COURSE DETAILS	
INSTITUTE	MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY
COURSE NAME	DATA VISUALIZATION
COURSE CODE	IIB40103
LECTURER	TS DIYANA BINTI AB KADIR
SEMESTER & YEAR	MARCH 2024
NAME	MOHAMAD MIRZA AIMAN BIN ZULKIPLE (52224121157)
ASSESSMENT	ANALYSIS REPORT

REPORT TITLE: SLEEP HEALTH AND LIFESTYLE DATASET

INTRODUCTION

This dataset was collected by Laksika Tharmalingam, a Data Science undergraduate at the University of Moratuwa in Sri Lanka. The Sleep Health and Lifestyle dataset has 375 rows and 13 columns, covering a range of variables related to sleep and daily habits. The 13 columns include Person ID, Gender, Age, Occupation, Sleep Duration, Quality of Sleep, Physical Activity Level, Stress Level, BMI Category, Blood Pressure, Heart Rate, Daily Steps, and Sleep Disorder.

Key Features of the Dataset:

- Sleep metrics.
  - Sleep Duration.
  - Quality of Sleep.

- Lifestyle factors
  - Physical Activity Level.
  - Stress Level.
  - BMI category.
  - Daily steps.

- Cardiovascular Health
  - Blood Pressure Results
  - Heart Rate Level.

- Sleep Disorder analysis.
  - Identifies the occurrence of sleep disorders such as Insomnia and Sleep Apnea.

Based on the table below, shows the contents of the dataset:

Columns in Dataset	Description of the columns in the dataset
Person ID	The unique ID for each person
Gender	The gender of the person
Age	The age of the person in years
Occupation	The occupation or jobs of the person
Sleep Duration (hours)	The number of hours a person sleeps per day.
Quality of sleep (rating:1-10)	A rating for the quality of sleep, ranging from 1 to 10.
Physical activity level (minutes/day)	The number of minutes the person is involved in physical activity daily.
Stress level (rating: 1- 10)	A rating for the stress level experienced by the person, ranging from 1 to 10.
BMI category	The BMI category of the person has 3 categories (Underweight, Normal, and Overweight)
Blood Pressure (systolic/diastolic)	The blood pressure measurement of the person can be measured by systolic pressure over diastolic pressure.

	Systolic and Diastolic category: ➢ **Normal** Less than 120 for Systolic and less than 80 for diastolic ➢ **Elevated** 120-129 for systolic and less than 80 for diastolic ➢ **High Blood Pressure (Hypertension) Stage 1** 130-139 for systolic and 80-89 for diastolic. ➢ **High Blood Pressure (Hypertension) Stage 2** 140 or higher for systolic and 90 or higher for diastolic. ➢ **(Hypertensive Crisis)** Higher than 180 for systolic and higher than 120 for diastolic.
Heart Rate (bpm)	The resting heart rate of the person is in beats per minute.
Daily steps	The number of steps the person takes per day.
Sleep disorder	The presence or absence of a sleep disorder in the person **(None, Insomnia and Sleep Apnea)** **None** ➢ The person does not exhibit any sleep disorder which is Insomnia and Sleep Apnea).

	Insomnia ➢ The person has trouble falling asleep or staying asleep, leading to a lack quality of sleep. **Sleep Apnea** ➢ The person suffers from pauses in breathing during sleep, resulting in disrupted sleep patterns and potential health risks.

RESEARCH QUESTIONS

1. **Blood Pressure Systolic vs Quality of sleep**

   - How does Blood Pressure (Systolic) affect the quality of sleep?

2. **Blood Pressure Diastolic vs Quality of sleep**

   - How does Blood Pressure (Diastolic) affect the quality of sleep?

3. **Stress Disorder and Gender type vs stress level.**

   - How do different sleep disorders (e.g., none, insomnia, sleep apnea) and gender type influence stress levels (rated 1-10)?

4. **Physical Activity Level vs Stress Level**

   - Is it increasing the physical activity level can decrease the stress level?

FINDINGS ELABORATION

QUESTION 1

How does Blood Pressure (Systolic) affect the quality of sleep?

This visualization used **line graph**:

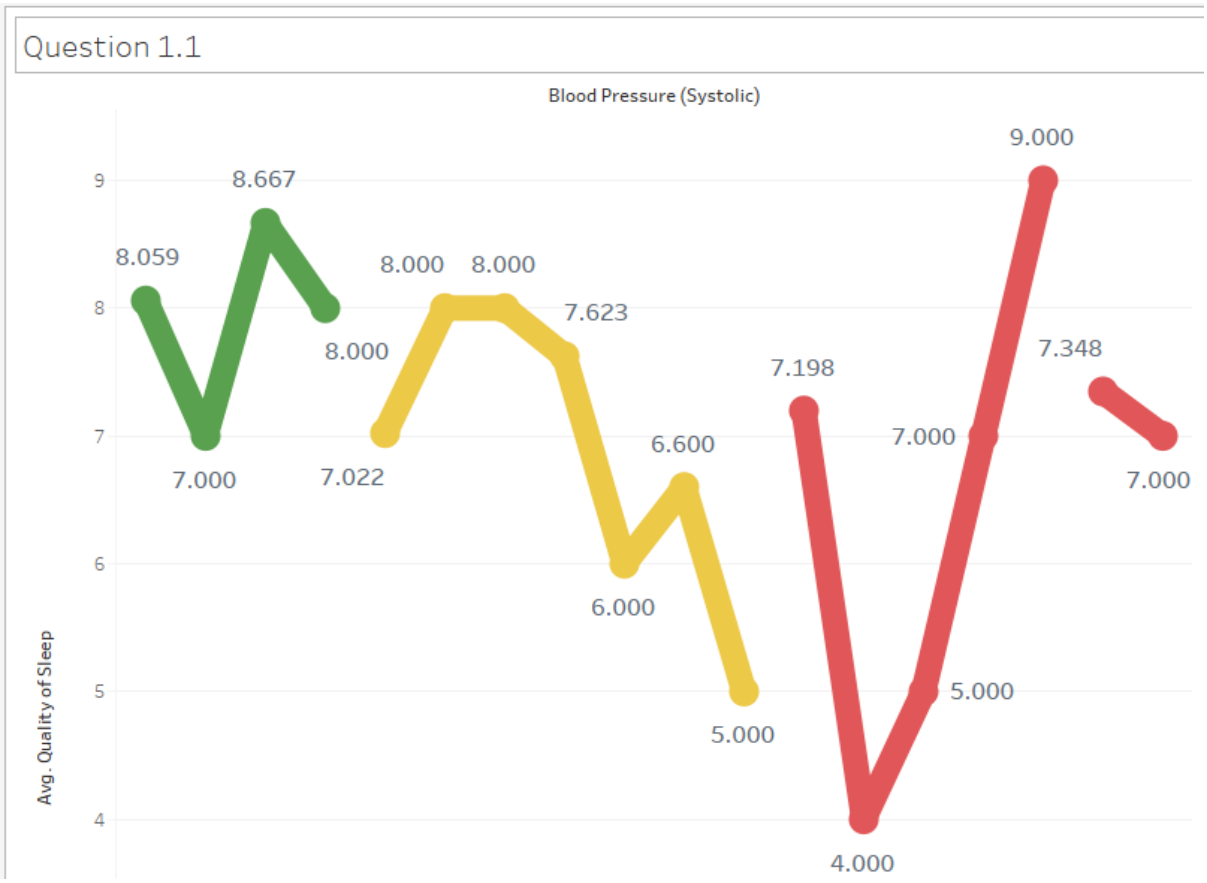
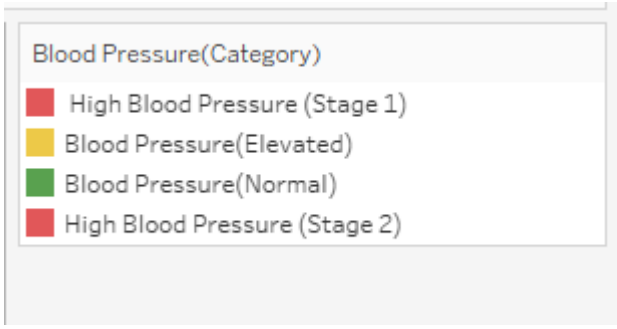


Figure 1

Based on Figure 1, the line graph shows the visualization between Blood Pressure (Systolic) and Average Quality of sleep.

