Racial Disparities in Coronary Artery Disease Prevalence: insights from the National Health and Nutrition Examination Survey

Muhammad Saad

## Preamble:

* **Reference Papers:**
  + [M. Talha et al. 2024](https://journals.sagepub.com/doi/10.1177/17539447241239814)
* **Study Objective**: To examine racial and ethnic disparities in coronary artery disease (CAD) prevalence and outcomes among young to middle-aged adults in the United States.
* **Data Source**: Cross-sectional analysis of the National Health and Nutrition Examination Survey (NHANES) from 2005 to 2018.
* **Population**: Adults aged 20-64 years with self-reported coronary artery disease.
* **Race Categories**:
  + Non-Hispanic White (NH White)
  + Non-Hispanic Black (NH Black)
  + Hispanic
* **Outcome**:
  + Prevalence of Coronary Artery Disease
* **Statistical Analysis**: Multiple logistic regression was used to assess the independent association of race/ethnicity with coronary artery disease (CAD) prevalence adjusted for:
  + Demographics: Age, sex, race/ethnicity, insurance coverage, and waist circumference.
  + Medical History: Hypertension, diabetes mellitus, hyperlipidemia, cancer, stroke, heart failure, chronic obstructive pulmonary disease (COPD), and arthritis.
  + Lifestyle Factors: Smoking status
* **Software:** All statistical analyses were conducted using R Version 4.4.1, incorporating sampling weights, primary sampling units, and strata to ensure the accuracy and generalizability of the results.

## Baseline Table:

| **Characteristic** | **Non-Hispanic White adults** N = 3,878,081*1* | **Non-Hispanic Black adults** N = 741,275*1* | **Hispanic adults** N = 639,786*1* | **p-value***2* | **Overall** N = 5,259,142*1* |
| --- | --- | --- | --- | --- | --- |
| Unweighted Sample, n |  |  |  |  |  |
| 1 | 468 (100%) | 273 (100%) | 270 (100%) |  | 1011 (100%) |
| Age | 54 (1) | 52 (1) | 51 (1) | 0.014 | 53 (0) |
| Age groups |  |  |  | 0.18 |  |
| 20-39 | 50 (9.8%) | 23 (12%) | 24 (16%) |  | 97 (11%) |
| 40-64 | 418 (90%) | 250 (88%) | 246 (84%) |  | 914 (89%) |
| Sex |  |  |  | 0.019 |  |
| Men | 291 (62%) | 144 (50%) | 151 (58%) |  | 586 (60%) |
| Women | 177 (38%) | 129 (50%) | 119 (42%) |  | 425 (40%) |
| Education level |  |  |  | <0.001 |  |
| Less than 9th grade | 34 (4.3%) | 15 (6.1%) | 82 (26%) |  | 131 (7.2%) |
| 9-11th grade (Includes 12th grade with no diploma) | 88 (14%) | 62 (22%) | 51 (18%) |  | 201 (15%) |
| High school graduate/GED or equivalent | 129 (30%) | 67 (24%) | 52 (24%) |  | 248 (28%) |
| Some college or AA degree | 155 (35%) | 93 (35%) | 61 (25%) |  | 309 (34%) |
| College graduate or above | 62 (17%) | 36 (14%) | 22 (7.9%) |  | 120 (16%) |
| Marital status |  |  |  | <0.001 |  |
| Divorced | 109 (21%) | 57 (19%) | 46 (15%) |  | 212 (20%) |
| Living with partner | 35 (7.6%) | 19 (8.5%) | 12 (4.5%) |  | 66 (7.3%) |
| Married | 239 (55%) | 89 (32%) | 154 (59%) |  | 482 (52%) |
| Never married | 45 (9.1%) | 48 (19%) | 28 (13%) |  | 121 (11%) |
| Separated | 18 (4.0%) | 30 (11%) | 13 (4.7%) |  | 61 (5.1%) |
| Widowed | 22 (3.7%) | 30 (11%) | 17 (3.8%) |  | 69 (4.7%) |
| Insurance | 387 (86%) | 242 (87%) | 199 (73%) | <0.001 | 828 (84%) |
| BMI |  |  |  | 0.25 |  |
| <18.5 | 10 (1.8%) | 3 (1.5%) | 3 (2.2%) |  | 16 (1.8%) |
| 18.5–24.9 | 71 (14%) | 51 (20%) | 32 (13%) |  | 154 (15%) |
| 25–29.9 | 119 (28%) | 53 (21%) | 89 (34%) |  | 261 (27%) |
| ⩾30.0 | 246 (56%) | 148 (57%) | 133 (52%) |  | 527 (56%) |
| Waist circumference |  |  |  | 0.13 |  |
| Normal | 115 (26%) | 70 (30%) | 80 (35%) |  | 265 (28%) |
| High | 317 (74%) | 169 (70%) | 165 (65%) |  | 651 (72%) |
| Smoking status |  |  |  | <0.001 |  |
| Never | 117 (30%) | 91 (35%) | 125 (45%) |  | 333 (33%) |
| Past | 143 (32%) | 68 (22%) | 93 (34%) |  | 304 (31%) |
| Current daily/nondaily smoker | 207 (38%) | 114 (44%) | 52 (22%) |  | 373 (37%) |
| *1*n (unweighted) (%); Mean (SE) | | | | | |
| *2*Design-based KruskalWallis test; Pearson's X^2: Rao & Scott adjustment | | | | | |

