

# The Relationship of Body Mass Index, Cardiovascular Disease, and Diabetes in a Population-Based Sample of Nevada Women

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## Background

- About half of US adults aged 18 years and older have a chronic condition.<sup>1</sup>
- In 2011, heart disease was the leading cause of death among women.<sup>2</sup>
- Body mass index (BMI) is a risk factor for most chronic diseases such as coronary heart disease, diabetes, and stroke.<sup>3</sup>
- However, there is a dearth of knowledge on the relationship between BMI, cardiovascular disease and diabetes among Nevada women .
- We assessed the relationship between BMI and cardiovascular disease using a population-based sample of Nevada women.

## Methods

- The 2011 Nevada BRFSS telephone survey was conducted with a random sample of 3,252 women in Nevada, of whom 152 (4%), 295 (9%), 1,144 (28%), 168 (4%), and 140 (4%) reported coronary heart disease, diabetes, hypertension, heart attack, and stroke respectively.
- Measures included:
  - Demographics
  - Body mass index (BMI)
  - Physical activity
  - Cholesterol
  - Depression (PHQ-8 score  $\geq 10$ )
  - Cardiovascular disease
- We used bivariate and surveylogistic regression analysis. Surveylogistic was used to assess the relationship between BMI coronary heart disease, diabetes, hypertension, heart attack, and stroke among Nevada women. We used forward selection in the creation of models and assessed for collinearity using the collin SAS macro. <sup>4</sup>

## References

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## Results

**Table 1: Characteristics of Nevada women, 2011 BRFSS (N= 3,252)**

| Characteristic         | N=3,252<br># (%) <sup>a</sup> |
|------------------------|-------------------------------|
| Age (years)            |                               |
| 18-54                  | 1,460 (67)                    |
| 55-64                  | 788 (16)                      |
| 65+                    | 1,004 (18)                    |
| Race/Ethnicity         |                               |
| White                  | 2,541 (59)                    |
| Hispanic               | 123 ( 7)                      |
| Black                  | 290 (22)                      |
| Other race             | 263 (12)                      |
| Annual income          |                               |
| <\$24,999              | 845 (39)                      |
| \$25,000 to 49,999     | 742 (27)                      |
| \$50,000+              | 1,154 (34)                    |
| Education              |                               |
| Less than H.S.         | 226 (18)                      |
| H.S. or G.E.D.         | 916 (30)                      |
| Some Post H.S.         | 1,102 (34)                    |
| College Graduate       | 999 (18)                      |
| Marital status         |                               |
| Married                | 1,622 (50)                    |
| Unmarried              | 1,609 (50)                    |
| Smoking status         |                               |
| Current smoker         | 627 (20)                      |
| Former smoker          | 953 (22)                      |
| Never smoker           | 1,659 (57)                    |
| Physical activity      |                               |
| Yes                    | 2,296 (74)                    |
| No                     | 732 (26)                      |
| Body mass index        |                               |
| Normal                 | 1,290 (47)                    |
| Overweight             | 920 (29)                      |
| Obese                  | 703 (24)                      |
| Depression             |                               |
| Yes                    | 1,988 (86)                    |
| No                     | 257 (14)                      |
| Cholesterol            |                               |
| Yes                    | 1,100 (36)                    |
| No                     | 1,668 (64)                    |
| Hypertension           |                               |
| Yes                    | 1,144 (28)                    |
| No                     | 2,100 (72)                    |
| Coronary heart disease |                               |
| Yes                    | 152 ( 4)                      |
| No                     | 3,071 (96)                    |
| Diabetes               |                               |
| Yes                    | 295 ( 9)                      |
| No                     | 2,948 (91)                    |
| Heart attack           |                               |
| Yes                    | 168 ( 4)                      |
| No                     | 3,073 (96)                    |
| Stroke                 |                               |
| Yes                    | 140 ( 4)                      |
| No                     | 3,106 (96)                    |