It has 4 categories for types of Blood Pressure:



Blood pressure (Normal) indicates a green colour ranging from 115 to 119.

Blood pressure (Elevated) indicates a yellow colour ranging from 120 to 129.

High Blood pressure (Stage 1) indicates a red colour ranging from 130 to 139.

High Blood pressure (Stage 2) indicates a red colour ranging from 140 and higher than that.

Sleep Quality is measured by use rating from 0-10.

A rating of 0-4 indicates low sleep quality.

A rating of 5-10 indicates high sleep quality.

Normal Blood Pressure (115 to 119)

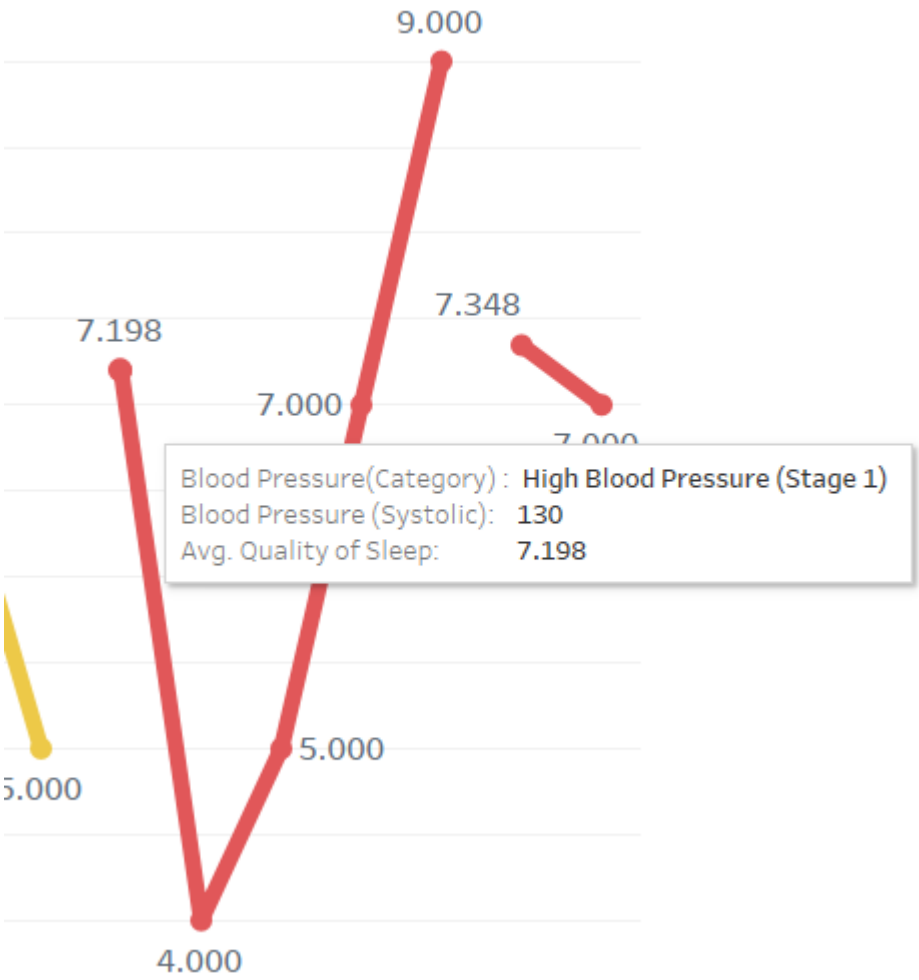
- **115:** Average sleep quality = 8.059/10
- **117:** Average sleep quality = 7.000/10
- **118:** Average sleep quality = 8.667/10
- **119:** Average sleep quality = 8.000/10

This Normal Blood Pressure shows that sleep quality will improve when the Blood Pressure (systolic) is in a normal condition range (115 to 119).

Elevated Blood Pressure (120 to 129)

- **120:** Average sleep quality = 7.022/10
- **121:** Average sleep quality = 8.000/10
- **122:** Average sleep quality = 8.000/10
- **125:** Average sleep quality = 7.623/10
- **126:** Average sleep quality = 6.00010
- **128:** Average sleep quality = 6.600/10
- **129:** Average sleep quality = 5.000/10

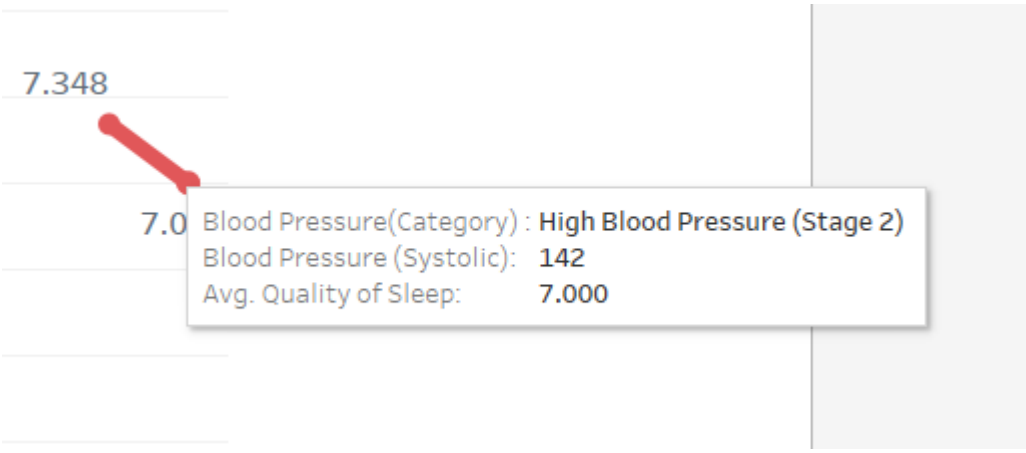
In this elevated range, when the blood pressure increases, the sleep quality will decrease. For instance, when the elevated blood pressure is 129, the sleep quality decreases, rated 5.000/10.



High Blood Pressure (Stage 1) (130 to 139)

- **130:** Average sleep quality = 7.198/10
- **131:** Average sleep quality = 4.000/10
- **132:** Average sleep quality = 5.000/10
- **135:** Average sleep quality = 7.000/10
- **139:** Average sleep quality = 9.000/10

Then, when Blood Pressure (Stage 1) is higher which is 131, the quality of sleep will be lower which is rated 4.000/10.



High Blood Pressure (Stage 2) (140 and higher)

- **140:** Average sleep quality = 7.348/10
- **142:** Average sleep quality = 7.000/10

In this High Blood Pressure (Stage 2), the quality of sleep is stable but lower than in the normal range which is around a rating 7/10.

In conclusion, the Normal Blood Pressure range (115-119) shows a good quality of sleep and higher blood pressure seems to worsen the quality of sleep, especially in the ranges of 120-139.

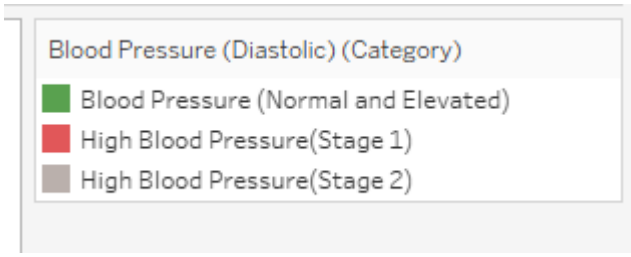
QUESTION 2

How does Blood Pressure (Diastolic) affect the quality of sleep?

This visualization used **bar chart**:

Based on Figure 1, the bar graph shows the visualization between Blood Pressure (Diastolic) and Average Quality of sleep.

