Comprehensive Report on Sleep Health and Lifestyle

Name: **Jency Francis**
Student ID : **23082639**
GitHub Link: https://github.com/JencyFrancis/Applied-Data-Science-Assignment-1
The dataset has been sourced from Kaggle.

1. Introduction

Sleep health plays a vital role in the ongoing research aimed at extending human longevity, highlighting its significance in our overall well-being. Quality sleep is not only just beneficial but also essential for our mental, emotional, physical and spiritual well-being. In this rapidly evolving world, it is crucial to transform our lifestyle by adjusting the sleeping pattern and incorporating regular exercise in day-to-day life, as these elements directly influence the quality of our sleep. The impact of inadequate sleep on brain function, hormone regulation, and cardiovascular health is well-documented and cannot be ignored. Let us dive into the data to deepen our understanding of this crucial topic.

2. Data Description

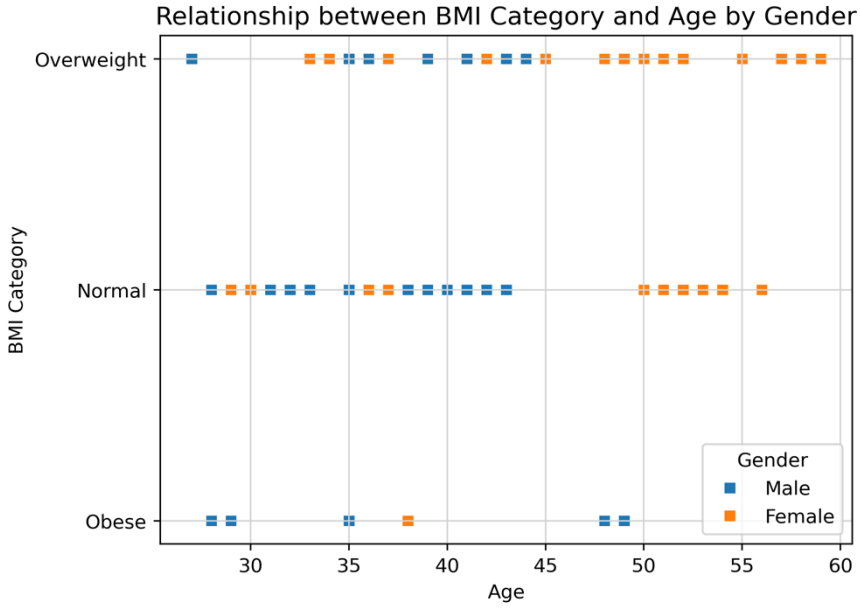
The analysis was done on a dataset called "Sleep_health_and_lifestyle_dataset.csv" which contains data regarding sleep health and lifestyle. The critical columns utilized for the analysis include:

Gender: The gender of the individual (Male/Female)	**Physical Activity Level**: The total number of minutes a person engages in physical activity each day
Age: The age of the individual, measured in years	**Stress Level**: A subjective rating of the stress a person experiences, ranging from 1 to 10
Sleep Duration: The number of hours the person sleeps each day	**BMI Category**: The classification of a person's Body Mass Index(BMI) into three categories: Obese, Overweight or Normal
Quality of Sleep: A subjective rating of the sleep quality, ranging from 1 to 10	**Daily Steps**: The number of steps a person takes each day

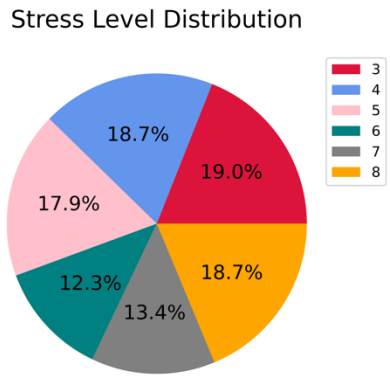
3. Analysis and Findings

3.1. Relationship between BMI Category and Age by Gender

Scatter plot is an effective tool for examining the correlation between variables. In this plot, "Age" is mentioned on the x-axis, while "BMI Category" is shown on the y-axis. The graphical representation reveals the relationship between BMI category and age differentiated by gender. It indicates that females are rarely classified as obese, whereas males predominantly fall into this category. Furthermore, in the overweight BMI category, it appears that females are more likely to be categorized as overweight compared to males, especially from the age of 45. Another observation is that males are overweight at their early stage of lives. However, both genders contribute almost equally to the normal BMI category. The **minimum** and **maximum** age of the dataset are 27 and 59 respectively across gender and **standard deviation** and **mean** are 8.67 and 42.18 respectively.



