

# Research Report Section: Effect of Sleep Disorders on Sleep Duration

## Introduction

Sleep is a fundamental component of human health, affecting physical and mental well-being. Sleep disorders can negatively influence sleep quality and duration, potentially leading to adverse health outcomes. This study aims to investigate whether there is a significant difference in sleep duration between individuals diagnosed with sleep disorders and those without.

## Research Question

Is there a significant difference in sleep duration between people with and without sleep disorders?

## Hypotheses

- **Null Hypothesis ( $H_0$ ):** There is no significant difference in sleep duration between individuals with and without sleep disorders.
- **Alternative Hypothesis ( $H_1$ ):** There is a significant difference in sleep duration between individuals with and without sleep disorders.

## Methodology

Data on sleep duration and sleep disorder status were obtained from a sample population. The sleep duration data were grouped into two categories: individuals with sleep disorders and individuals without sleep disorders.

Preliminary tests showed that sleep duration data for both groups did not follow a normal distribution, as assessed by the Shapiro-Wilk test ( $p < 0.001$  for both groups). Due to this violation of the normality assumption, the Mann-Whitney U test, a non-parametric alternative to the independent samples t-test, was employed to compare the two groups.

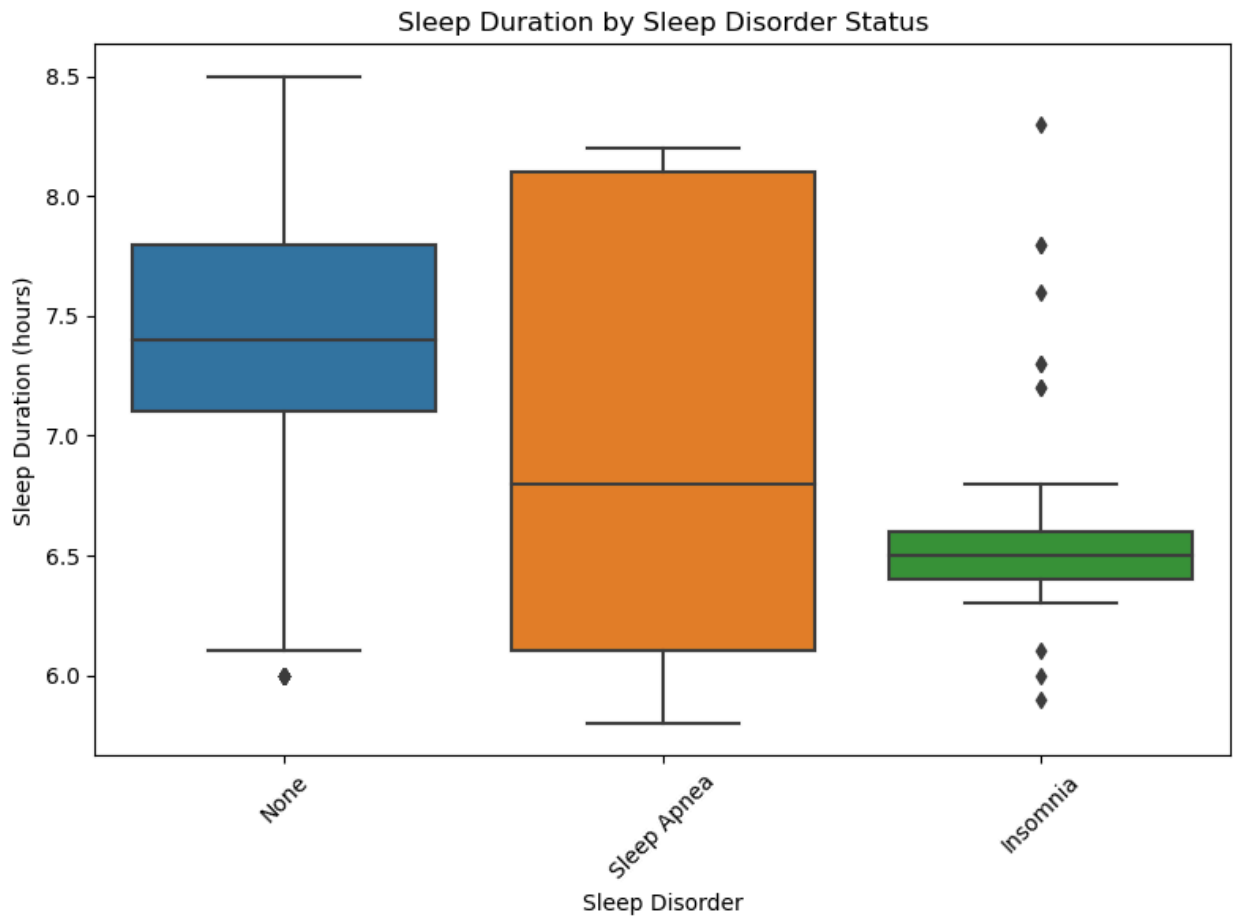
## Results

Descriptive statistics indicated that individuals without sleep disorders had a higher mean sleep duration (7.36 hours) compared to those with sleep disorders (6.81 hours), a difference of approximately 33 minutes.

