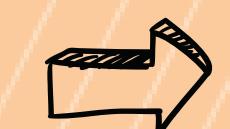




# TABLE OF CONTENTS

1. INTRODUCTION &  
PROJECT OVERVIEW



2. DATA  
UNDERSTANDING



3. PROBLEM  
STATEMENT



4. DEPLOYMENT



5. CONCLUSION





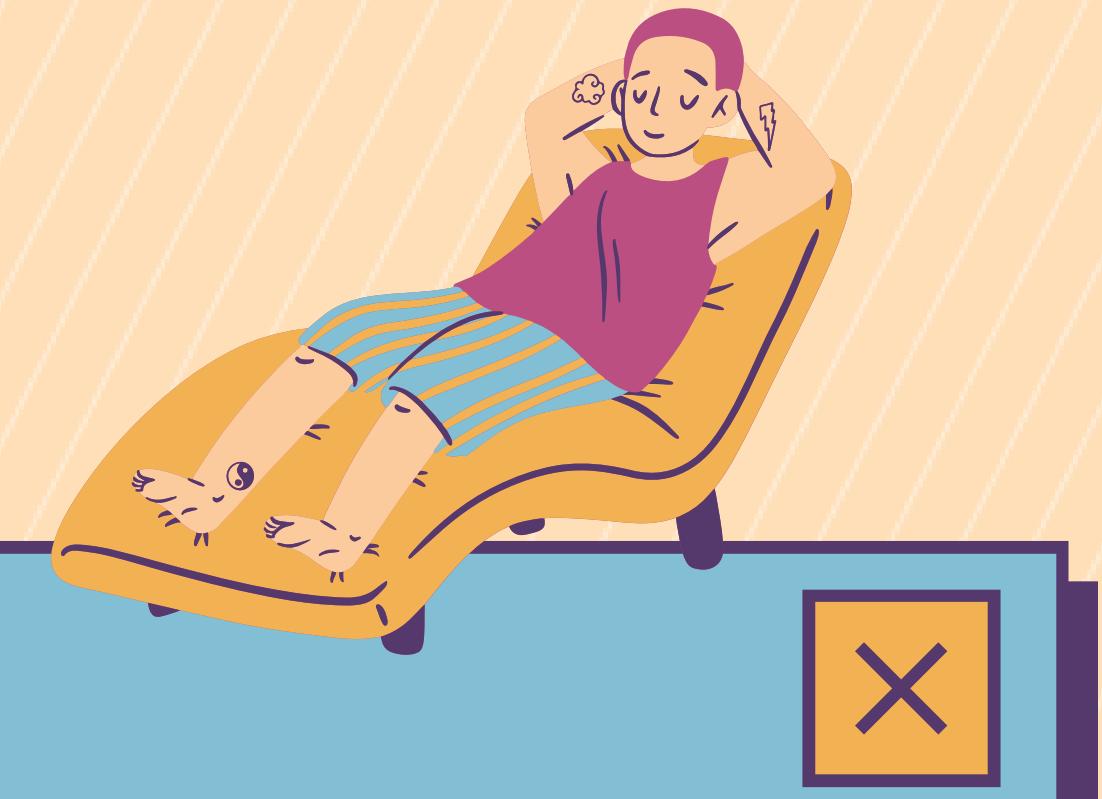
1.

## INTRODUCTION & PROJECT OVERVIEW

A stylized web browser window with a light blue header and a yellow search bar containing the letters 'c'. The main content area features the word 'INTRODUCTION' in large, bold, dark purple capital letters. Below it is a paragraph of text in a smaller dark purple font.

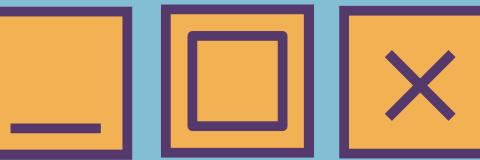
Sleep is essential for overall health and well-being, affecting physical, mental, and emotional functioning. By examining current research and sleep patterns, we aim to provide insights and practical recommendations for achieving better sleep.

# PROJECT OVERVIEW



According to the National Sleep Foundation, adults between 27 and 59 years of age need an average of 7 to 9 hours of sleep per night. This is based on public health recommendations, but internal and external factors may change the number of hours you need.

# PROJECT OVERVIEW



By integrating research findings and data analysis, this project aims to provide actionable insights to help individuals improve their sleep habits and overall health.



2.

## DATA UNDERSTANDING





# DATA SOURCE

[Create](#)[Home](#)[Competitions](#)[Datasets](#)[Models](#)[Code](#)[Discussions](#)[Learn](#)

LAKSIKA THARMALINGAM · UPDATED 10 MONTHS AGO

859

New Notebook

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## Sleep Health and Lifestyle Dataset

Unlock sleep insights with the Sleep Health Dataset

[Data Card](#)   [Code \(173\)](#)   [Discussion \(13\)](#)   [Suggestions \(0\)](#)

### About Dataset

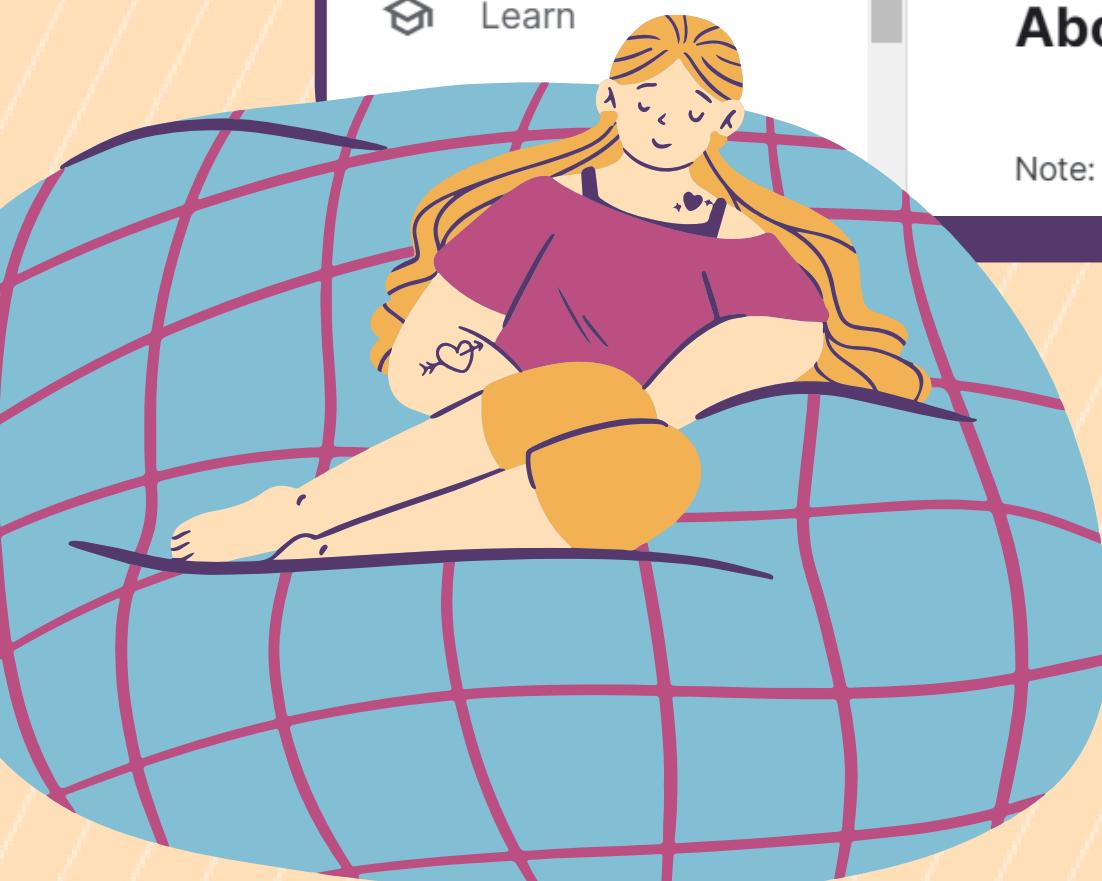
Note: Don't forget to upvote when you find this useful.