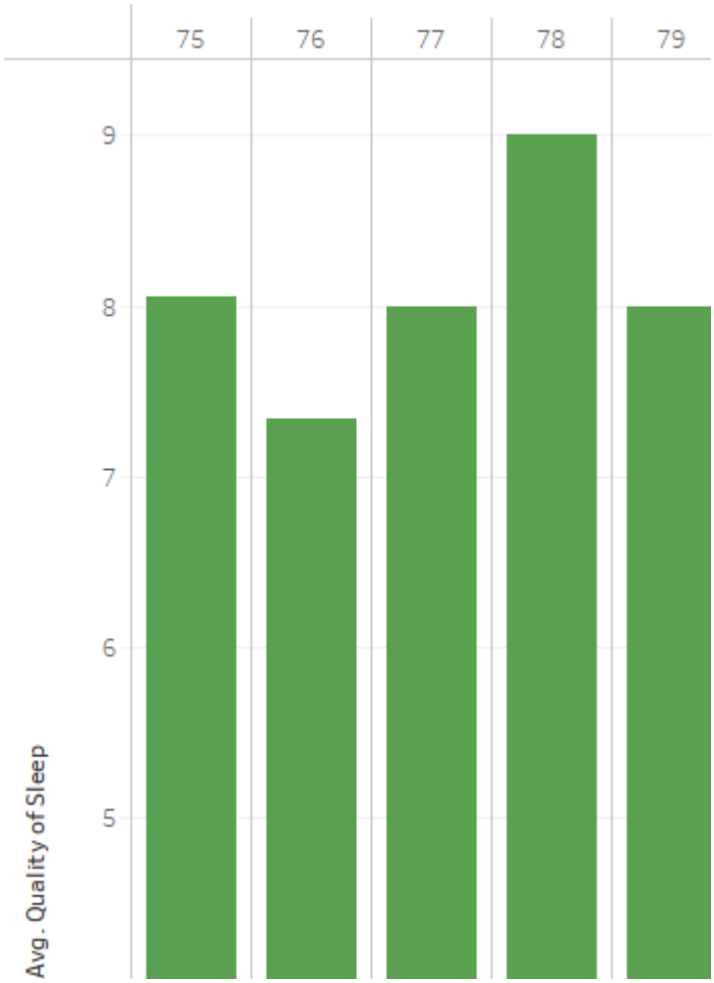
It has 3 categories for types of Blood Pressure:



Blood pressure (Normal and Elevated) indicates a green colour ranging from 75-79

High Blood pressure (Stage 1) indicates a red colour ranging from 80 to 89.

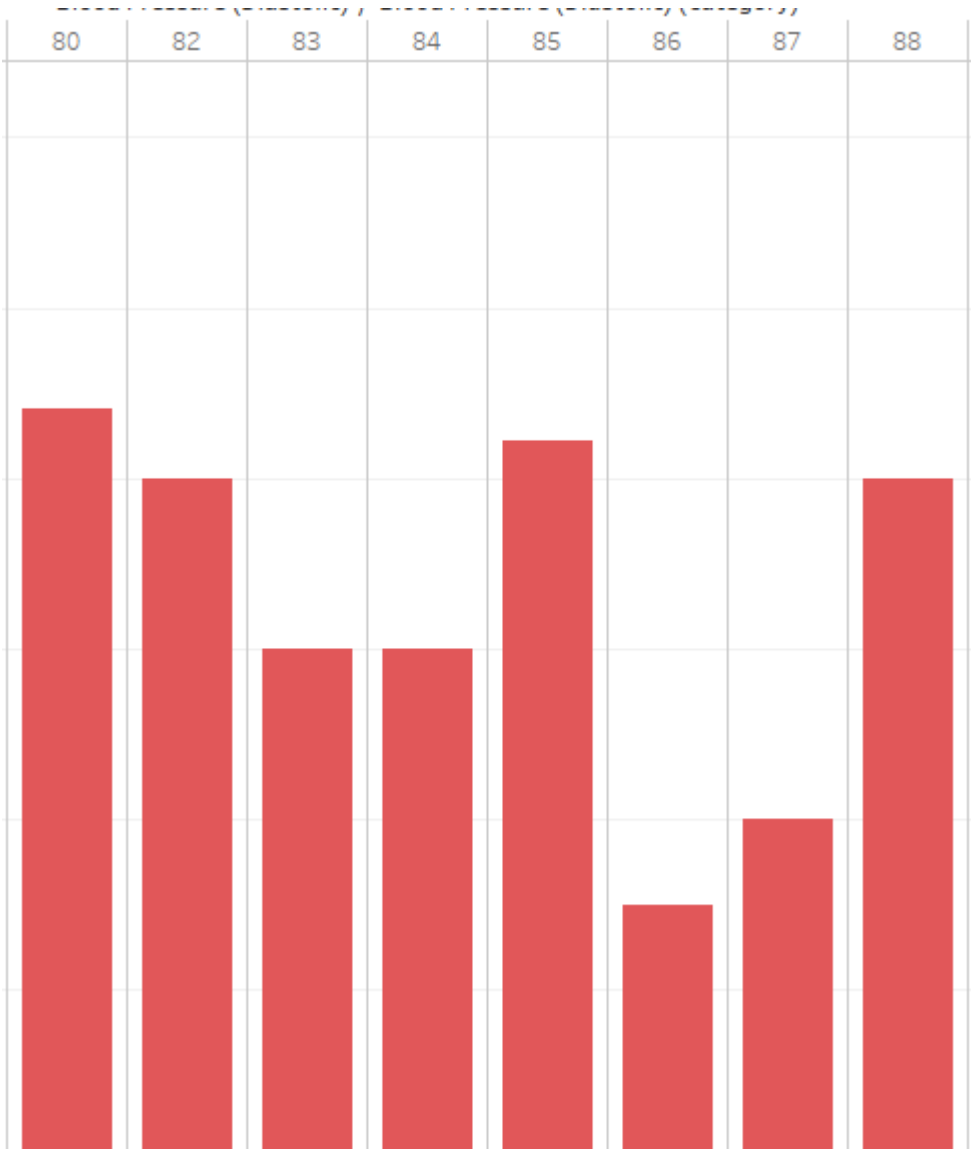
High Blood pressure (Stage 2) indicates a grey colour ranging from 90 and higher than that.



Normal and Elevated Blood Pressure (75 to 79)

- **75:** Average sleep quality = 8.059/10
- **76:** Average sleep quality = 7.333/10
- **77:** Average sleep quality = 8.000/10
- **78:** Average sleep quality = 9.000/10
- **79:** Average sleep quality = 8.000/10

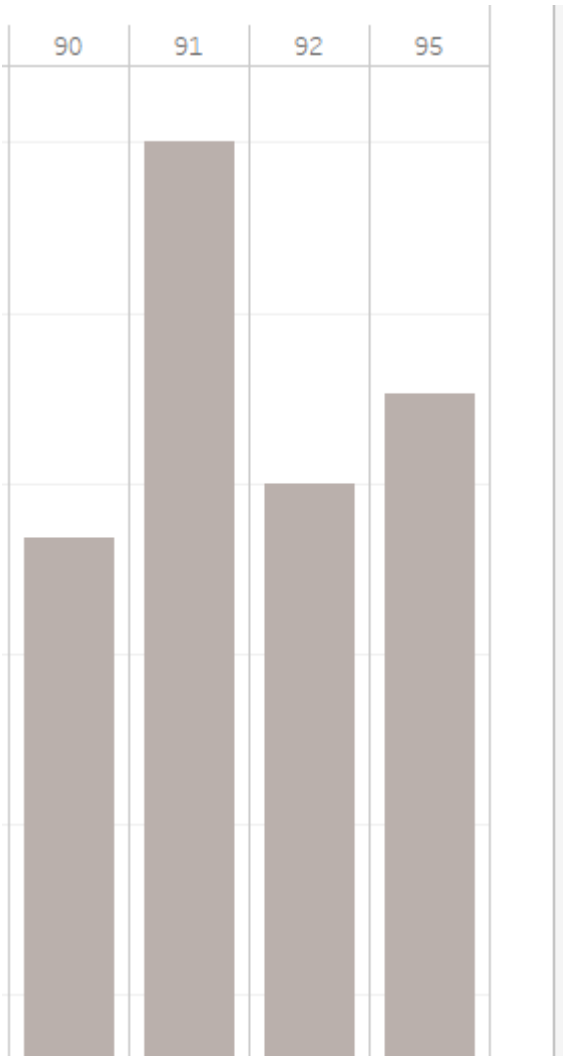
In this range, when Blood Pressure Diastolic is 78 which is still in the normal range for blood pressure, the quality of sleep will be better which is rating 9.000/10.



