# and-lifestyle-analysis-with-python

October 18, 2023

## 1 Sleep Health and Lifestyle Analysis with Python

Problem Statement Delving into a comprehensive analysis of sleep patterns, factors affecting our daily lives, and their impacts on cardiovascular health. From sleep duration to stress levels, we'll uncover valuable insights to enhance well-being.

## 2 Import Library

[1]:
```
import pandas as pd
```

[2]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
```

```
C:\Users\Syed Arif\anaconda3\lib\site-packages\scipy\__init__.py:146:
UserWarning: A NumPy version >=1.16.5 and <1.23.0 is required for this version
of SciPy (detected version 1.25.1
  warnings.warn(f"A NumPy version >={np_minversion} and <{np_maxversion}"
```

## 3 Uploading Csv fle

[3]:
```
df = pd.read_csv(r"C:\Users\Syed␣
↪Arif\Desktop\Sleep_health_and_lifestyle_dataset.csv")
```

## 4 Data Preprocessing

## 5 .head()

head is used show to the By default = 5 rows in the dataset

[4]:
```
df.head()
```

[4]:
```
   Person ID Gender  Age            Occupation  Sleep Duration  \
0          1   Male   27     Software Engineer             6.1
```

```
1          2   Male   28               Doctor             6.2
2          3   Male   28               Doctor             6.2
3          4   Male   28  Sales Representative            5.9
4          5   Male   28  Sales Representative            5.9

   Quality of Sleep  Physical Activity Level  Stress Level BMI Category  \
0                 6                       42             6   Overweight
1                 6                       60             8       Normal
2                 6                       60             8       Normal
3                 4                       30             8        Obese
4                 4                       30             8        Obese

  Blood Pressure  Heart Rate  Daily Steps Sleep Disorder
0         126/83          77         4200           None
1         125/80          75        10000           None
2         125/80          75        10000           None
3         140/90          85         3000    Sleep Apnea
4         140/90          85         3000    Sleep Apnea
```

## 6 .tail()

tail is used to show rows by Descending order

[5]:
```
df.tail()
```

[5]:
```
     Person ID  Gender  Age Occupation  Sleep Duration  Quality of Sleep  \
369        370  Female   59      Nurse             8.1                 9
370        371  Female   59      Nurse             8.0                 9
371        372  Female   59      Nurse             8.1                 9
372        373  Female   59      Nurse             8.1                 9
373        374  Female   59      Nurse             8.1                 9

     Physical Activity Level  Stress Level BMI Category Blood Pressure  \
369                       75             3   Overweight         140/95
370                       75             3   Overweight         140/95
371                       75             3   Overweight         140/95
372                       75             3   Overweight         140/95
373                       75             3   Overweight         140/95