**Usability** ⓘ

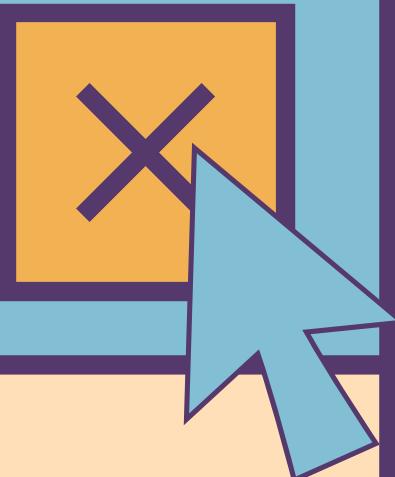
10.00

**License**

CC-BY Public Domain

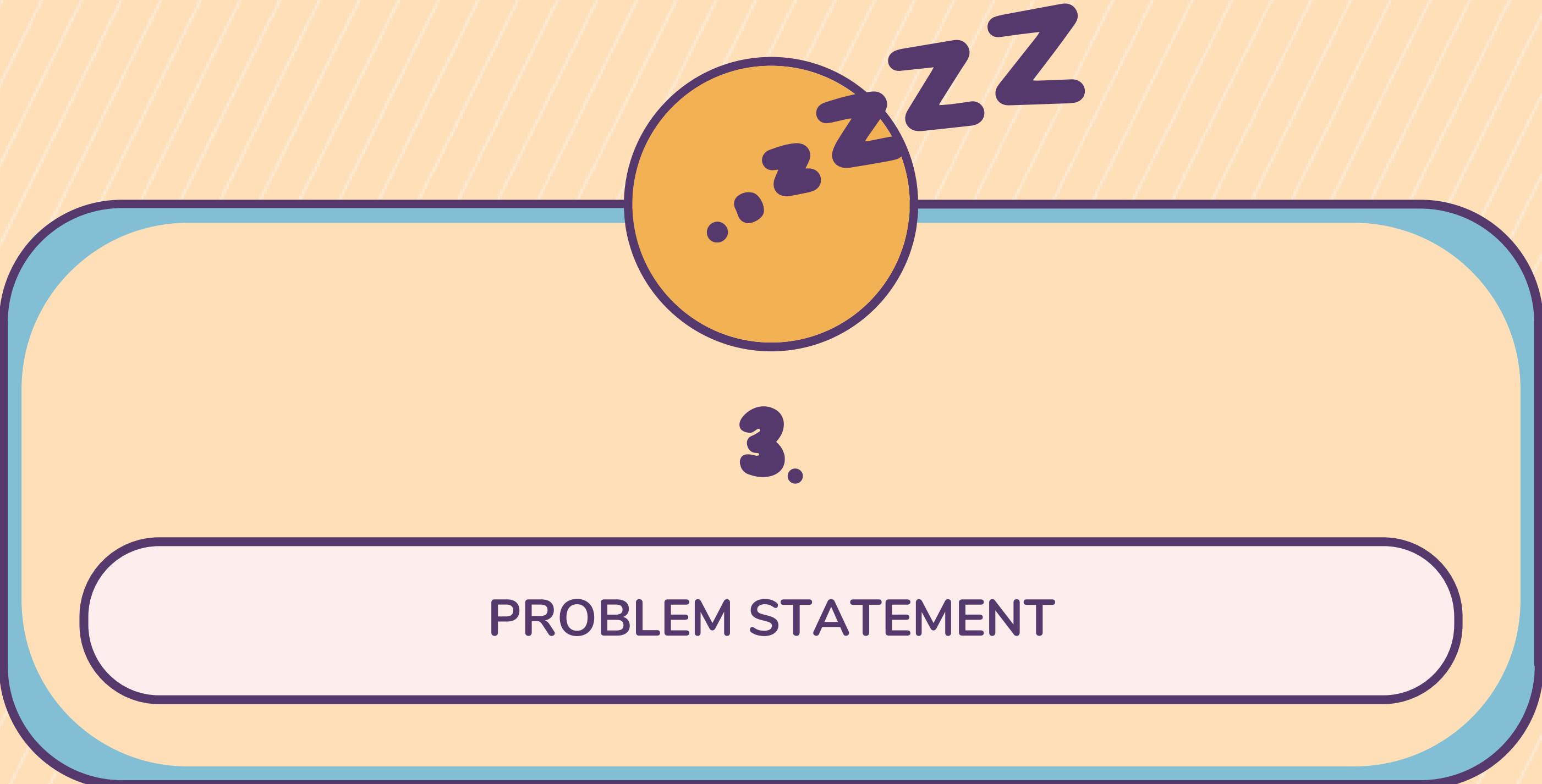


# PRIMARY FACTORS



- **Gender** : The gender of the person (Male/Female).
- **BMI Category** : The BMI category of the person (Underweight, Normal, Overweight).
- **Sleep Duration** : The number of hours the person sleeps per day.(hours)
- **Sleep Disorder** :The presence or absence of a sleep disorder in the person





3.

## PROBLEM STATEMENT

# CONTENTS

**TEST A HYPOTHESIS,  
MEAN & PROPORTION CI**

**DIFFERENCE IN MEANS  
& PROPORTIONS**

**REGRESSION  
ANALYSIS**



# Hypothesis Test

$H_0 : \mu = \mu_0$  vs  $H_1 : \mu \neq \mu_0$ .

