

R_MPP-484573

by Academic 2025

General metrics

9,492

characters

1,350

words

144

sentences

5 min 24 sec

reading
time

10 min 23 sec

speaking
time

Score



This text scores better than 88%
of all texts checked by Grammarly

Writing Issues

31

Issues left

12

Critical

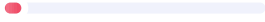
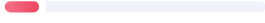



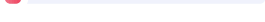




19

Advanced

Plagiarism

This text hasn't been checked for plagiarism

Writing Issues

15	Correctness	
1	Citation style options	
2	Text inconsistencies	
4	Ungrammatical sentence	
3	Incorrect punctuation	
1	Incorrect phrasing	
1	Faulty subject-verb agreement	
1	Determiner use (a/an/the/this, etc.)	
2	Wrong or missing prepositions	
16	Clarity	
15	Paragraph can be improved	
1	Intricate text	

Unique Words

Measures vocabulary diversity by calculating the percentage of words used only once in your document

34%

unique words

Rare Words

Measures depth of vocabulary by identifying words that are not among the 5,000 most common English words.

36%

rare words

Word Length

Measures average word length

4.8

characters per word

Sentence Length

Measures average sentence length

9.4

words per sentence

R_MPP-484573

2

The Association Between Body Mass Index and Cardiovascular Disease Among Adults in Texas: A Secondary Analysis of the BRFSS (2015-2019)

Student Name

Course Name

Department Name

Date

The Association Between Body Mass Index and Cardiovascular Disease Among Adults in Texas: A Secondary Analysis of the BRFSS (2015-2019)

Introduction

The United States reports cardiovascular disease (CVD) as its main cause of death, which also leads to substantial disability across the country. Obesity stands out as one of the main preventable risk factors that lead to hypertension, dyslipidemia, type 2 diabetes, and systemic inflammation, which later result in negative heart health outcomes ([Powell-Wiley et al., 2021](#))¹. The body develops pathological connections through hemodynamic, metabolic, and neurohormonal alterations, leading to atherosclerosis and structural heart changes ([Volpe & Gallo, 2023](#))¹. The body develops pathological connections through hemodynamic, metabolic, and neurohormonal alterations, leading to atherosclerosis and structural heart changes ([Volpe & Gallo, 2023](#))¹. Long-term weight control is essential, as BMI patterns show an independent capacity to forecast future CVD risk throughout a person's lifetime ([Amani-Beni et al., 2023](#))¹.

The upcoming increase in CVD cases will occur because the population ages and Obesity rates continue to stay high ([Mohebi et al., 2022](#))¹. The population displays distinct patterns of mental health trends since older adults, racial and ethnic minorities, and people from lower [socioeconomic](#)² backgrounds experience more severe symptoms ([Yasmin et al., 2025](#))¹. The Behavioral Risk Factor Surveillance System (BRFSS) provides large datasets that machine learning studies use to establish that BMI, age, and race are strong indicators of CVD outcomes ([Imani et al., 2026](#))¹. The research investigates how CVD prevalence relates to BMI among Texas adults using BRFSS data, while examining two research questions. The study's research questions examine CVD distribution across age categories, sex, and race/ethnicity from 2015 to 2019. The second research question investigates whether BMI classification is associated with CVD prevalence after researchers control for demographic factors.

Methods

The BRFSS was sampled to extract information in 2015, 2017, and 2019. CVDCRHD4 (Ever diagnosed with Angina or coronary heart disease) was the primary outcome variable. Time (year-to-year comparison), Person (Education and Marital Status), and Place (State-level analysis) were the main lenses used in the analysis. The Chi-Square tests were used to calculate statistical significance and Boxplots to visualize the association with BMI.

Results

Time Trend Analysis

Table 1 CVD Trends

The statistical significance of the decreasing trend in the prevalence of CVD in analysis of more than 1.1 million respondents is statistically significant ($p = 0.0385$) as shown in table 1. Prevalence decreased from 5.97% in 2015 to 5.84% in 2019. This trend is also demonstrated in the CVD Frequency Bar Chart, indicating the number of cases by volume in the three waves of the surveys.