High Blood Pressure (Stage 1) (80 to 89)

- **80:** Average sleep quality = 7.405/10
- **82:** Average sleep quality = 7.000/10
- **83:** Average sleep quality = 6.000/10
- **84:** Average sleep quality = 6.000/10
- **85:** Average sleep quality = 7.216/10
- **86:** Average sleep quality = 4.500/10
- **87:** Average sleep quality = 5.000/10
- **88:** Average sleep quality = 7.000

Based on this result for Blood Pressure (Stage 1), when the blood pressure (systolic) is higher which is 86, the quality of sleep (rating) will lower which is rating 4.500/10.



High Blood Pressure (Stage 2) (90 and higher)

- **90:** Average sleep quality = 6.677/10
- **91:** Average sleep quality = 9.000/10
- **92:** Average sleep quality = 7.000/10
- **95:** Average sleep quality = 7.523/10

In this Blood Pressure (Stage 2), although the blood pressure is higher which is 91, the quality of sleep still good which is rating 9.000/10.

There are also low and high-quality of sleep, which is a quality of sleep rating 6.677/10 when blood pressure (diastolic) is 90. So, this is a low quality of sleep.

In conclusion, higher diastolic blood pressure often leads to the worst sleep quality, especially in the Blood pressure (stage 1) range of 80-89. Then, the Blood pressure (Stage 2) range of 90 and above shows mixed rating quality of sleep but still good sleep quality.

QUESTION 3

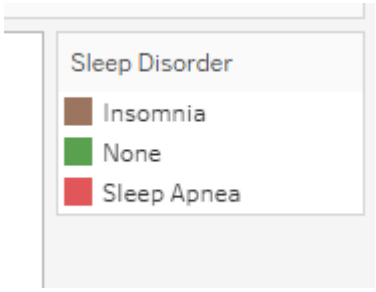
How do different sleep disorders (e.g., none, insomnia, sleep apnea) and gender type influence stress levels (rated 1-10)?

This visualization used **side-by-side bars:**

This is the result and findings from the visualization I do from the tableau between sleep disorders, gender and stress levels which is use rating 1-10 to measure the stress level.

Stress level (0-5) is the level of stress is good and moderate.

Stress level (6-10) is the level of stress is high.



Sleep disorders have 3 categories which is distinguished by their color:

Brown colour indicates a sleep disorder type of Insomnia.

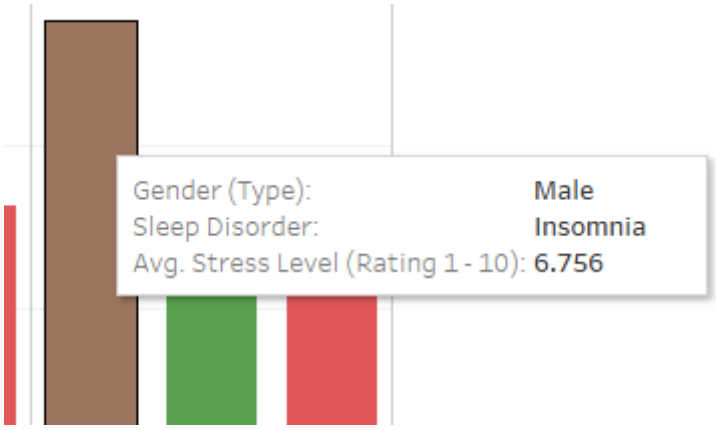
The green colour indicates no sleep disorder.

The red colour indicates sleep disorder type sleep apnea.

1. Sleep Disorder type (Insomnia)

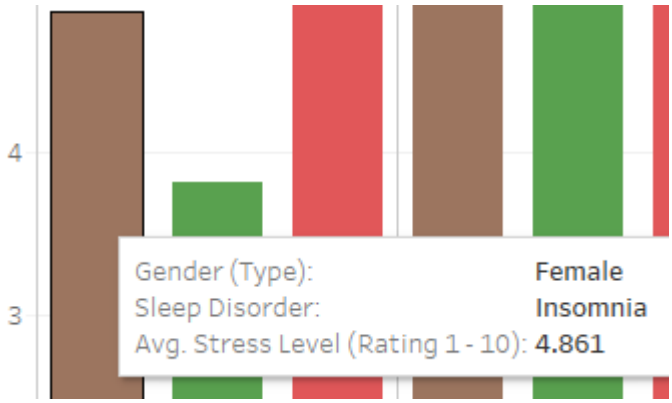
For Male:

Have an average stress level rating of 6.756/10



For Female:

Have the average stress level rating of 4.861/10



Based on this result from visualization, Males that have sleep disorder type Insomnia have a higher stress level rating which is rated 6.756/10 compared to females which is rated 4.861/10. So, this shows that the sleep disorder Insomnia has a more severe impact on higher stress levels in males.

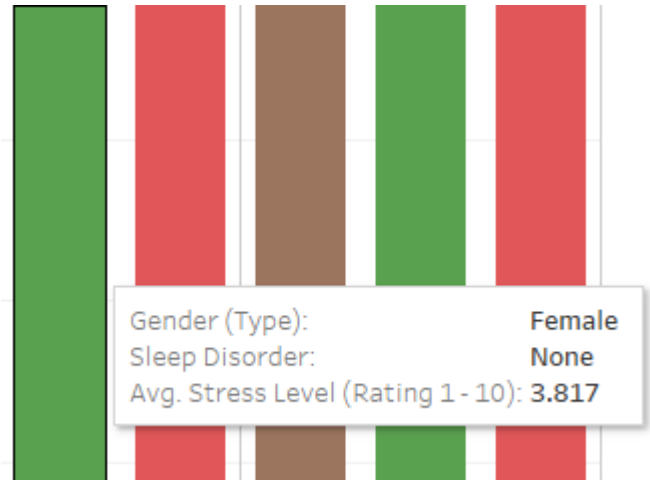
2. No sleep disorder (None)

For male:

Have the average stress level rating 5.891/10

For female:

Have the average stress level rating 3.817/10

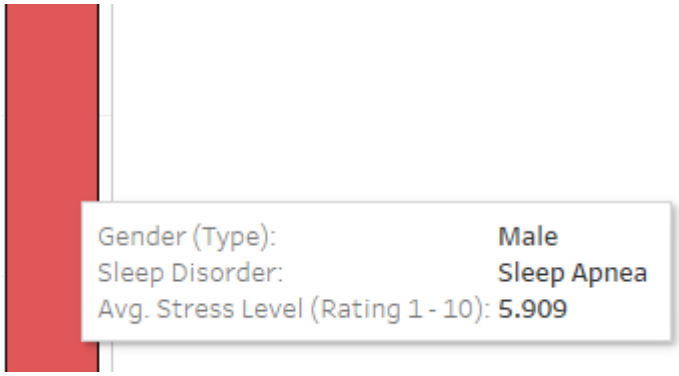


Males that have no sleep disorder still have a moderate stress level which is rated 5.891/10, while females without sleep disorder have a lower stress level which is rated 3.817/10. This indicates that gender males have higher baseline stress levels even without sleep disorders, while gender females have lower baseline stress levels.