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$$

$$s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}}$$

Acceptance Region  $\approx [-1.966, 1.966]$

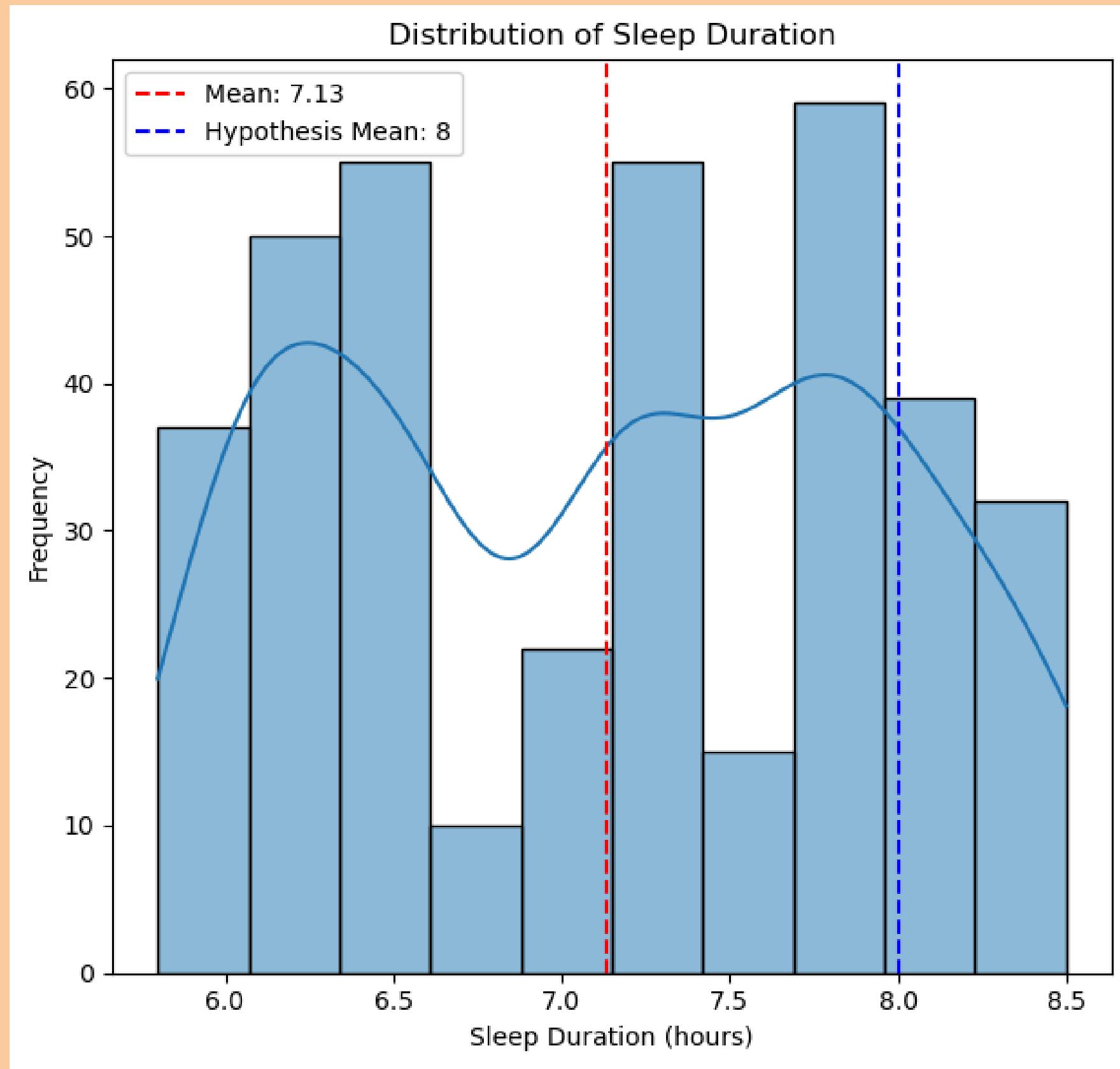
$$t_0 = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$$

T-statistic: -21.095361561847522

If  $t_0$  is in critical region, then reject  $H_0$ .



# Hypothesis Test



# Confidence intervals for the mean

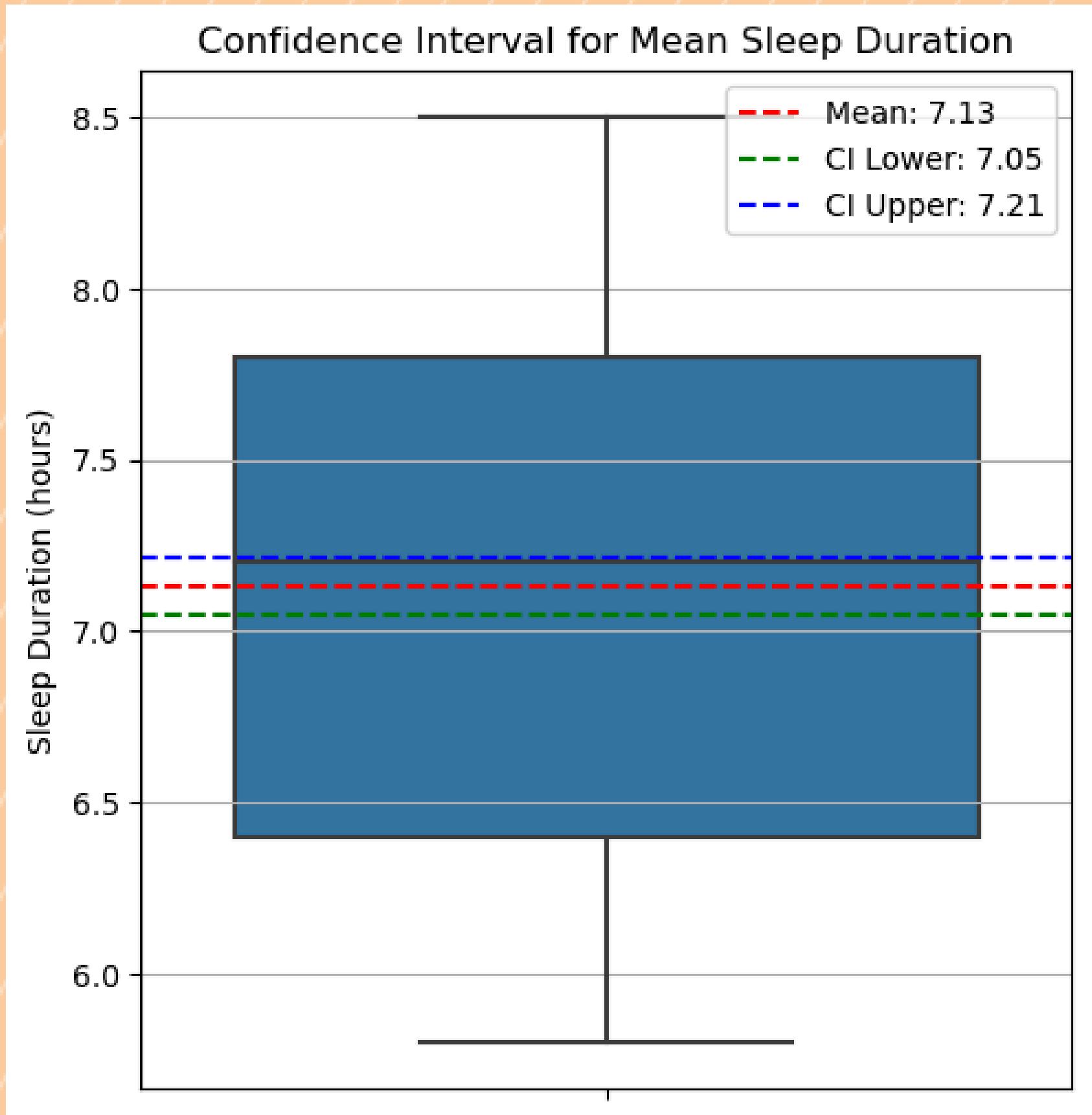
Mean Sleep Duration: 7.132085561497325

$$\bar{x} - t_{\alpha/2, n-1} \cdot \frac{s}{\sqrt{n}} \leq \mu \leq \bar{x} + t_{\alpha/2, n-1} \cdot \frac{s}{\sqrt{n}}$$

Confidence Interval: (7.051185378693037, 7.212985744301613)



# Confidence intervals for the mean



# Hypothesis Test

```
p = 0.20 # Hypothesized proportion.
```

$H_0 : p = p_0$  vs  $H_1 : p \neq p_0$ .

$$\hat{p} = \frac{x}{n}$$

$$z_0 = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1 - p_0)}{n}}}$$

```
Sample proportion (̂p): 0.4144385026737968
```