     Heart Rate  Daily Steps Sleep Disorder
369          68         7000    Sleep Apnea
370          68         7000    Sleep Apnea
371          68         7000    Sleep Apnea
372          68         7000    Sleep Apnea
373          68         7000    Sleep Apnea
```

## 7 .shape

It show the total no of rows & Column in the dataset

[6]:
```
df.shape
```

[6]:
```
(374, 13)
```

## 8 .Columns

It show the no of each Column

[7]:
```
df.columns
```

[7]:
```
Index(['Person ID', 'Gender', 'Age', 'Occupation', 'Sleep Duration',
       'Quality of Sleep', 'Physical Activity Level', 'Stress Level',
       'BMI Category', 'Blood Pressure', 'Heart Rate', 'Daily Steps',
       'Sleep Disorder'],
      dtype='object')
```

## 9 .dtypes

This Attribute show the data type of each column

[8]:
```
df.dtypes
```

[8]:
```
Person ID                  int64
Gender                    object
Age                        int64
Occupation                object
Sleep Duration           float64
Quality of Sleep           int64
Physical Activity Level    int64
Stress Level               int64
BMI Category              object
Blood Pressure            object
Heart Rate                 int64
Daily Steps                int64
Sleep Disorder            object
dtype: object
```

## 10 .unique()

In a column, It show the unique value of specific column.

[9]:
```
df["BMI Category"].unique()
```

[9]:
```
array(['Overweight', 'Normal', 'Obese', 'Normal Weight'], dtype=object)
```

## 11 .nuique()

It will show the total no of unque value from whole data frame

[10]:
```
df.nunique()
```

[10]:
```
Person ID                  374
Gender                       2
Age                         31
Occupation                  11
Sleep Duration              27
Quality of Sleep             6
Physical Activity Level     16
Stress Level                 6
BMI Category                 4
Blood Pressure              25
Heart Rate                  19
Daily Steps                 20
Sleep Disorder               3
dtype: int64
```

## 12 .describe()

It show the Count, mean , median etc

[11]:
```
df.describe()
```

[11]:

| | Person ID | Age | Sleep Duration | Quality of Sleep | \ |
|---|---|---|---|---|---|
| count | 374.000000 | 374.000000 | 374.000000 | 374.000000 | |
| mean | 187.500000 | 42.184492 | 7.132086 | 7.312834 | |
| std | 108.108742 | 8.673133 | 0.795657 | 1.196956 | |
| min | 1.000000 | 27.000000 | 5.800000 | 4.000000 | |
| 25% | 94.250000 | 35.250000 | 6.400000 | 6.000000 | |
| 50% | 187.500000 | 43.000000 | 7.200000 | 7.000000 | |
| 75% | 280.750000 | 50.000000 | 7.800000 | 8.000000 | |
| max | 374.000000 | 59.000000 | 8.500000 | 9.000000 | |

| | Physical Activity Level | Stress Level | Heart Rate | Daily Steps |
|---|---|---|---|---|
| count | 374.000000 | 374.000000 | 374.000000 | 374.000000 |
| mean | 59.171123 | 5.385027 | 70.165775 | 6816.844920 |
| std | 20.830804 | 1.774526 | 4.135676 | 1617.915679 |
| min | 30.000000 | 3.000000 | 65.000000 | 3000.000000 |
| 25% | 45.000000 | 4.000000 | 68.000000 | 5600.000000 |
| 50% | 60.000000 | 5.000000 | 70.000000 | 7000.000000 |

```
75%                  75.000000      7.000000   72.000000   8000.000000
max                  90.000000      8.000000   86.000000  10000.000000
```

## 13 .value_counts

It Shows all the unique values with their count

[12]:
```
df["Occupation"].value_counts()
```

[12]:
```
Nurse                    73
Doctor                   71
Engineer                 63
Lawyer                   47
Teacher                  40
Accountant               37
Salesperson              32
Software Engineer         4
Scientist                 4
Sales Representative      2
Manager                   1
Name: Occupation, dtype: int64
```

## 14 .isnull()

It shows the how many null values

[13]:
```
df.isnull()
```

[13]:
```
     Person ID  Gender    Age  Occupation  Sleep Duration  Quality of Sleep  \
0        False   False  False       False           False             False
1        False   False  False       False           False             False
2        False   False  False       False           False             False
3        False   False  False       False           False             False
4        False   False  False       False           False             False
..         …     …    …         …             …                 …
369      False   False  False       False           False             False
370      False   False  False       False           False             False
371      False   False  False       False           False             False
372      False   False  False       False           False             False
373      False   False  False       False           False             False