Figure 1 CVD Frequency Trend

Person and Place Analysis

Table 2 CVD Prevalence by Education and Marital Status

Table 3 CVD Prevalence by State

Socio-demographic factors were found to be associated with CVD with highly significant values in 2019 ($p < .0001$). The lowest prevalence was observed

among persons with higher education (Group 6: College Graduate) (4.70%). Persons with lower education (below high school level) had much higher rates. Marital status was also a factor; widowed (Group 3) were affected the most with a 11.06 prevalence. Table 3 focuses on geographical variation in disease burden, rationalizing particular geographical locations with greater disease load.

Factor Association

Figure 2 Box plot of BMI Distribution vs CVD Status

The analysis of the BMI Distribution vs. CVD Status boxplot shows that there is an obvious correlation: people with CVD (Group 1) on average have higher median body BMI than those without the disease (Group 2). This assures the fact that weight control is a decisive aspect in heart matters.

Conclusion and Public Health Recommendations

The longitudinal analysis of BRFSS performed in 2015-2019 has shown that the prevalence of Cardiovascular Disease (CVD) in the United States, in general, has undergone a slight yet statistically significant decrease ($p = 0.0385$), but remains a very serious socio-economic/physiological gap in the health of the population. The evidence indicates that low education levels and particular marital statuses, especially widowhood, are such strong predictors that they lead to a higher risk of CVD. In addition, the physical evidence of the BMI distributions prove that the increased weight remains one of the leading physical attributes linked with disease conditions. In response to these findings, the public health policy should be changed with high focus on interventions that are highly targeted. The Communities that have lower access to education and the states in high-prevalence of the so-called hotspots should be given priority as far as resources are concerned. Moreover, social

support programs ^{28,29} of widowed people, ²⁹ and effective weight-control programs should ²⁹ become part of health programs. This multi-faceted ^{30,31} strategies are crucial to maintain the downward trend of prevalence ³⁰ because of this multi-faceted approach ^{30,31} would minimize the equitable health burden among the ³⁰ diverse populations.

References

- Amani-Beni, R., Darouei, B., Zefreh, H., Sheikhabahaei, E., & Sadeghi, M. (2023). Effect of obesity duration and BMI trajectories on cardiovascular disease: A narrative review. *Cardiology and Therapy*, *12*(2), 307–326.
<https://doi.org/10.1007/s40119-023-00317-6>
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<https://doi.org/10.1016/j.ahjo.2026.100719>
- Mohebi, R., Chen, C., Ibrahim, N. E., et al. (2022). Cardiovascular disease projections in the United States based on the 2020 census estimates. *Journal of the American College of Cardiology*, *80*(6), 565–578.
<https://doi.org/10.1016/j.jacc.2022.05.033>
- Powell-Wiley, T. M., Poirier, P., Burke, L. E., et al. (2021). Obesity and cardiovascular disease: A scientific statement from the American Heart Association. *Circulation*, *143*(21), e984–e1010.
<https://doi.org/10.1161/CIR.0000000000000973>

Volpe, M., & Gallo, G. (2023). Obesity and cardiovascular disease: An executive document on pathophysiological and clinical links promoted by the Italian Society of Cardiovascular Prevention (SIPREC). *Frontiers in Cardiovascular Medicine*, *10*, Article 1136340. <https://doi.org/10.3389/fcvm.2023.1136340>

Yasmin, F., Moeed, A., Fahim, M. A. A., et al. (2025). Trends and sociodemographic ¹¹disparities in the circulatory disease prevalence in the United States: An analysis of the National Health Interview Survey database (2019–2022). *BMC Cardiovascular Disorders*, *25*, Article 852.