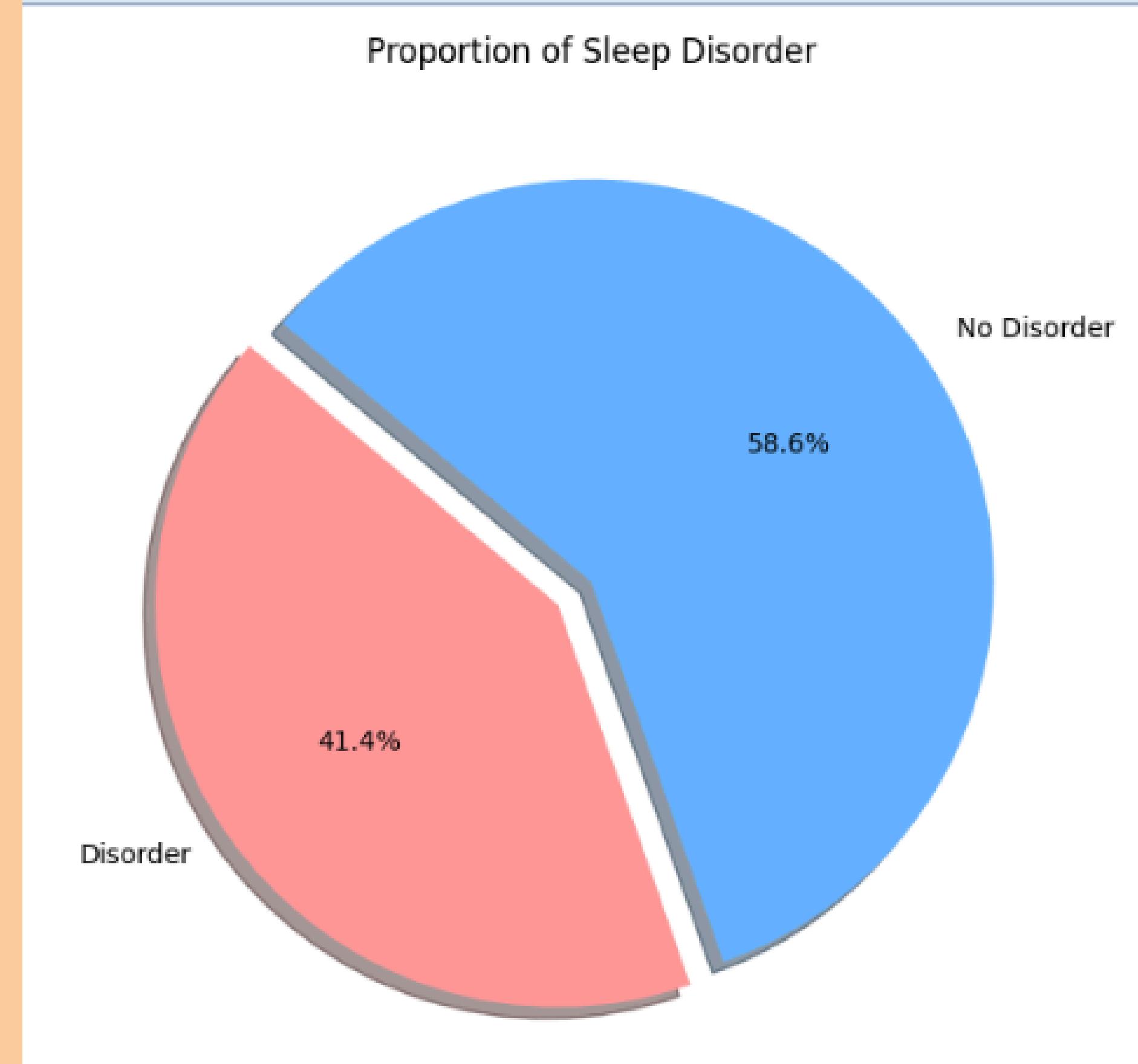
```
Z-statistic: 10.367698184400131
```

Acceptance region: [-1.96, 1.96]

$z_0$  is in critical region, then reject  $H_0$ .



# Hypothesis Test



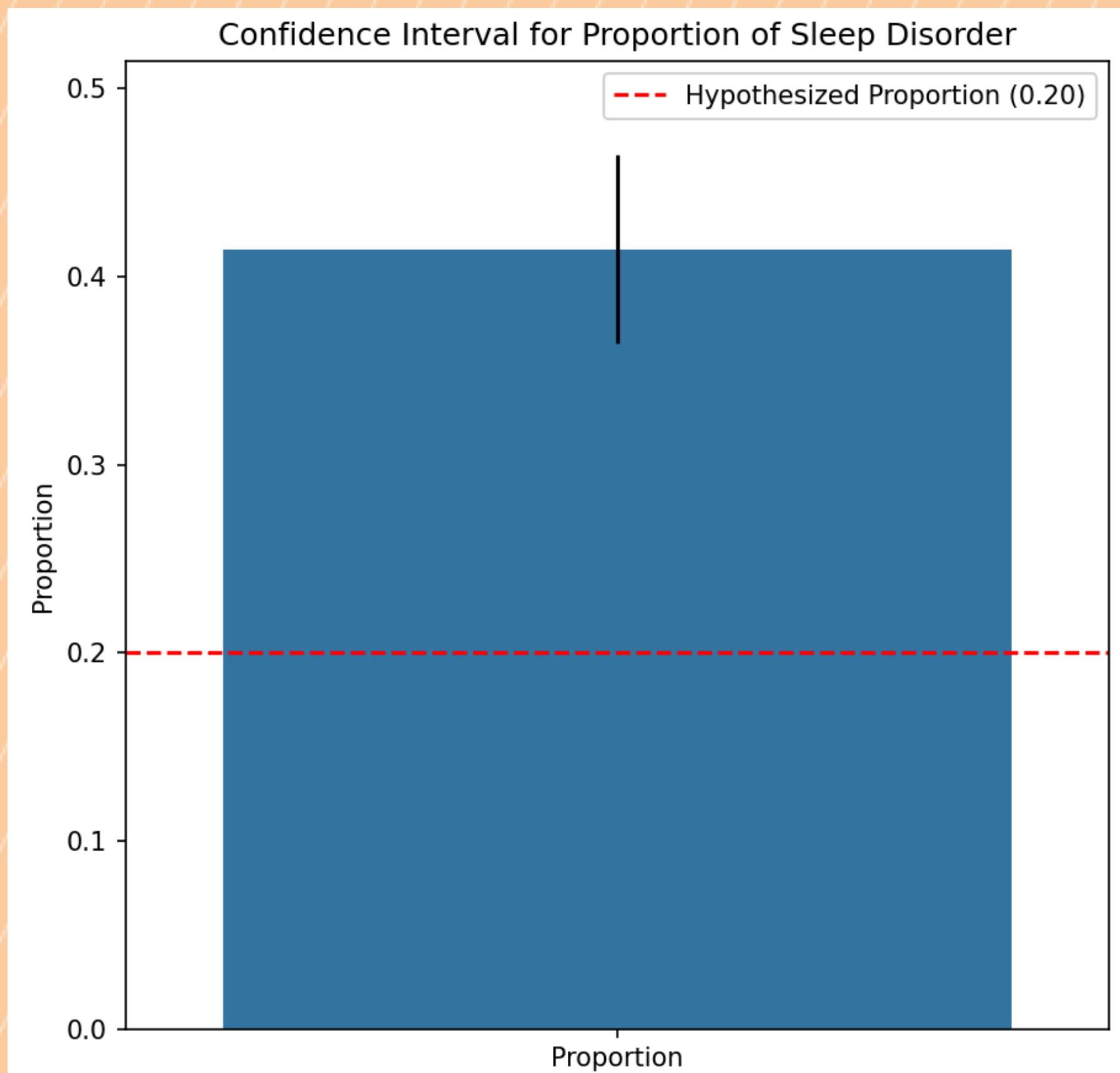
# Confidence interval for proportion of sleep Disorder

$$\hat{p} - z_{\alpha/2} \cdot \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}} \leq \mu \leq \hat{p} + z_{\alpha/2} \cdot \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

Confidence Interval: (0.36451229323774176, 0.4643647121098518)