     Physical Activity Level  Stress Level  BMI Category  Blood Pressure  \
0                      False         False         False           False
1                      False         False         False           False
2                      False         False         False           False
3                      False         False         False           False
```

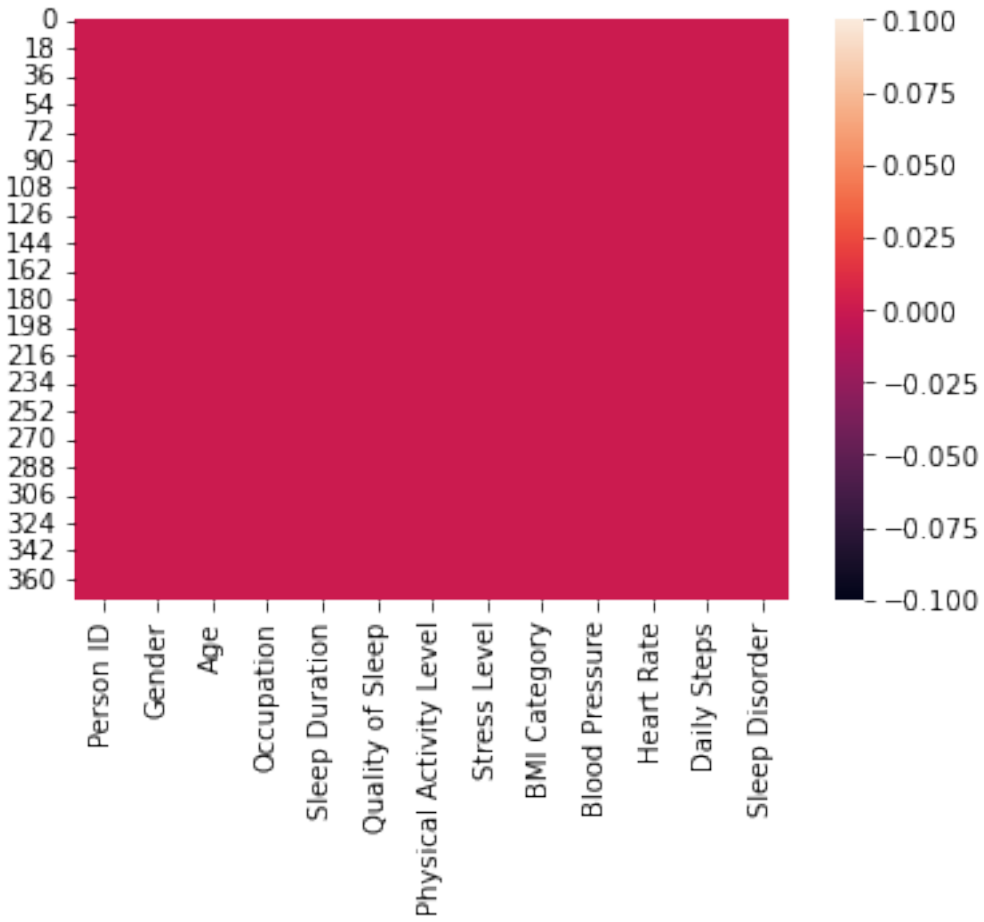
```
4                    False         False         False           False
..                     …             …             …               …
369                  False         False         False           False
370                  False         False         False           False
371                  False         False         False           False
372                  False         False         False           False
373                  False         False         False           False

     Heart Rate  Daily Steps  Sleep Disorder
0         False        False           False
1         False        False           False
2         False        False           False
3         False        False           False
4         False        False           False
..          …            …               …
369       False        False           False
370       False        False           False
371       False        False           False
372       False        False           False
373       False        False           False