**Note:**

<sup>a</sup> weighted percent

**Table 2: Factors independently associated with heart attack among Nevada women (N=2,434)**

| Risk Factor                          | Heart Attack (%) <sup>‡</sup> |               | Adjusted OR (95% CI)          |
|--------------------------------------|-------------------------------|---------------|-------------------------------|
|                                      | Yes (n = 140)                 | No (n= 2,294) |                               |
| Age (years)                          |                               |               |                               |
| 18-54                                | 21                            | 63            | Referent                      |
| 55-64                                | 19                            | 18            | 1.23 (0.48-3.15)              |
| 65+                                  | 60                            | 19            | <b>6.74 (2.85-15.95)***</b>   |
| Race/Ethnicity                       |                               |               |                               |
| White                                | 50                            | 64            | Referent                      |
| Black                                | 26                            | 6             | <b>4.64 (2.02-10.68)**</b>    |
| Hispanic                             | 11                            | 21            | 1.64 (0.44-6.09)              |
| Other Race                           | 13                            | 9             | 4.23 (1.51-11.82)             |
| Body Mass Index (kg/m <sup>2</sup> ) |                               |               |                               |
| Normal                               | 25                            | 46            | Referent                      |
| Overweight                           | 35                            | 29            | 1.07 (0.48-2.43)              |
| Obese                                | 40                            | 25            | <b>2.35 (1.08-5.14)*</b>      |
| Cholesterol                          |                               |               |                               |
| No                                   | 19                            | 65            | Referent                      |
| Yes                                  | 81                            | 35            | <b>2.66 (1.34-5.30)**</b>     |
| Smoking status                       |                               |               |                               |
| Never                                | 43                            | 55            | Referent                      |
| Former                               | 25                            | 27            | 1.03 (0.50-2.14)              |
| Current                              | 32                            | 18            | 1.54 (0.75-3.14)              |
| Hypertension                         |                               |               |                               |
| No                                   | 22                            | 68            | Referent                      |
| Yes                                  | 78                            | 32            | 1.88 (0.86-4.13)              |
| Coronary Heart Disease               |                               |               |                               |
| No                                   | 49                            | 98            | Referent                      |
| Yes                                  | 51                            | 2             | <b>25.46 (12.86-50.37)***</b> |

**Abbreviations:** OR, odds ratio; CI, confidence interval

<sup>‡</sup> weighted percent

\**p* ≤.05; \*\**p* ≤.01; \*\*\**p* <.0001

**Table 3: Factors independently associated with stroke among Nevada women (N=2,048)**

| Risk Factor                          | Stroke (%) <sup>‡</sup> |               | Adjusted OR (95% CI)       |
|--------------------------------------|-------------------------|---------------|----------------------------|
|                                      | Yes (n = 78)            | No (n= 1,727) |                            |
| Age (years)                          |                         |               |                            |
| 18-54                                | 38                      | 58            | Referent                   |
| 55-64                                | 24                      | 21            | 1.08 (0.29-4.02)           |
| 65+                                  | 38                      | 21            | 1.86 (0.48-7.19)           |
| Race/Ethnicity                       |                         |               |                            |
| White                                | 48                      | 67            | Referent                   |
| Black                                | 23                      | 6             | 3.88 (0.63-23.75)          |
| Hispanic                             | 25                      | 18            | 2.00 (0.65-6.18)           |
| Other Race                           | 4                       | 9             | 1.01 (0.30-3.47)           |
| Body Mass Index (kg/m <sup>2</sup> ) |                         |               |                            |
| Normal                               | 18                      | 45            | Referent                   |
| Overweight                           | 49                      | 30            | <b>2.27 (1.03-4.99)*</b>   |
| Obese                                | 33                      | 25            | 1.66 (0.55-4.98)           |
| Cholesterol                          |                         |               |                            |
| No                                   | 22                      | 64            | Referent                   |
| Yes                                  | 78                      | 36            | <b>3.51 (1.23-10.00)*</b>  |
| Depression                           |                         |               |                            |
| No                                   | 72                      | 87            | Referent                   |
| Yes                                  | 28                      | 13            | 1.68 (0.63-4.51)           |
| Coronary Heart Disease               |                         |               |                            |
| No                                   | 70                      | 97            | Referent                   |
| Yes                                  | 31                      | 3             | <b>6.63 (1.87-23.48)**</b> |

**Abbreviations:** OR, odds ratio; CI, confidence interval

<sup>‡</sup> weighted percent

\**p* ≤.05; \*\**p* <.01

## Summary & Conclusions

- Being overweight or obese was an independent risk factor for coronary heart disease, diabetes, high blood pressure, and stroke among Nevada women.
- Cholesterol was an independent risk factor for coronary heart disease, diabetes, and stroke.
- Age was an independent risk factor for high blood pressure and diabetes. In addition, depression was an independent risk factor for high blood pressure and coronary heart disease was an independent risk factor for stroke.
- To reduce cardiovascular disease among Nevada women, programs must place a high priority on promoting a healthy diet and increased physical activity which will go a long way in reducing chronic conditions.

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