# Confidence interval for proportion of sleep Disorder



# Boxplot of Sleep Duration by Gender

- $Q1$  là  $x_{\lceil \frac{n}{4} \rceil}$
- $Q3$  là  $x_{\lceil \frac{3n}{4} \rceil}$

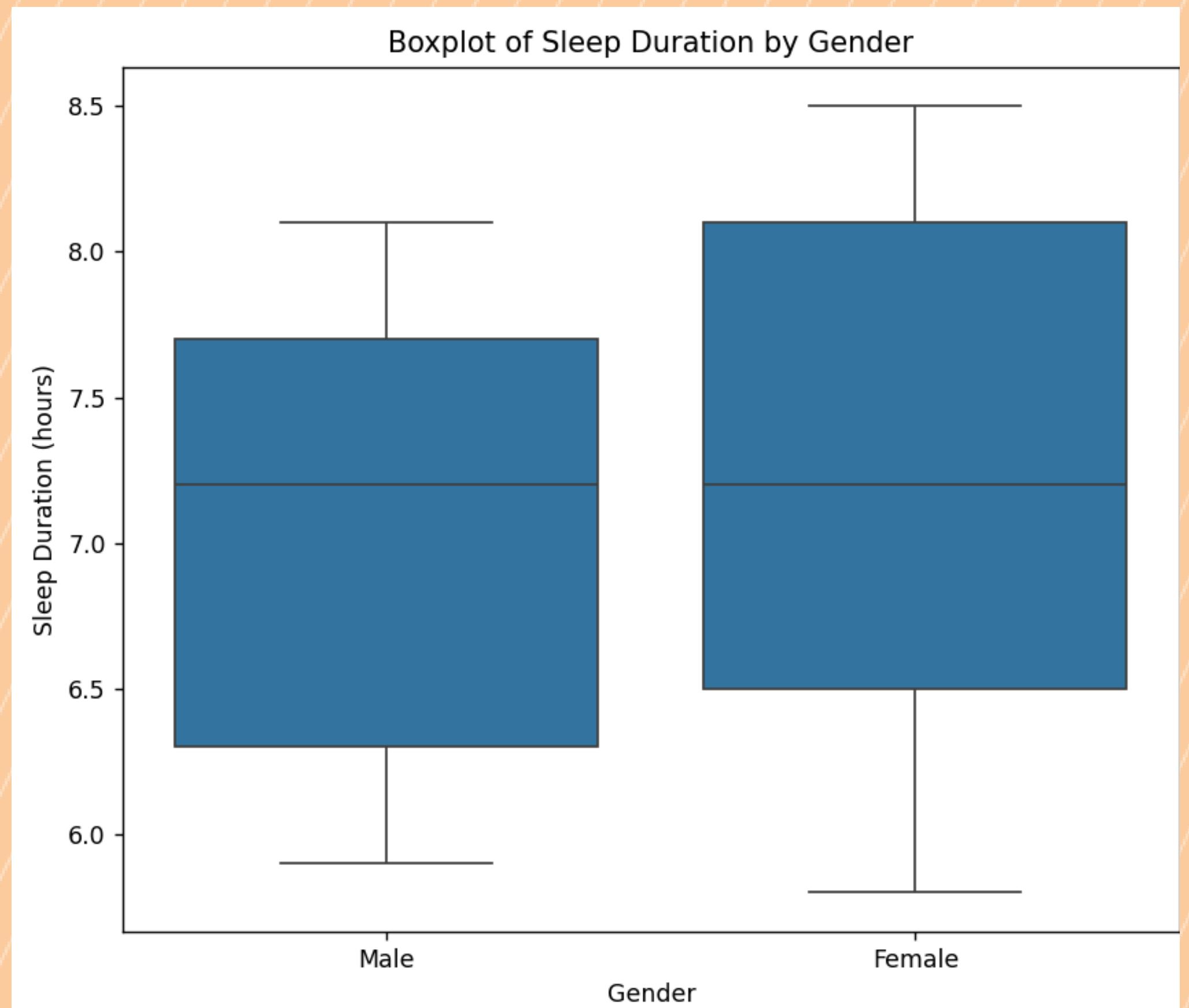
$$\text{IQR} = Q3 - Q1$$

Upper whisker =  $\min(\max(\text{data}), Q3 + 1.5 \times \text{IQR})$

Lower whisker =  $\max(\min(\text{data}), Q1 - 1.5 \times \text{IQR})$



# Boxplot of Sleep Duration by Gender



# Confidence interval for Difference in Mean Sleep Duration

- Mean Difference =  $\bar{X}_{\text{Male}} - \bar{X}_{\text{Female}}$

## STANDARD ERROR OF THE DIFFERENCE

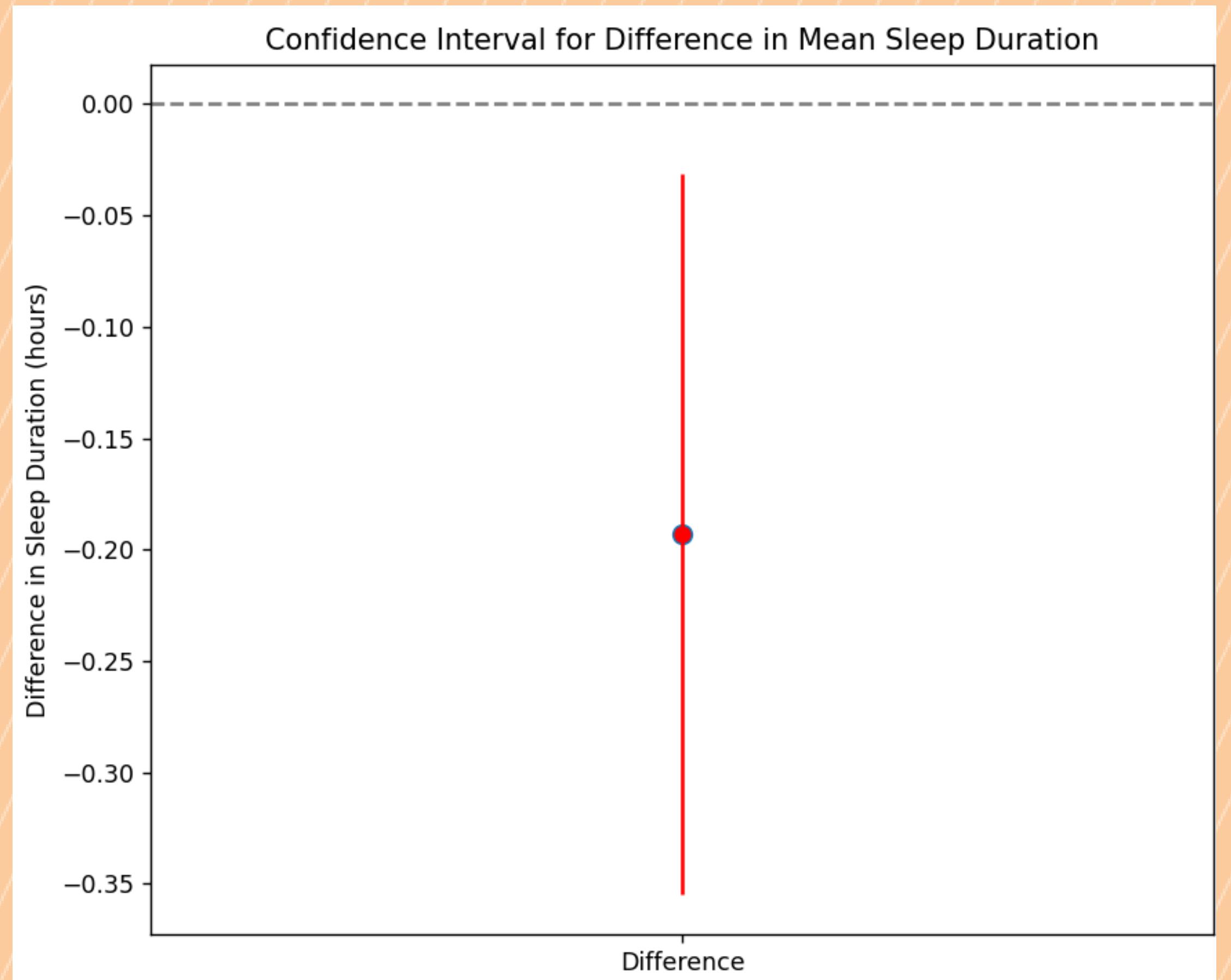
$$SE_{\text{diff}} = \sqrt{\left( \frac{SD_{\text{Male}}^2}{n_{\text{Male}}} \right) + \left( \frac{SD_{\text{Female}}^2}{n_{\text{Female}}} \right)}$$