3. Sleep Disorder type (Sleep Apnea)

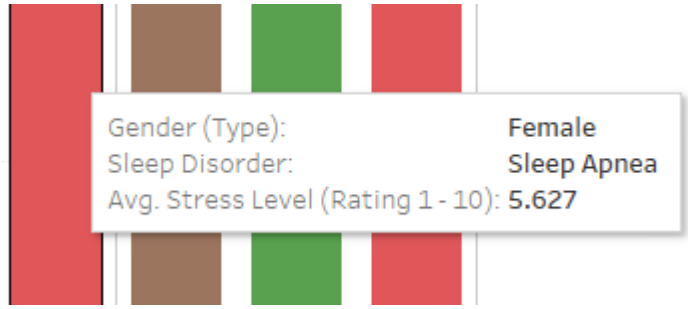
For male:

Have the average stress level which is rating 5.909/10



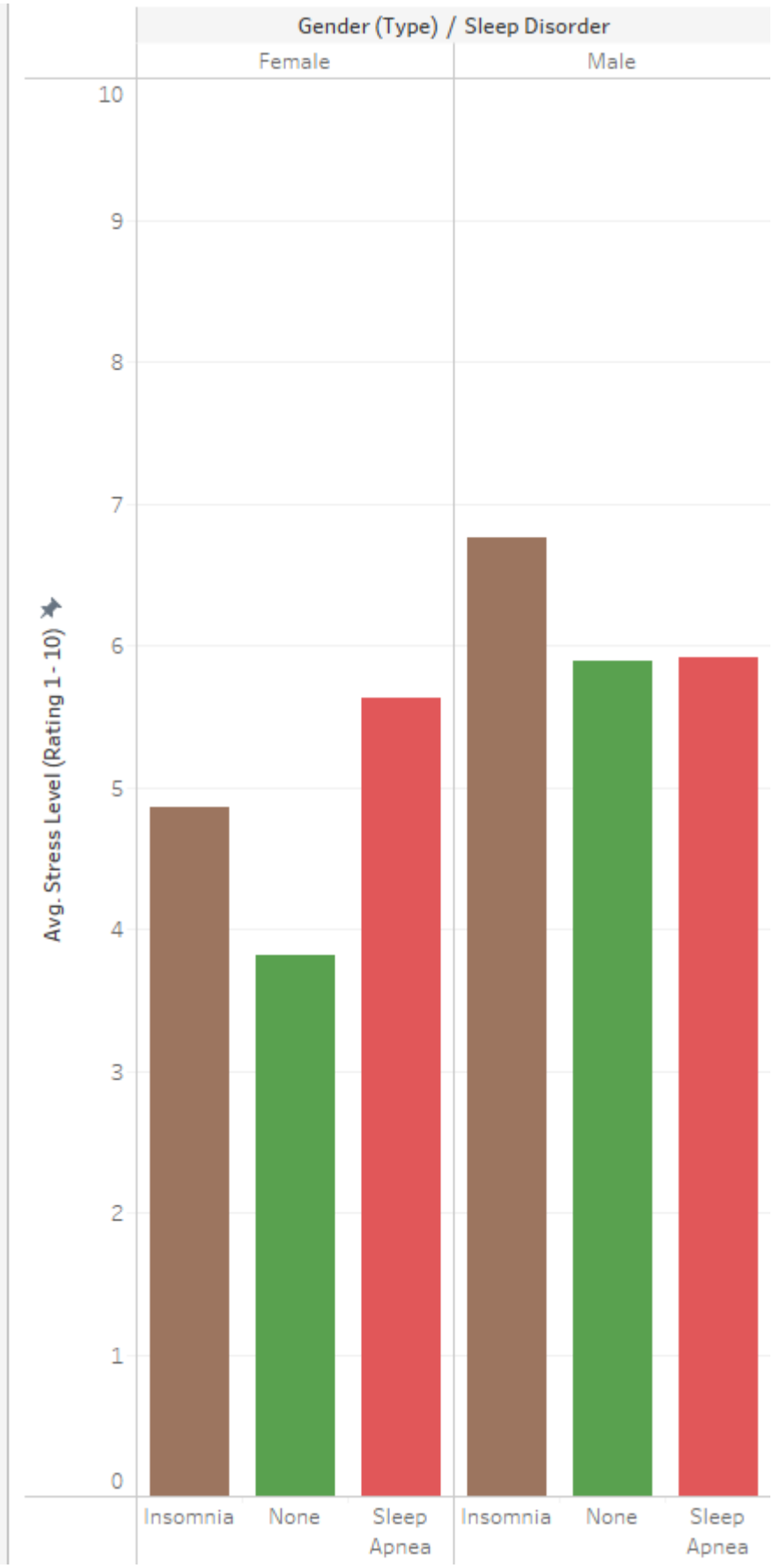
For Female:

Have the average stress level which is rating 5.627/10



Based on this result, both gender males and females with sleep disorder type sleep apnea have similar stress levels, with males showing higher stress levels than females which is rated 5.909/10 while females rated 5.627/10. Then, this shows that sleep apnea affects both genders in terms of stress, but gender males show higher stress levels compared to gender females.

This picture belows shows the visualization between sleep disorder, gender with stress level:

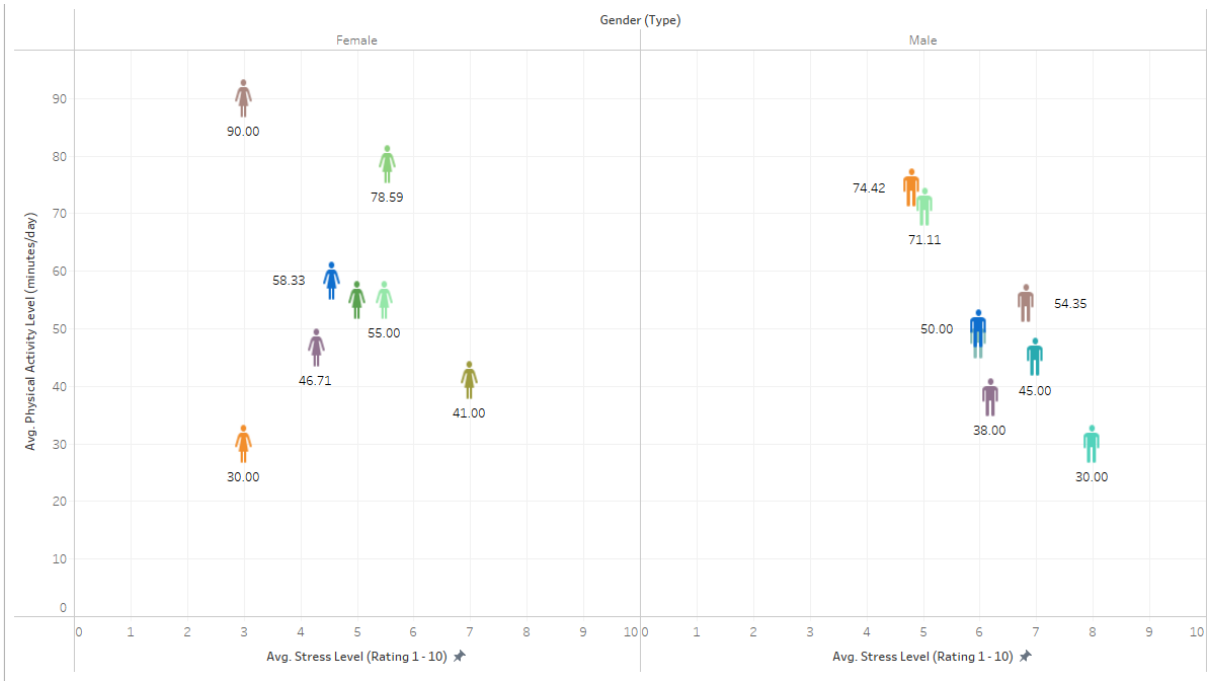


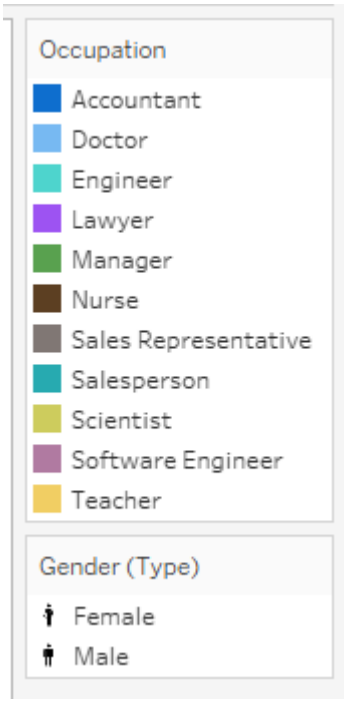
QUESTION 4

Is it increasing the physical activity level can decrease the stress level?