<https://doi.org/10.1186/s12872-025-05139-z>

Appendices: SAS Code

```
libname mydata "~/sasuser.v94";
```

```
ods graphics on;
```

```
/* 1. Process 2015 */
```

```
data d2015;
```

```
set mydata.sasdata_20151;
```

```
YEAR = 2015;
```

```
/* Use 'coalesce' to find the variable regardless of underscore */
```

```
C_VAR = CVDCRHD4;
```

```
B_VAR = _BMI5 / 100;
```

```
ST_VAR = _STATE;
```

```
keep YEAR C_VAR B_VAR ST_VAR EDUCA MARITAL SEX _SEX _RACE;
```

```
run;
```

```
/* 2. Process 2017 */
```

```
data d2017;
```

```
set mydata.sasdata_20171;
```

```
YEAR = 2017;  
C_VAR = CVDCRHD4;  
B_VAR = _BMI5 / 100;  
ST_VAR = _STATE;  
keep YEAR C_VAR B_VAR ST_VAR EDUCA MARITAL SEX _SEX _RACE;  
run;
```

```
/* 3. Process 2019 - Removing strict name requirements to prevent data loss */  
data d2019;  
set mydata.sasdata_20191;  
YEAR = 2019;  
C_VAR = CVDCRHD4;  
B_VAR = _BMI5 / 100;  
ST_VAR = _STATE;  
keep YEAR C_VAR B_VAR ST_VAR EDUCA MARITAL SEX _SEX _RACE;  
run;
```

```
/* 4. Combine and Filter - RELAXED FILTERS TO KEEP 2019 DATA */  
data final_analysis;  
set d2015 d2017 d2019;  
/* Only filter on variables we KNOW are there */  
if C_VAR in (1, 2); /* Chronic Disease (CVD) */  
if 10 < B_VAR < 80; /* BMI Factor */  
run;
```

```
/* -----
```

PH631 OUTPUT RESULTS

----- */

/* TIME ANALYSIS - Requirement 5 */

title "Table 1: CVD Trends (All Years: 2015, 2017, 2019)";

proc freq data=final_analysis;

tables YEAR * C_VAR / chisq nocol nopercnt;

run;

/* PERSON ANALYSIS - Requirement 5 (Using variables available in 2019) */

title "Table 2: CVD Prevalence by Education and Marital Status (2019)";

proc freq data=final_analysis;

where YEAR = 2019;

tables (EDUCA MARITAL) * C_VAR / chisq;

run;

/* PLACE ANALYSIS - Requirement 5 */

title "Table 3: CVD Prevalence by State (2019)";

proc freq data=final_analysis;

where YEAR = 2019;

tables ST_VAR * C_VAR / norow nocol nopercnt;

run;

/* FACTOR ASSOCIATION FIGURE - Requirement 7 */

title "Figure 1: BMI Distribution vs CVD Status (2019)";

proc sgplot data=final_analysis;

where YEAR = 2019;

vbox B_VAR / category=C_VAR;

```
xaxis label="CVD Status (1=Yes, 2=No)";
```

```
yaxis label="BMI Value";
```

```
run;
```

```
title "Figure 2: CVD Frequency Trend (2015-2019)";
```

```
proc sgplot data=final_analysis;
```

```
vbar YEAR / group=C_VAR groupdisplay=cluster;
```

```
run;
```