Confidence interval 95%:

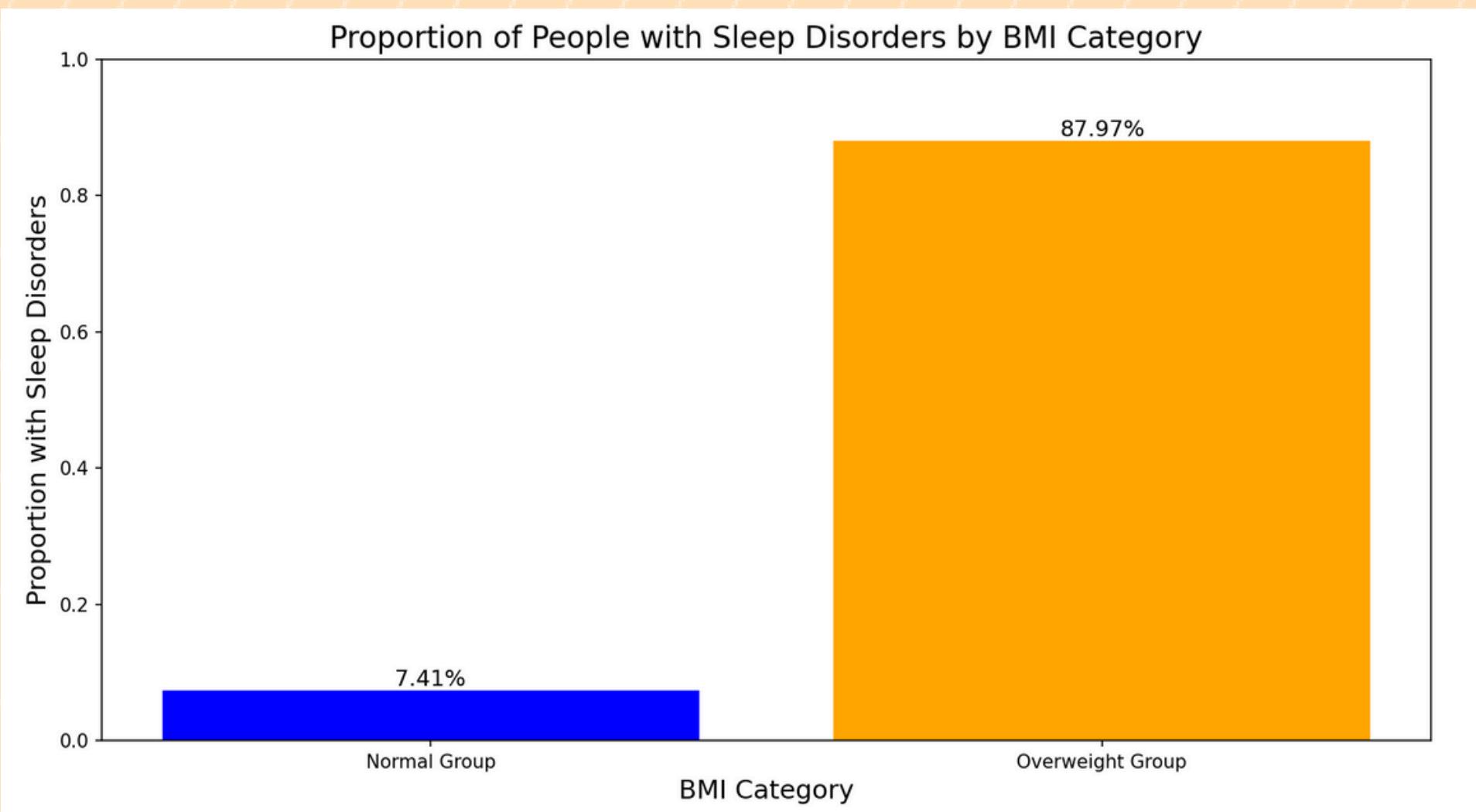
$$\text{Mean Difference} \pm t_{\alpha/2, df} \times SE_{\text{diff}} = -0.3 \pm t_{\alpha/2, df} \times SE_{\text{diff}}$$



# Confidence interval for Difference in Mean Sleep Duration



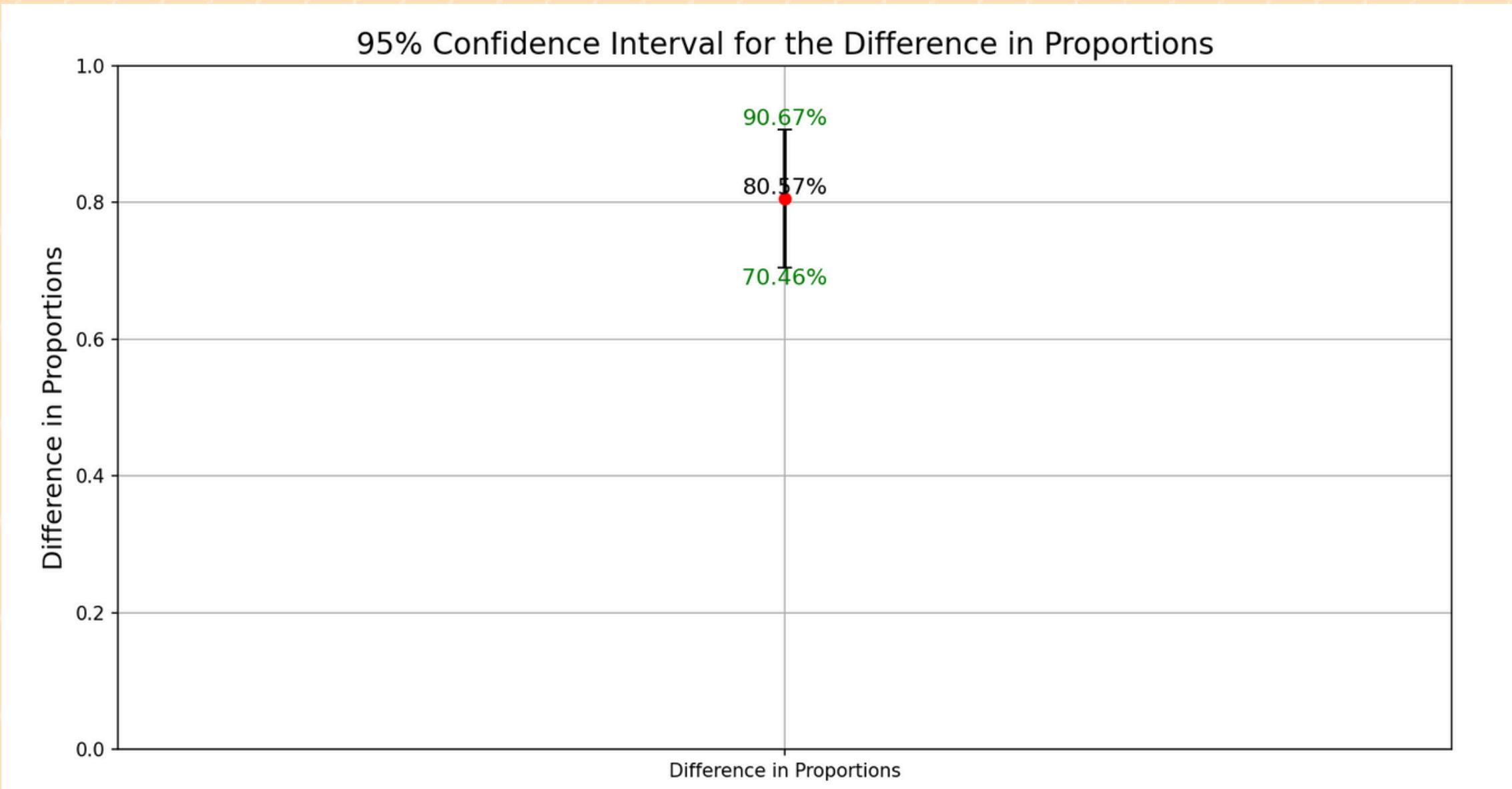
# PROPORTION OF PEOPLE WITH SLEEP DISORDERS BY BMI CATEGORY