[374 rows x 13 columns]
```

[14]:
```
sns.heatmap(df.isnull())
```

[14]:
```
<AxesSubplot:>
```




[15]:
```
df["Sleep Disorder"]=df["Sleep Disorder"].replace("None" , "Nothing")
```

[16]:
```
df
```

[16]:

| | Person ID | Gender | Age | Occupation | Sleep Duration | \ |
|---|---|---|---|---|---|---|
| 0 | 1 | Male | 27 | Software Engineer | 6.1 | |
| 1 | 2 | Male | 28 | Doctor | 6.2 | |
| 2 | 3 | Male | 28 | Doctor | 6.2 | |
| 3 | 4 | Male | 28 | Sales Representative | 5.9 | |
| 4 | 5 | Male | 28 | Sales Representative | 5.9 | |
| .. | … | … | … | … | … | |
| 369 | 370 | Female | 59 | Nurse | 8.1 | |
| 370 | 371 | Female | 59 | Nurse | 8.0 | |
| 371 | 372 | Female | 59 | Nurse | 8.1 | |
| 372 | 373 | Female | 59 | Nurse | 8.1 | |
| 373 | 374 | Female | 59 | Nurse | 8.1 | |

| | Quality of Sleep | Physical Activity Level | Stress Level | BMI Category | \ |
|---|---|---|---|---|---|

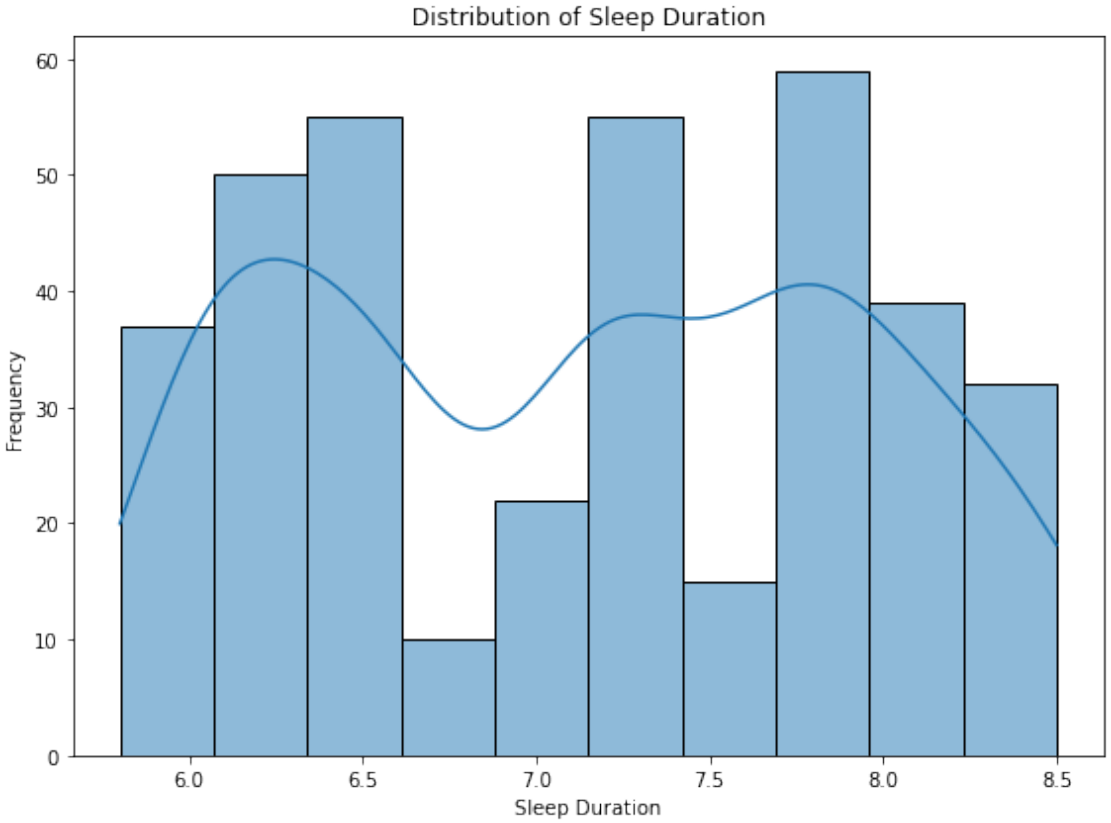
```
0                   6                      42             6   Overweight
1                   6                      60             8       Normal
2                   6                      60             8       Normal
3                   4                      30             8        Obese
4                   4                      30             8        Obese
..                ...                     ...           ...          ...
369                 9                      75             3   Overweight
370                 9                      75             3   Overweight
371                 9                      75             3   Overweight
372                 9                      75             3   Overweight
373                 9                      75             3   Overweight

    Blood Pressure  Heart Rate  Daily Steps Sleep Disorder
0           126/83          77         4200        Nothing
1           125/80          75        10000        Nothing
2           125/80          75        10000        Nothing
3           140/90          85         3000    Sleep Apnea
4           140/90          85         3000    Sleep Apnea
..             ...         ...          ...            ...
369         140/95          68         7000    Sleep Apnea
370         140/95          68         7000    Sleep Apnea
371         140/95          68         7000    Sleep Apnea
372         140/95          68         7000    Sleep Apnea
373         140/95          68         7000    Sleep Apnea