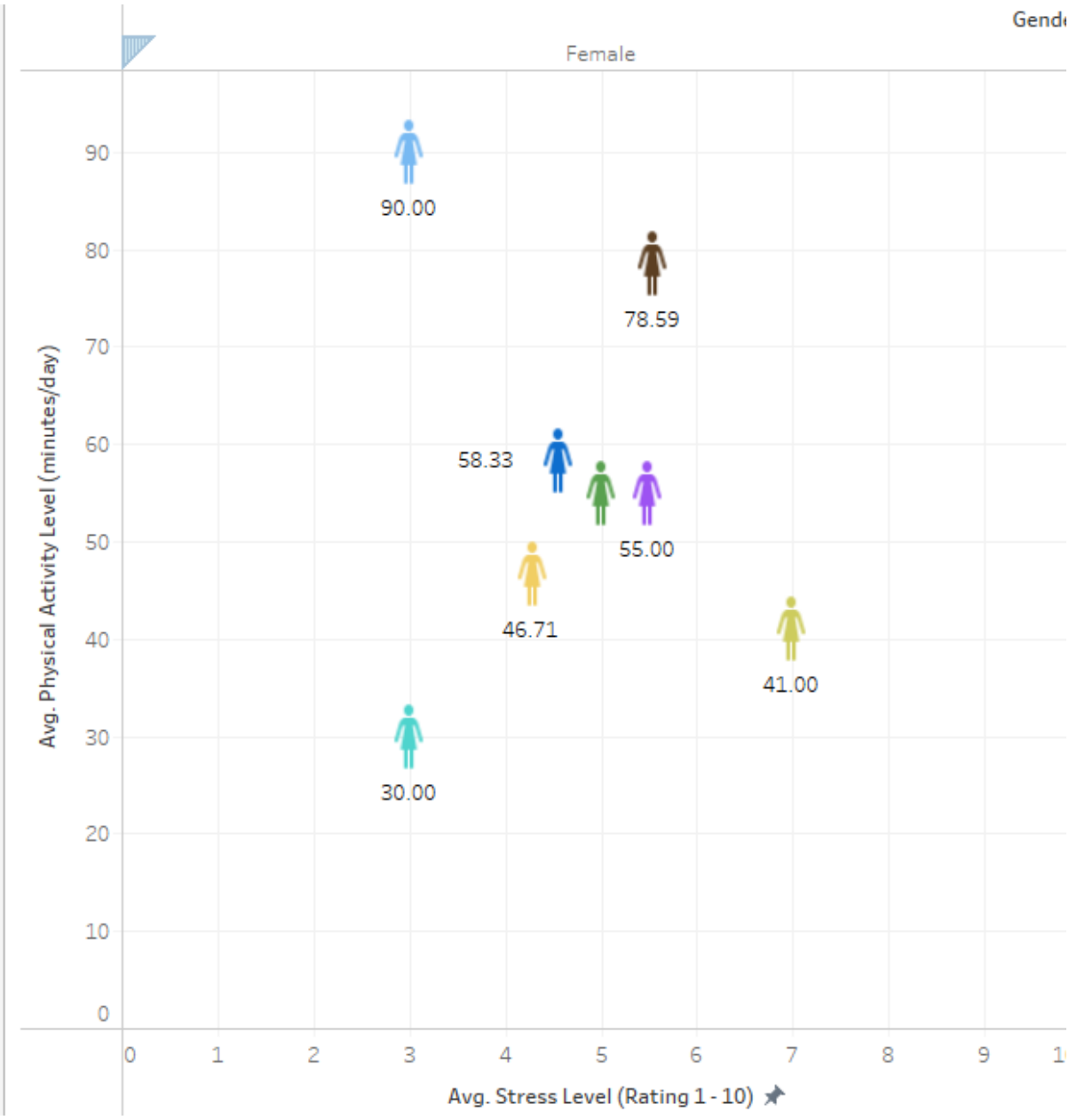
This type of visualization used **scatter plot**:

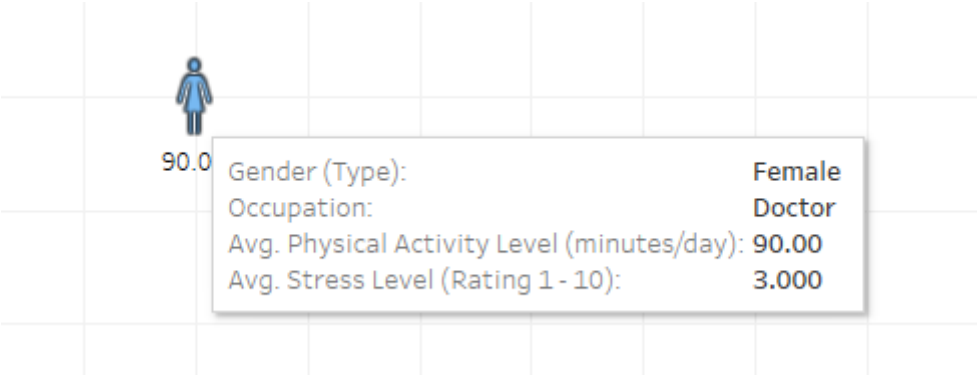
This visualization is about physical activity level (minutes/day) with average stress level (rating 1-10). It also has gender male and female and various types of occupations.



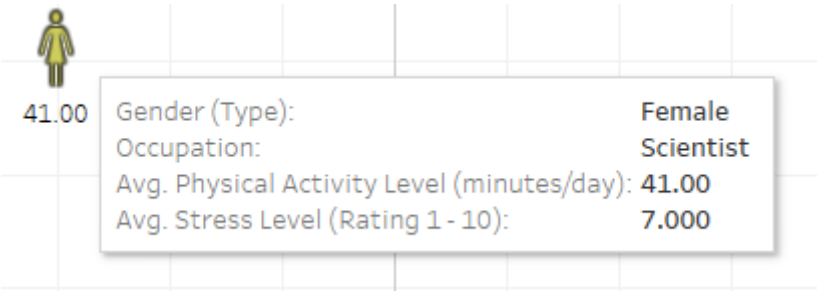


For Gender Female:





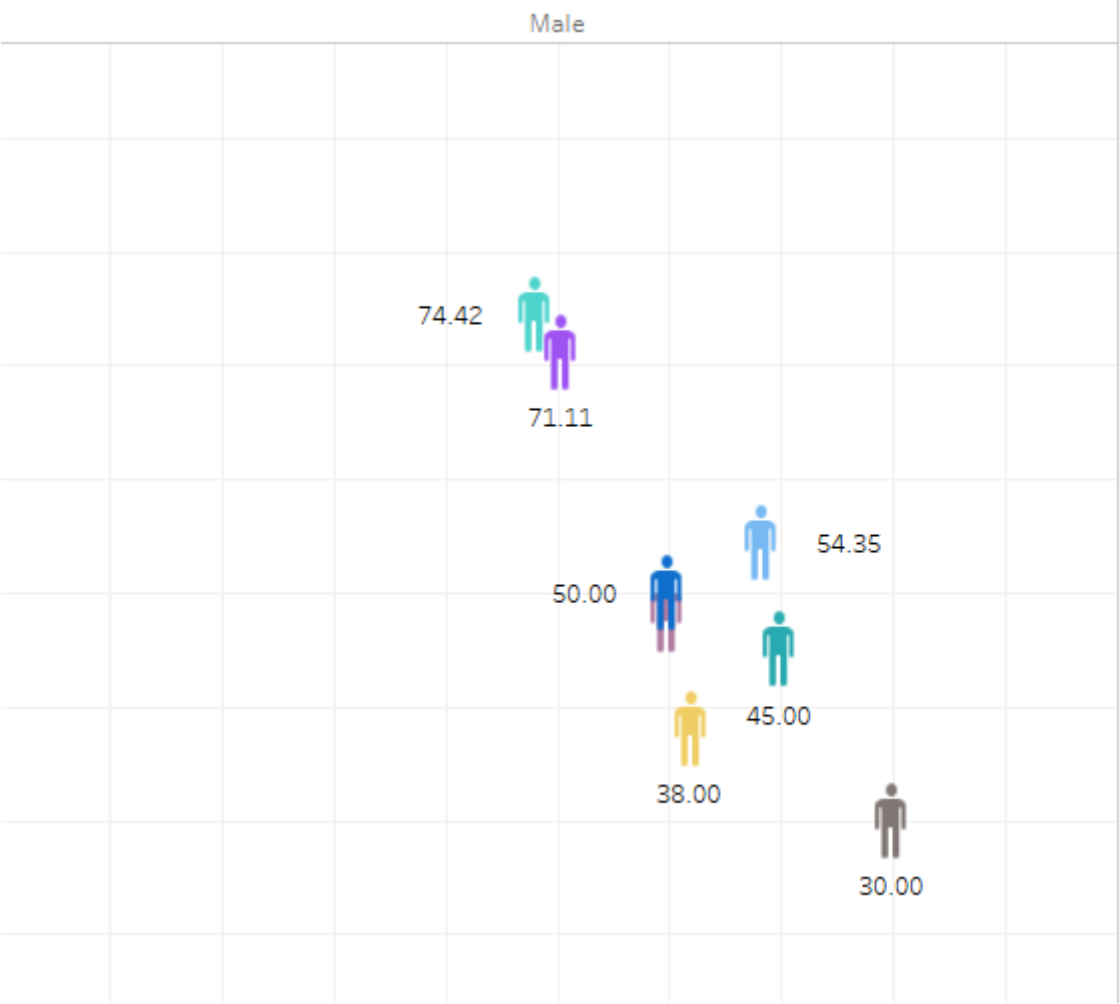
Based on this result from visualization in Tableau, it shows that when the physical activity level is higher which is 90.00 minutes per day, the average stress level will lower which is rating 3.000/10. It means that the stress level is in good condition.

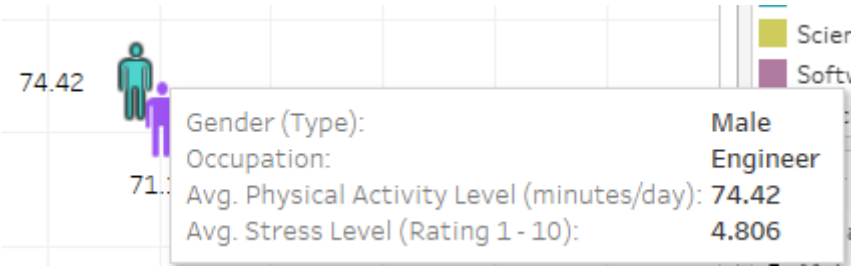


Based on this result from visualization in Tableau, it shows that when physical activity is lower which is 41.00 minutes per day, the average stress level will be higher which is rated 7.000/10. It means that stress levels are in bad conditions.

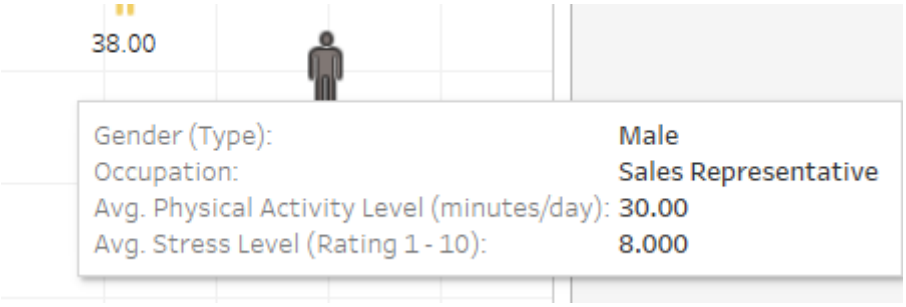
In conclusion, when physical activity level is higher, the average stress level will lower.

For gender Male:





It shows that when the average physical activity level (minutes per day) is higher which is 74.42 minutes per day, the average stress level will lower which is a rating of 4.806/10.