$$\hat{p}_1 = \frac{x_1}{n_1} \text{ and } \hat{p}_2 = \frac{x_2}{n_2}$$



# CONFIDENCE INTERVAL FOR THE DIFFERENCE IN PROPORTIONS



Pooled proportion:  $\bar{p} = \frac{x_1 + x_2}{n_1 + n_2}$

Standard Error:

$$SE = \sqrt{\bar{p} \times (1 - \bar{p}) \times \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}$$

$$Z = \frac{\hat{p}_2 - \hat{p}_1}{SE}$$

Confidence Interval:

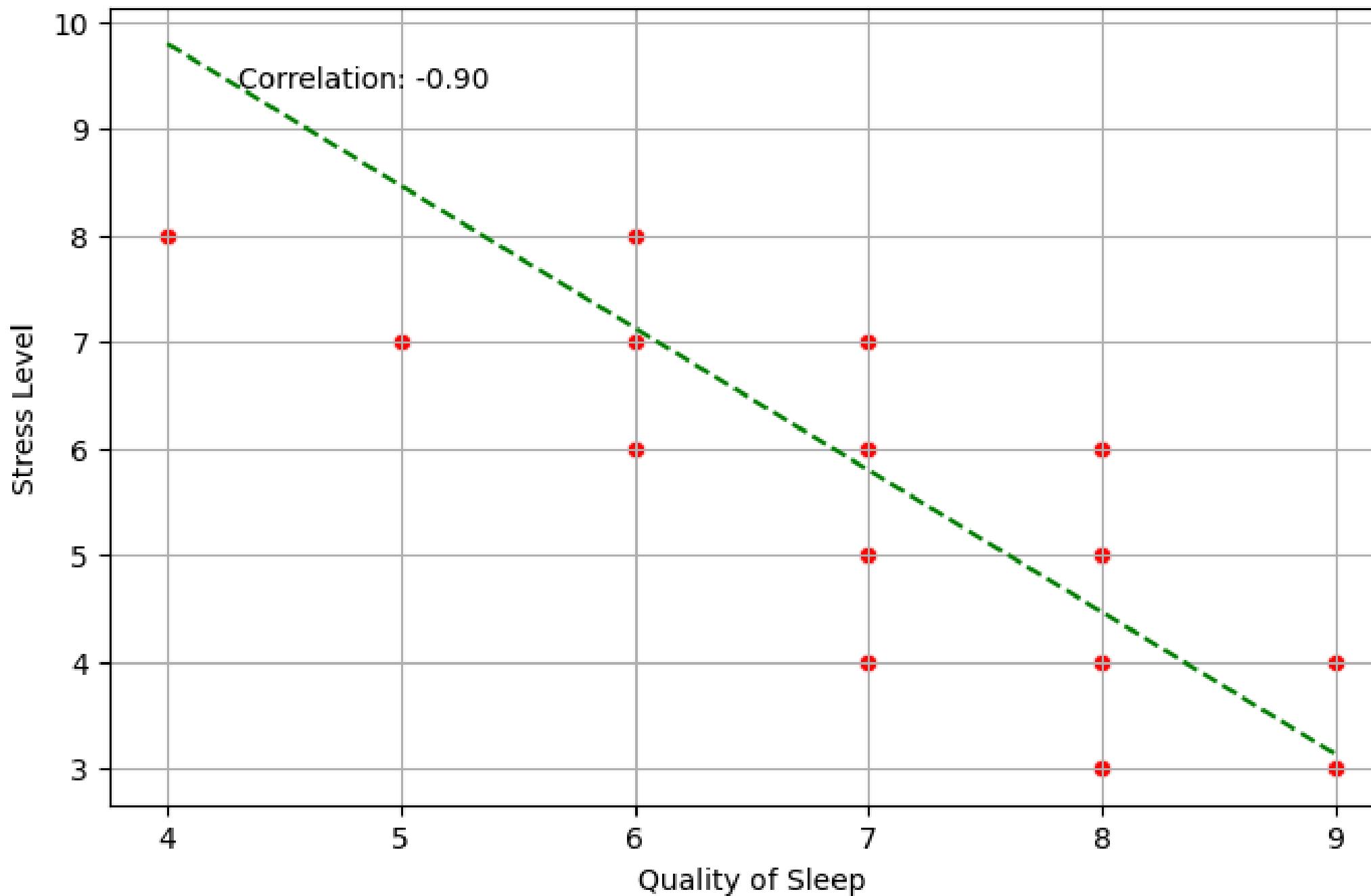
$$(\hat{p}_2 - \hat{p}_1) \pm Z_{\alpha/2} \times SE$$