[374 rows x 13 columns]
```

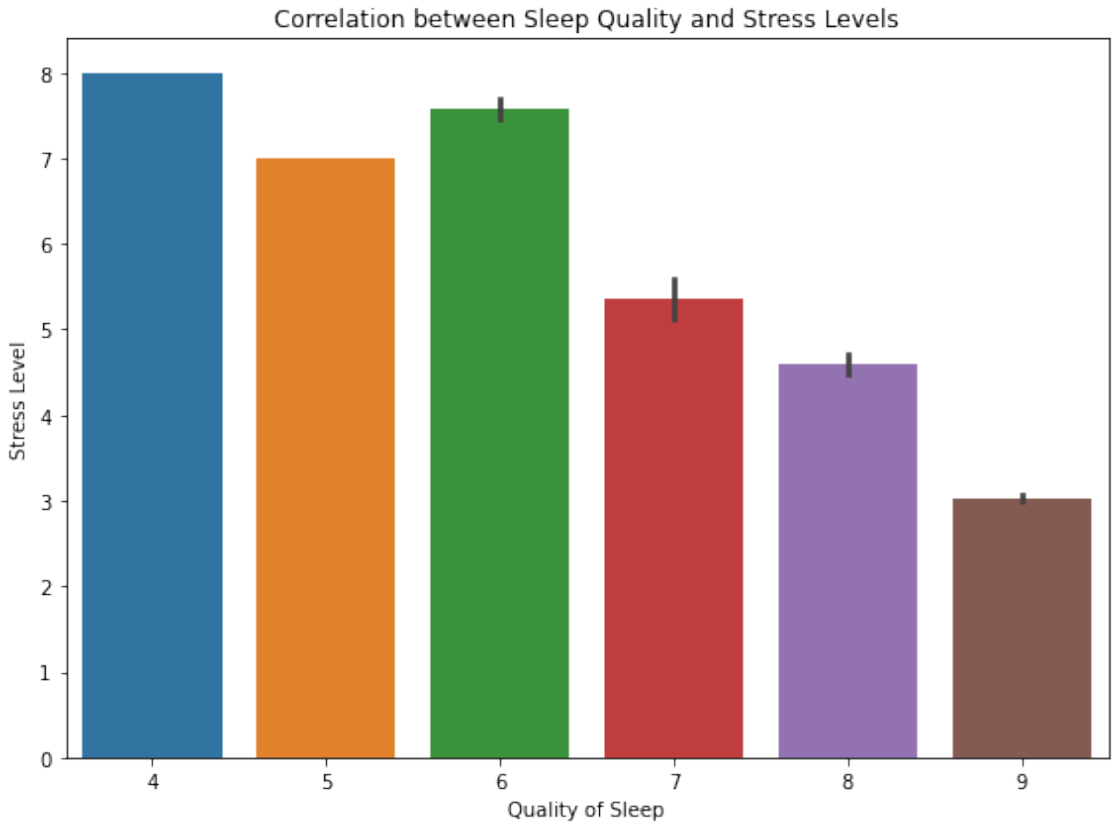
## 15 1. What is the distribution of sleep duration among the individuals?

[17]:
```
# Create a histogram of sleep duration
plt.figure(figsize=(8, 6))
sns.histplot(data=df, x='Sleep Duration', kde=True)
plt.title('Distribution of Sleep Duration')
plt.xlabel('Sleep Duration')
plt.ylabel('Frequency')
plt.tight_layout()
plt.show()
```