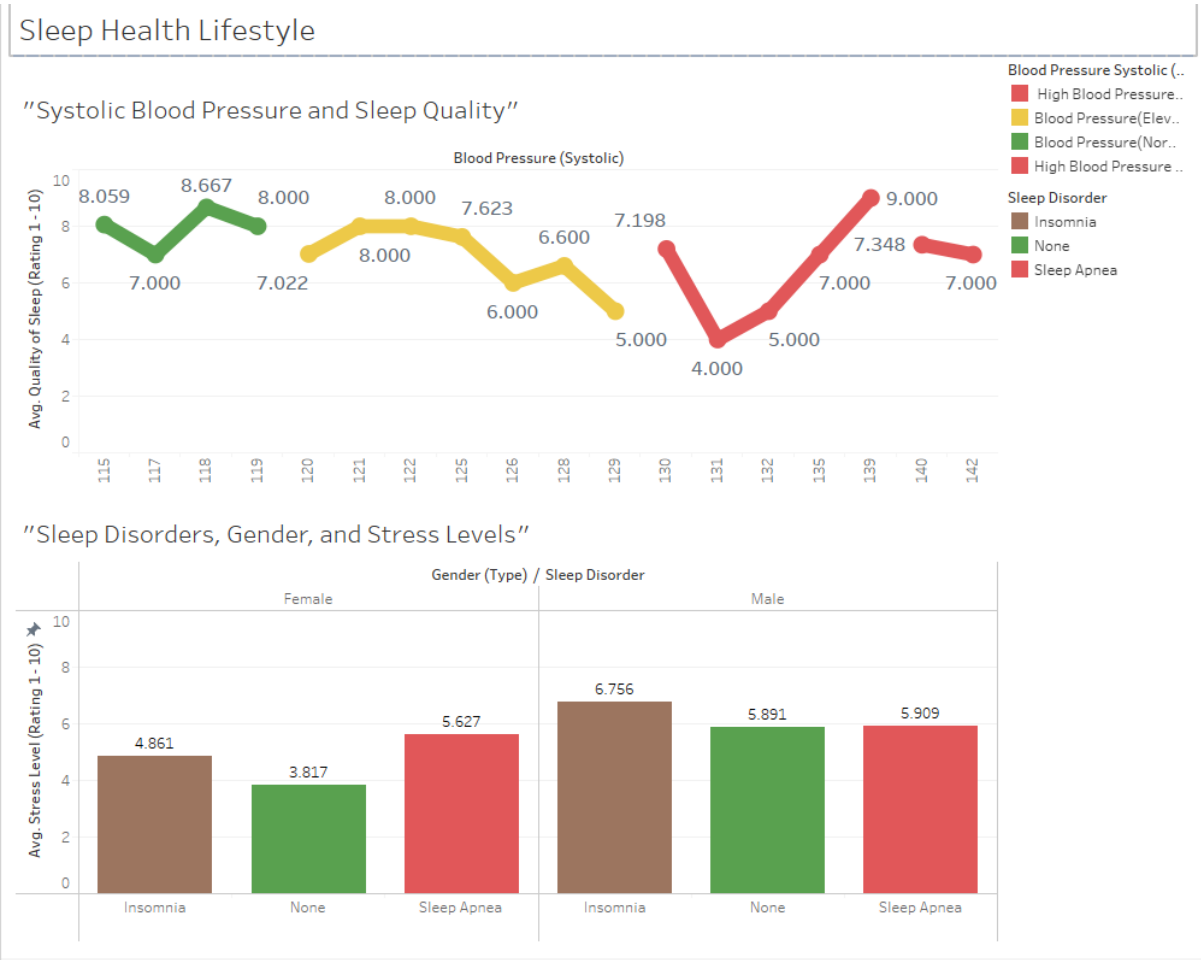


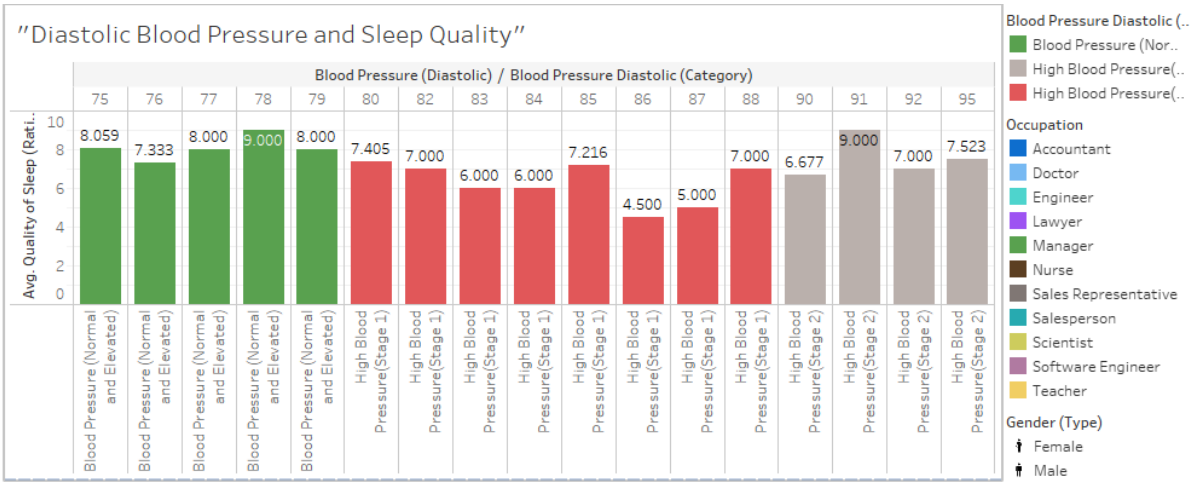
Its shows that when physical activity level (minutes per day) is lower which is 30.00 minutes per day, the average stress level will higher which is rating 8.000/10.

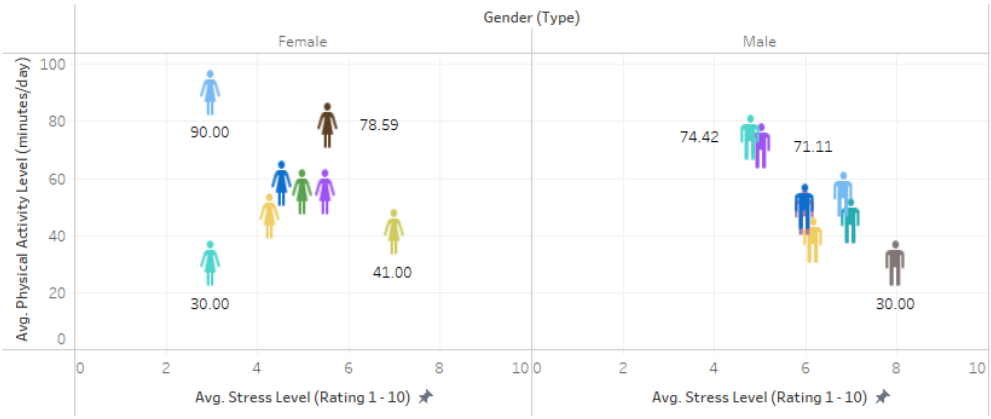
- When rating for average stress level become higher which is around rating 5-10, it indicates higher stress level.

- When the rating for average stress level becomes lower which is around rating 0-4, it indicates a lower stress level.

This picture below is the dashboard that has 4 different visualizations:




"Diastolic Blood Pressure and Sleep Quality"
Blood Pressure (Diastolic) / Blood Pressure Diastolic (Category)
Avg. Quality of Sleep (Rati..
75 76 77 78 79 80 82 83 84 85 86 87 88 90 91 92 95
8.059 7.333 8.000 9.000 8.000 7.405 7.000 6.000 6.000 7.216 4.500 5.000 7.000 6.677 9.000 7.000 7.523
Blood Pressure (Normal and Elevated)
High Blood Pressure(Stage 1)
High Blood Pressure(Stage 2)
Blood Pressure Diastolic (..
Blood Pressure (Nor..
High Blood Pressure(..
High Blood Pressure(..
Occupation
Accountant
Doctor
Engineer
Lawyer
Manager
Nurse
Sales Representative
Salesperson
Scientist
Software Engineer
Teacher
Gender (Type)
Female
Male


"Physical Activity Impact on Stress Level"
Gender (Type)
Female
Male
Avg. Physical Activity Level (minutes/day)
90.00
78.59
41.00
30.00
74.42
71.11
30.00
Avg. Stress Level (Rating 1 - 10)
Avg. Stress Level (Rating 1 - 10)

CONCLUSION AND RECOMMENDATION

CONCLUSION:

1. **Systolic Blood Pressure and Sleep Quality:**
    - Normal Blood Pressure range (115-119) improves sleep quality.
    - Elevated Blood Pressure range (120-129) reduces sleep quality.
    - High Blood Pressure Stages 1 and 2 range (130-142) show mixed effects but often lower sleep quality.

2. **Diastolic Blood Pressure and Sleep Quality:**
    - Normal and elevated blood pressure range (75-79) leads to good sleep quality.
    - High Blood Pressure Stage 1 (80-89) often lower sleep quality.
    - High Blood Pressure Stage 2 (90-95) has variable effects on sleep quality.

3. **Sleep Disorders, Gender, and Stress:**
    - Males with insomnia have higher stress than females with insomnia.
    - Males without sleep disorders have higher stress than females without sleep disorders.
    - Both genders with sleep apnea have similar stress levels, with males slightly higher.

4. **Physical Activity and Stress:**
    - More physical activity lowers stress levels.
    - Less physical activity increases stress levels.
    - This is true for both males and females.

RECOMMENDATIONS:

1. **For Individuals:**
    - Maintain Normal Blood Pressure: Keep blood pressure within the normal range for better sleep.
    - Increase Physical Activity: Exercise regularly to reduce stress.
    - Manage Sleep Disorders: Seek treatment for sleep issues to control stress.

2. **For Healthcare Providers:**
    - Monitor Blood Pressure: Regularly check and manage patients' blood pressure.
    - Promote Exercise: Encourage daily physical activity.
    - Treat Sleep Disorders: Provide resources for managing sleep disorders.

3. **For Policy Makers:**
    - Raise Awareness: Educate the public about blood pressure, exercise, and sleep health.
    - Provide Resources: Ensure access to healthcare and exercise facilities.
    - Support Research: Fund studies on the links between blood pressure, sleep, physical activity, and stress.

This analysis can give benefits to organizations:

1. **Employee Health Programs:**
    - Create programs to check and control blood pressure for better sleep and health.
    - Encourage exercise to lower stress and increase productivity.

2. **Workplace Wellness Initiatives:**
    - Provide help for managing sleep problems to reduce stress and improve job satisfaction.
    - Design wellness programs that consider how stress affects different genders.

3. **Productivity and Performance:**
    - Healthier, well-rested employees are more productive and engaged.
    - Fewer sick days and lower healthcare costs from healthier employees.

REFERENCES

1. **American Heart Association. (2023, May 30). Understanding blood pressure readings. American Heart Association. https://www.heart.org/en/health-topics/high-blood-pressure/understanding-blood-pressure-readings**

2. **Tharmalingam, L. (2023). Sleep health and lifestyle dataset [Data set]. Kaggle. https://www.kaggle.com/datasets/uom190346a/sleep-health-and-lifestyle-dataset/data**

IIB 40103 DATA VISUALIZATION
Analysis report rubric

Report title: _____
Student 1 name: _____
Student 2 name: _____

NO	*CRITERIA*	*WEIGHTAGE*	*Outstanding*	*Meet expectation*	*Can be improved*	*Minimal effort*	*TOTAL MARKS*
			4	3	2	1	
1	**Introduction** Clarity on the dataset introduction	2					
2	**Research question** Clarity on the research questions	2					
3	**Findings** Findings answered the research questions	2					
4	**Dashboard interactivity** Ability to produce interactive dashboard	2					
5	**Conclusion** The recommendation given has potential to be implemented	2					
						TOTAL (40 MARKS)	