# Regression Analysis

Scatter Plot of Quality of Sleep vs. Stress Level

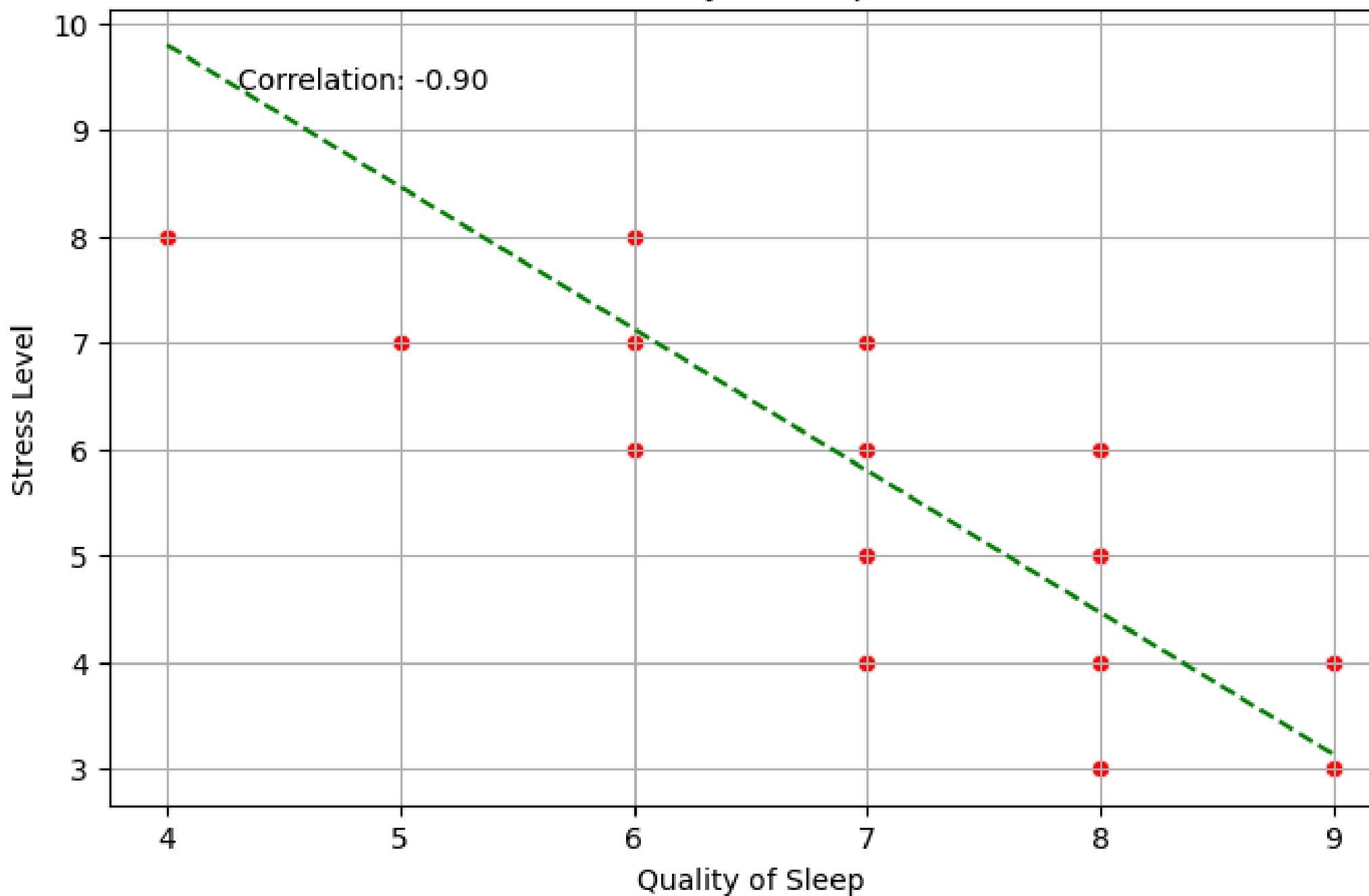


$$Y = 15.13 + -1.33 * X$$



## Regression Analysis

Scatter Plot of Quality of Sleep vs. Stress Level



For example,  
if we have a sleep quality  
rating is 9,  
then the predicted stress  
level would be around 3.16

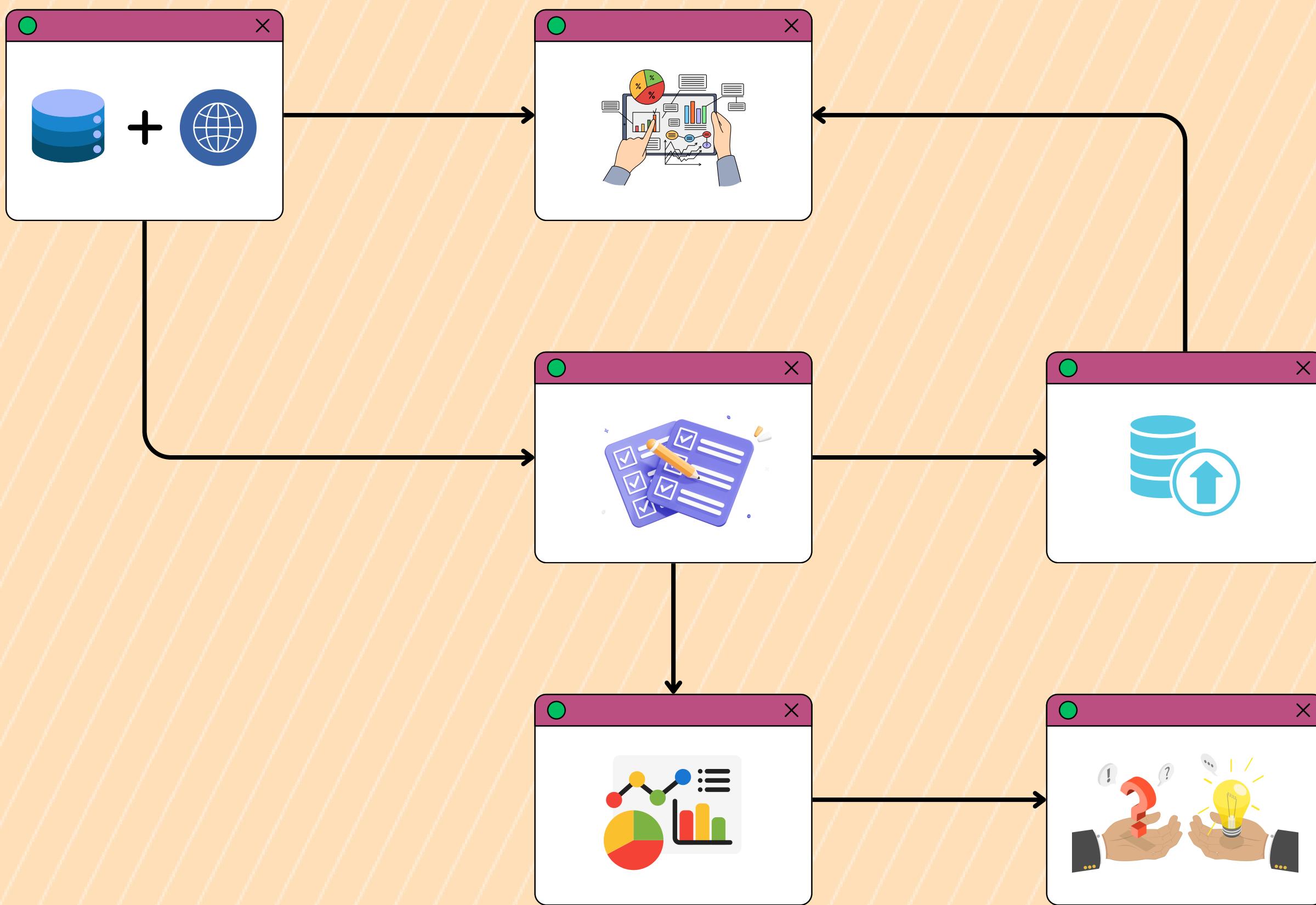
$$Y = 15.13 + -1.33 * 9$$

4.

## DEPLOYMENT



# SLEEPWELL





# WEBSITE



CLICK HERE



[Home](#) [Statistics](#) [Survey Results](#)

## Welcome to SleepWell

SleepWell is your personal sleep analysis application. We help you understand your sleep patterns and provide recommendations for better sleep quality.

### General Sleep Statistics

Average vs Recommended Sleep Duration by Gender

Average Sleep Duration (hours)      Recommended Sleep Dur





5.

CONCLUSION





# CONCLUSION

Our sleep statistics and analysis project has provided deep insights into the sleep duration and quality across different demographic groups. By analyzing data from various sources, we identified the average sleep duration, sleep quality, and pre-sleep habits that significantly impact overall health. These findings not only raise awareness about the importance of sleep but also form the foundation for developing a sleep consultation website. This website will offer valuable information, tools to assess sleep quality, and personalized advice to improve sleep, thereby enhancing users' quality of life.