## Comorbidities Table:

| **Characteristic** | **Non-Hispanic White adults** N = 3,878,081*1* | **Non-Hispanic Black adults** N = 741,275*1* | **Hispanic adults** N = 639,786*1* | **p-value***2* | **Overall** N = 5,259,142*1* |
| --- | --- | --- | --- | --- | --- |
| Hypertension | 316/468 (67%) | 233/273 (84%) | 184/270 (66%) | <0.001 | 733/1011 (69%) |
| Mean systolic blood pressure | 124 (1) | 132 (2) | 125 (2) | <0.001 | 125 (1) |
| Mean diastolic blood pressure | 72 (1) | 76 (1) | 72 (1) | 0.020 | 73 (1) |
| Diabetes | 142/454 (30%) | 100/259 (35%) | 102/263 (33%) | 0.54 | 344/976 (31%) |
| Hyperlipidemia | 291/445 (69%) | 171/256 (65%) | 166/241 (62%) | 0.16 | 628/942 (68%) |
| Cancer | 75/467 (17%) | 26/273 (8.4%) | 21/269 (5.9%) | <0.001 | 122/1009 (14%) |
| Stroke | 87/468 (15%) | 57/272 (21%) | 32/267 (9.2%) | 0.034 | 176/1007 (16%) |
| Heart Failure | 111/466 (18%) | 92/272 (34%) | 72/262 (28%) | <0.001 | 275/1000 (22%) |
| COPD | 153/468 (31%) | 63/271 (24%) | 40/268 (16%) | 0.001 | 256/1007 (28%) |
| Arthritis | 273/468 (55%) | 153/273 (54%) | 127/270 (39%) | 0.007 | 553/1011 (53%) |
| Obesity | 246/446 (56%) | 148/255 (57%) | 133/258 (52%) | 0.56 | 527/959 (56%) |
| *1*n (unweighted)/N (unweighted) (%); Mean (SE) | | | | | |
| *2*Pearson's X^2: Rao & Scott adjustment; Design-based KruskalWallis test | | | | | |

## Multivariable Logistic Regression:

### Prevalence of CAD:

#### Unadjusted ORs

| **Characteristic** | **OR** **(95% CI)***1* | **p-value** |
| --- | --- | --- |
| Race/Ethnicity |  |  |
| Non-Hispanic White adults | — |  |
| Non-Hispanic Black adults | 1.01 (0.84 to 1.21) | 0.92 |
| Hispanic adults | 0.67 (0.55 to 0.81) | <0.001 |
| *1*OR = Odds Ratio, CI = Confidence Interval | | |

#### Adjusted ORs

| **Characteristic** | **OR** **(95% CI)***1* | **p-value** |
| --- | --- | --- |
| Race/Ethnicity |  |  |
| Non-Hispanic White adults | — |  |
| Non-Hispanic Black adults | 0.75 (0.59 to 0.95) | 0.019 |
| Hispanic adults | 1.01 (0.77 to 1.31) | 0.96 |
| Age | 1.05 (1.04 to 1.06) | <0.001 |
| Sex |  |  |
| Men | — |  |
| Women | 0.53 (0.42 to 0.67) | <0.001 |
| Insurance |  |  |
| No | — |  |
| Yes | 1.02 (0.74 to 1.39) | 0.92 |
| Waist Circumference |  |  |
| Normal | — |  |
| High | 0.99 (0.72 to 1.36) | 0.93 |
| Smoking Status |  |  |
| Never | — |  |
| Past | 1.64 (1.21 to 2.23) | 0.002 |
| Current daily/nondaily smoker | 2.44 (1.86 to 3.21) | <0.001 |
| Hypertension | 2.24 (1.76 to 2.85) | <0.001 |
| Diabetes Mellitus | 1.78 (1.29 to 2.45) | <0.001 |
| Hyperlipidemia | 2.08 (1.60 to 2.70) | <0.001 |
| Cancer | 1.03 (0.69 to 1.56) | 0.87 |
| Stroke | 5.62 (3.48 to 9.07) | <0.001 |
| Heart Failure | 19.2 (12.7 to 28.9) | <0.001 |
| COPD | 2.35 (1.73 to 3.20) | <0.001 |
| Arthritis | 1.64 (1.28 to 2.10) | <0.001 |
| Obesity | 1.14 (0.85 to 1.51) | 0.38 |
| *1*OR = Odds Ratio, CI = Confidence Interval | | |