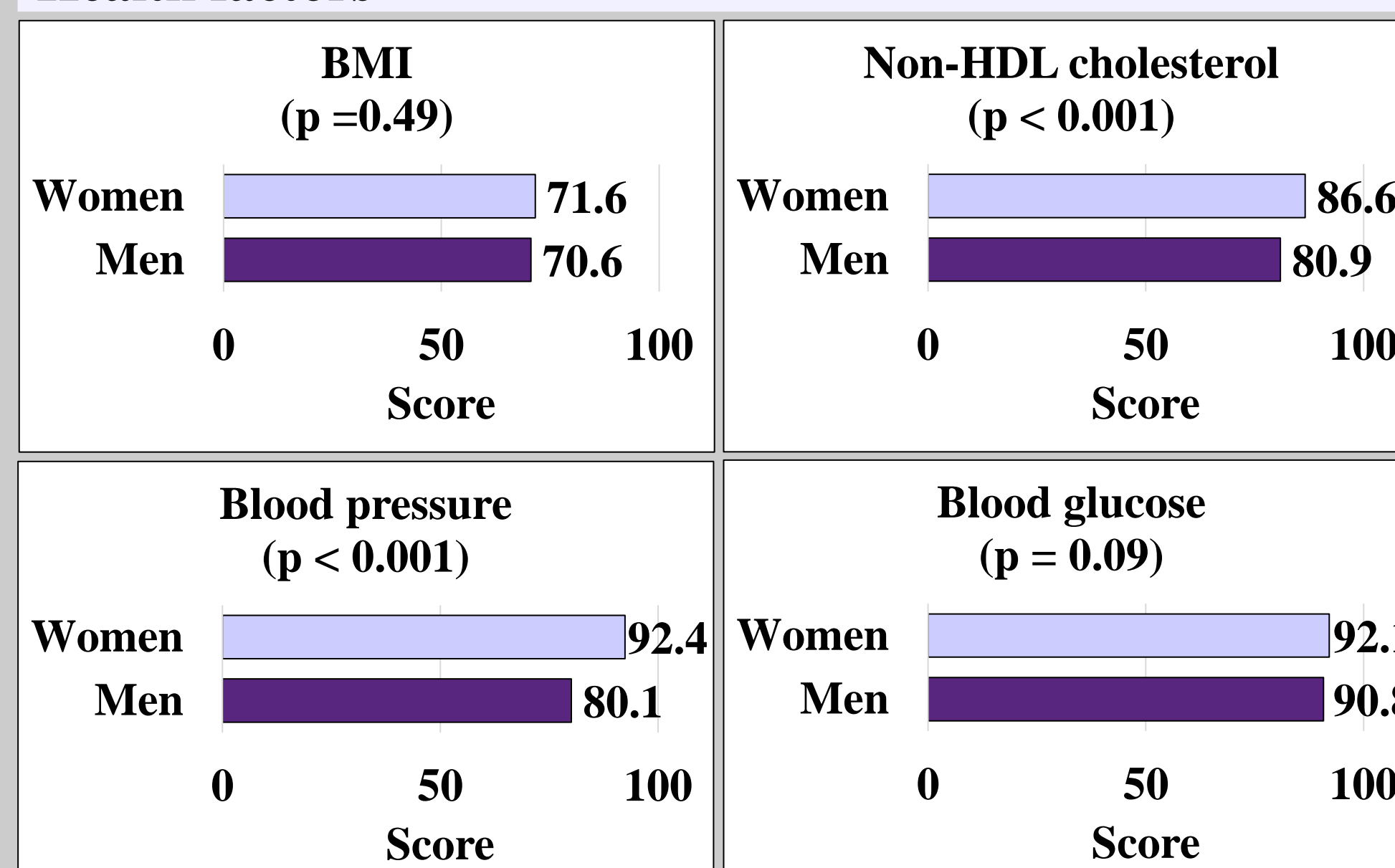
**Figure 1.** Overall CVH categories by sex among young adults in Puerto Rico, PR-OUTLOOK 2020-2023 (n=2,162).



### Behavioral factors



### Health factors



**Figure 2.** Adjusted means in overall and individual CVH metric components, PR-OUTLOOK 2020-2023 (n=2,162)

## Conclusion

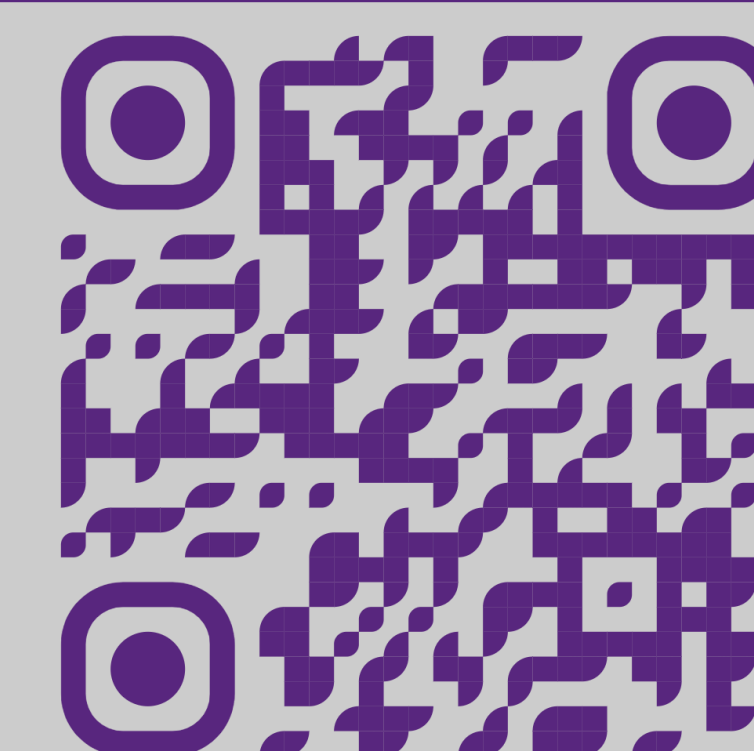
- CVH of young adults in this community sample of young adults in Puerto Rico falls below the ideal range, with men showing worse CVH than women, findings consistent with previous studies among young adults.<sup>7</sup>
  - These findings emphasize the need for tailored interventions to improve CVH among young adults, addressing specific areas where both sexes show less-than-ideal CVH components.
- Future research should focus on understanding the factors contributing to sex-related differences in CVH to inform these interventions.

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The study was approved by the UPR-MSC Institutional Review Board (protocol #2290033724A008).

## References



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