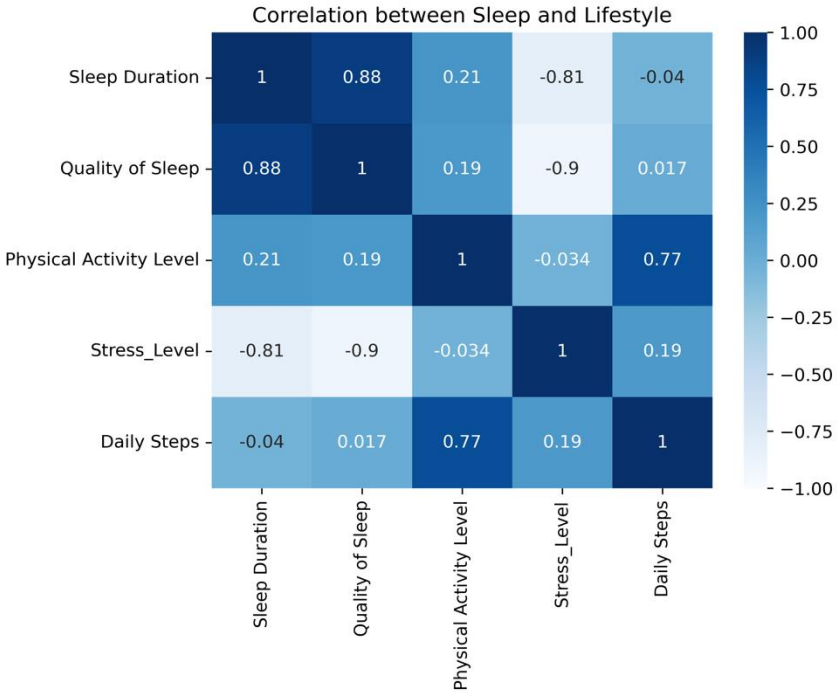
3.2. Stress Level Distribution



A pie chart offers a clear and effective representation of a key variable. It is striking that 'stress level 3' accounts for the largest slice comprising 19% of the entire dataset, closely followed by 'stress level 8', 'stress level 4' and 'stress level 5', standing at 18.7%,18.7% and 17.9% respectively. This challenges the common belief that the higher stress levels, such as 7 or 6, would also dominate this classification along with 'stress level 8'. However, they are only at 13.4% and 12.3% respectively, which also happens to be the lowest. For stress level, the value of **skewness** is 0.15 which suggest a moderate distribution and **kurtosis** is -1.33 which imply that the distribution has lighter tails and is flatter than a normal distribution.

3.3. Correlation between Sleep and Lifestyle

A heatmap can effectively illustrate the correlation between sleep and various other factors. The color scheme in this visualization magnifies our ability to understand the data intuitively, allowing us to identify the factors that have the most significant impact. In this context, darker colors indicate a stronger relationship, while lighter colors signify a weaker relationship. It is indispensable to note that, longer sleep duration is strongly associated with better sleep quality. Additionally, the level of physical activity positively influences both sleep quality and sleep duration. Interestingly, sleep quality remains unaffected by stress levels.



4. Important Statistics

Below is the table summarizing the crucial statistics derived from the dataset:

Statistic	Age	Sleep Duration	Quality of Sleep	Physical Activity Level	Stress_Level	Daily Steps
Mean	42.18	7.13	7.31	59.17	5.39	6816.84
Std	8.67	0.80	1.20	20.83	1.77	1617.92
Min	27.00	5.80	4.00	30.00	3.00	3000.00
25%	35.25	6.40	6.00	45.00	4.00	5600.00
50%	43.00	7.20	7.00	60.00	5.00	7000.00
75%	50.00	7.80	8.00	75.00	7.00	8000.00
Max	59.00	8.50	9.00	90.00	8.00	10000.00

5.Conclusion

The report analyzed sleep health and lifestyle, providing valuable insights on stress level, sleep duration, quality of sleep, BMI, physical activity level and age. In conclusion, there is potential for further elaborate investigations to improve our sleep and lifestyle.