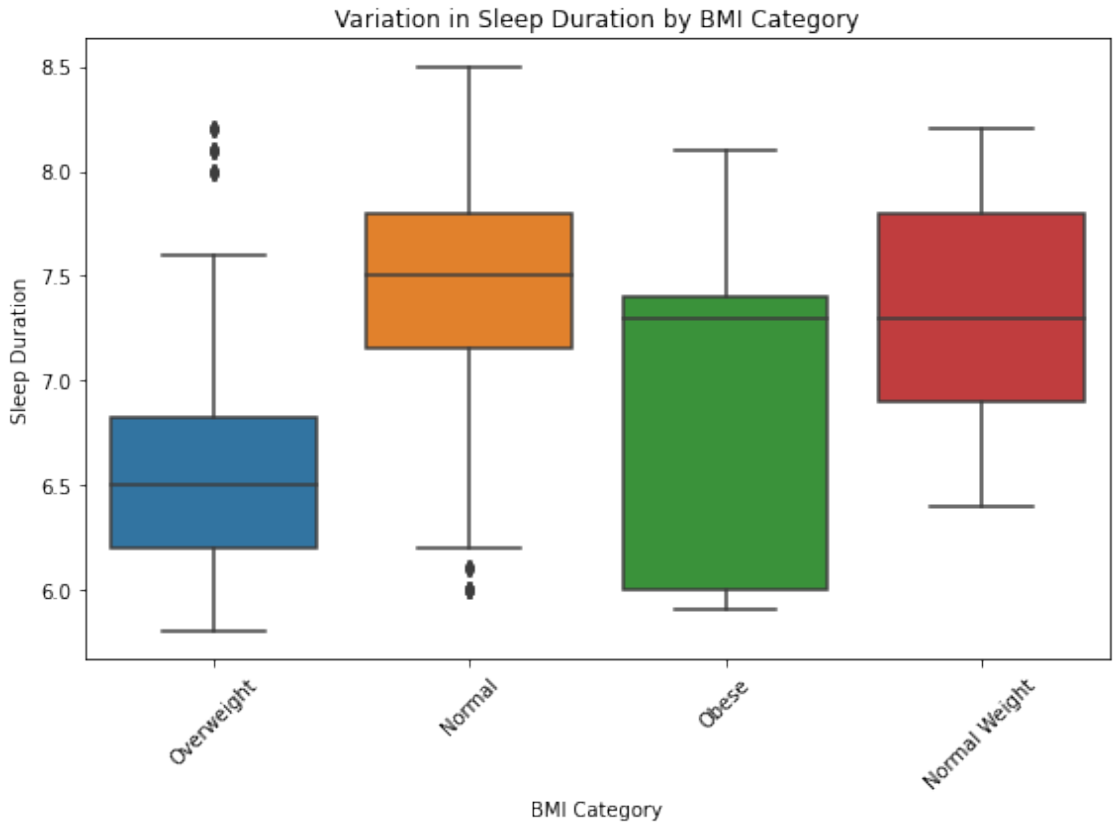

## 16 2. Is there a correlation between sleep quality and stress levels?

[18]:
```
# Create a scatter plot to visualize the correlation
plt.figure(figsize=(8, 6))
sns.barplot(data=df, x='Quality of Sleep', y='Stress Level')
plt.title('Correlation between Sleep Quality and Stress Levels')
plt.xlabel('Quality of Sleep')
plt.ylabel('Stress Level')
plt.tight_layout()
plt.show()
```