*Boxplot: Sleep Duration by Sleep Disorder Status*

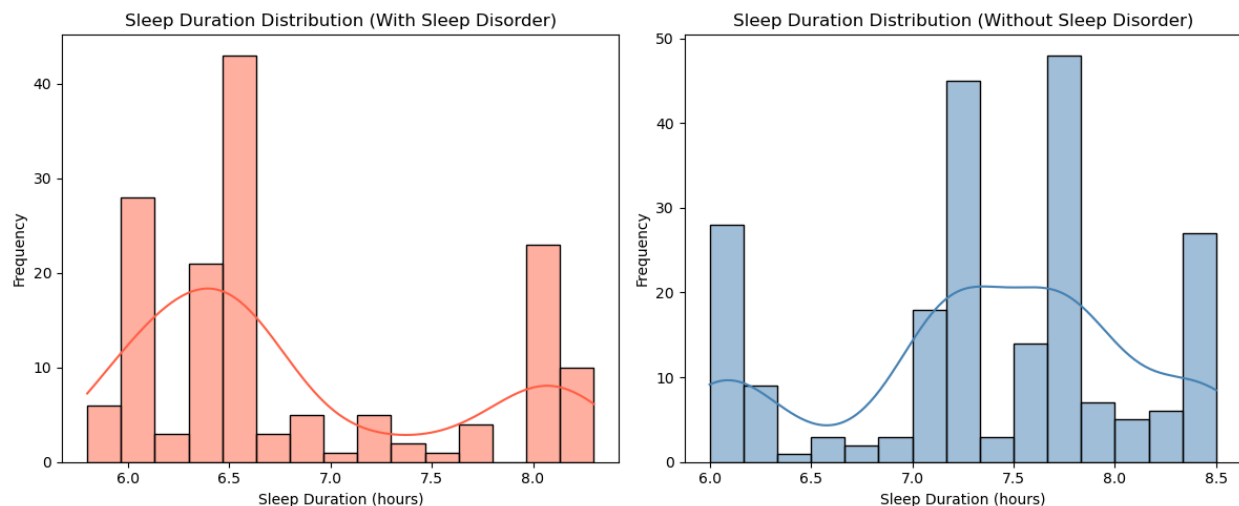
Figure 1.

In [48]:



## Histograms: Distribution of Sleep Duration for Each Group

**Figure 2**



## Visual Analysis of Sleep Duration by Sleep Disorder Status

**Figure 1** presents a boxplot comparing sleep duration between individuals with and without sleep disorders. The median sleep duration is visibly lower for those with sleep disorders, with a wider interquartile range indicating greater variability. Additionally, the presence of outliers in both groups highlights individual differences in sleep patterns.

**Figure 2** shows histograms with kernel density estimates for each group. The distribution of sleep duration among individuals with sleep disorders is right-skewed, indicating that most individuals sleep fewer hours, with a few sleeping longer durations. Conversely, the distribution for those without sleep disorders is more symmetric and centered around longer sleep durations. These differences in distribution support the use of a non-parametric Mann-Whitney U test to compare the groups.

Together, these visualizations illustrate a clear difference in sleep duration patterns, complementing the statistical findings of a significant difference between groups.

The Mann-Whitney U test revealed a statistically significant difference between the two groups ( $U = 10,906.0$ ,  $p < 0.001$ ). This result provides strong evidence to reject the null hypothesis and conclude that sleep duration differs significantly based on sleep disorder status.

## **Discussion**

The findings suggest that sleep disorders are associated with reduced sleep duration. This aligns with existing literature indicating that sleep disorders impair the ability to maintain sufficient and restorative sleep. The difference of 33 minutes per night, while seemingly modest, may have meaningful health consequences over time, affecting cognitive function, mood regulation, and overall quality of life.

## **Conclusion**

This study confirms a significant association between sleep disorders and reduced sleep duration. Healthcare providers should consider these findings when diagnosing and managing patients with sleep complaints. Further research could explore the impact of specific types of sleep disorders and interventions aimed at improving sleep duration and quality.