1.	<i>(Powell-Wiley et al., 2021); (Volpe & Gallo, 2023); (Amani-Beni et al., 2023); (Mohebi et al., 2022); (Yasmin et al., 2025); (Imani et al., 2026)</i>	Citation style options	Correctness
2.	<i>socioeconomic; socio-economic</i>	Text inconsistencies	Correctness
3.	<i>The BRFSS was sampled to extract information in 2015, 2017, and 2019.</i>	Paragraph can be improved	Clarity
4.	<i>The Chi-Square tests were used to calculate statistical significance and Boxplots to visualize the association with BMI.</i>	Ungrammatical sentence	Correctness
5.	<i>The Chi-Square tests were used to calculate statistical significance and Boxplots to visualize the association with BMI.</i>	Paragraph can be improved	Clarity
6.	<i>The statistical significance of the decreasing trend in the prevalence of CVD in analysis of more than 1.1 million respondents is statistically significant ($p = 0.0385$) as shown in table 1.</i>	Ungrammatical sentence	Correctness
7.	<i>The statistical significance of the decreasing trend in the prevalence of CVD in analysis of more than 1.1 million respondents is statistically significant ($p = 0.0385$) as shown in table 1.</i>	Paragraph can be improved	Clarity
8.	<i>This trend is also demonstrated in the CVD Frequency Bar Chart, indicating the number of cases by volume in the three waves of the surveys.</i>	Paragraph can be improved	Clarity
9.	<i>:CVD</i>	Incorrect punctuation	Correctness
10.	<i>:CVD</i>	Incorrect punctuation	Correctness
11.	<i>Socio-demographic; sociodemographic</i>	Text inconsistencies	Correctness

12.	<i>Socio-demographic factors were found to be associated with CVD with highly significant values in 2019 ($p < .0001$).</i>	Paragraph can be improved	Clarity
13.	<i>Persons with lower education (below high school level) had much higher rates.</i>	Paragraph can be improved	Clarity
14.	widowed → widows	Incorrect phrasing	Correctness
15.	<i>Table 3 focuses on geographical variation in disease burden, rationalizing particular geographical locations with greater disease load.</i>	Paragraph can be improved	Clarity
16.	: Box	Incorrect punctuation	Correctness
17.	<i>The analysis of the BMI Distribution vs. CVD Status boxplot shows that there is an obvious correlation: people with CVD (Group 1) on average have higher median body BMI than those without the disease (Group 2).</i>	Ungrammatical sentence	Correctness
18.	<i>The analysis of the BMI Distribution vs. CVD Status boxplot shows that there is an obvious correlation: people with CVD (Group 1) on average have higher median body BMI than those without the disease (Group 2).</i>	Paragraph can be improved	Clarity
19.	<i>This</i>	Intricate text	Clarity
20.	<i>This assures the fact that weight control is a decisive aspect in heart matters.</i>	Paragraph can be improved	Clarity
21.	<i>The longitudinal analysis of BRFSS performed in 2015-2019 has shown that the prevalence of Cardiovascular Disease (CVD) in the United States, in general, has undergone a slight yet statistically significant decrease ($p = 0.0385$), but remains a very serious socio-economic/physiological gap in the he...</i>	Paragraph can be improved	Clarity
22.	prove → proves	Faulty subject-verb agreement	Correctness

23.	<i>In addition, the physical evidence of the BMI distributions prove that the increased weight remains one of the leading physical attributes linked with disease conditions.</i>	Paragraph can be improved	Clarity
24.	a high	Determiner use (a/an/the/this, etc.)	Correctness
25.	<i>In response to these findings, the public health policy should be changed with high focus on interventions that are highly targeted.</i>	Paragraph can be improved	Clarity
26.	<i>The Communities that have lower access to education and the states in high-prevalence of the so-called hotspots should be given priority as far as resources are concerned.</i>	Paragraph can be improved	Clarity
27.	with high prevalence	Wrong or missing prepositions	Correctness
28.	ef → for	Wrong or missing prepositions	Correctness
29.	<i>Moreover, social support programs of widowed people, and effective weight-control programs should become part of health programs.</i>	Paragraph can be improved	Clarity
30.	<i>This multi-faceted strategies are crucial to maintain the downward trend of prevalence because of this multi-faceted approach would minimize the equitable health burden among the diverse populations.</i>	Paragraph can be improved	Clarity
31.	<i>This multi-faceted strategies are crucial to maintain the downward trend of prevalence because of this multi-faceted approach would minimize the equitable health burden among the diverse populations.</i>	Ungrammatical sentence	Correctness