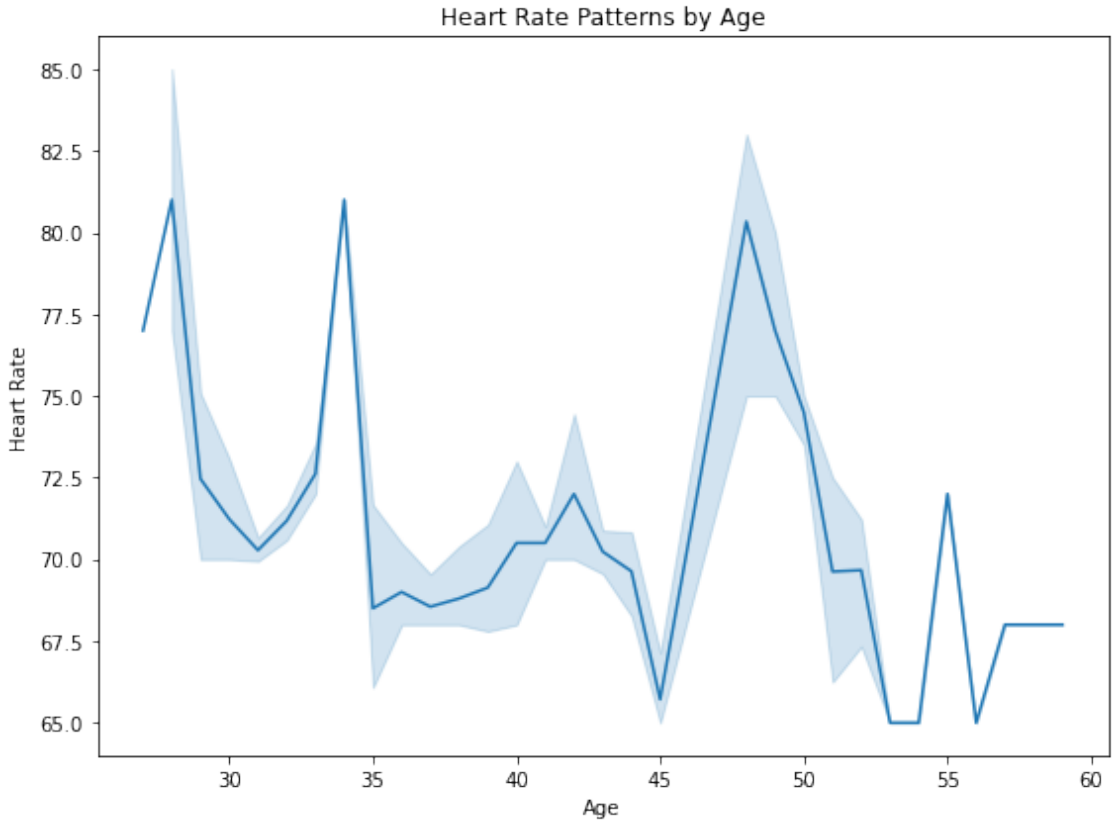

## 17 3. How does sleep duration vary by BMI category?

[19]:
```
# Create a box plot to show the distribution of sleep duration by BMI category
plt.figure(figsize=(8, 6))
sns.boxplot(data=df, x='BMI Category', y='Sleep Duration')
plt.title('Variation in Sleep Duration by BMI Category')
plt.xlabel('BMI Category')
plt.ylabel('Sleep Duration')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



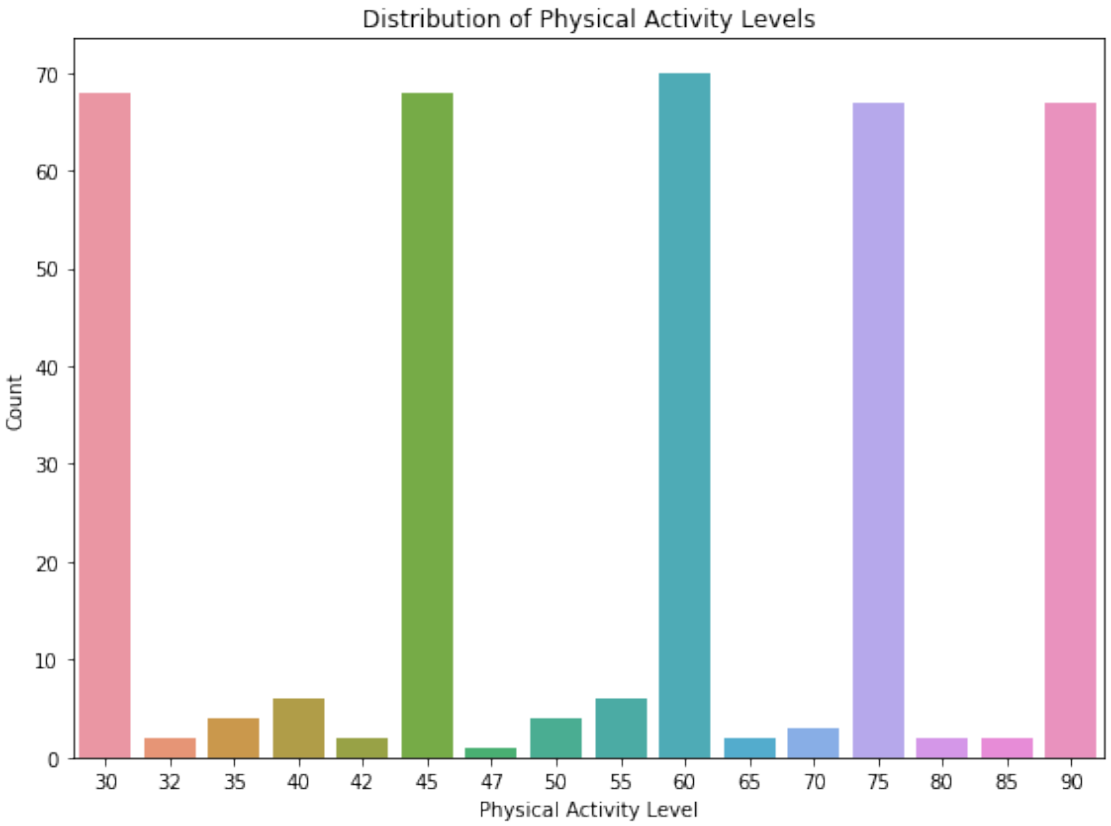

## 18 4. Are there any patterns in heart rate based on age?

[20]:
```
# Create a line plot to visualize the relationship between age and heart rate
plt.figure(figsize=(8, 6))
sns.lineplot(data=df, x='Age', y='Heart Rate')
plt.title('Heart Rate Patterns by Age')
plt.xlabel('Age')
plt.ylabel('Heart Rate')
plt.tight_layout()
plt.show()
```



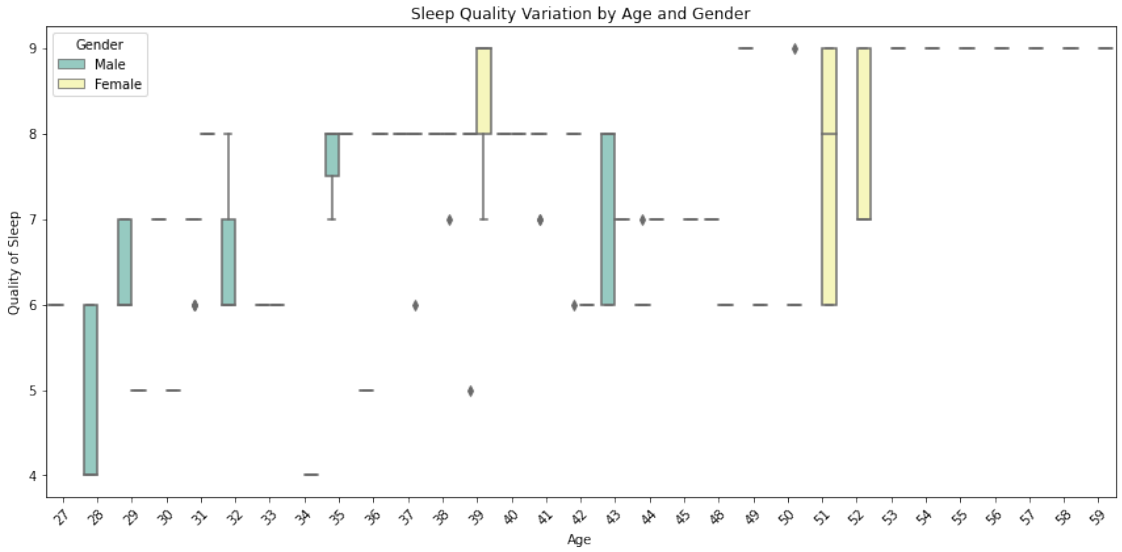

## 19 5. What is the distribution of physical activity levels?

[21]:
```
# Create a bar plot to show the distribution of physical activity levels
plt.figure(figsize=(8, 6))
sns.countplot(data=df, x='Physical Activity Level')
plt.title('Distribution of Physical Activity Levels')
plt.xlabel('Physical Activity Level')
plt.ylabel('Count')
plt.tight_layout()
plt.show()
```



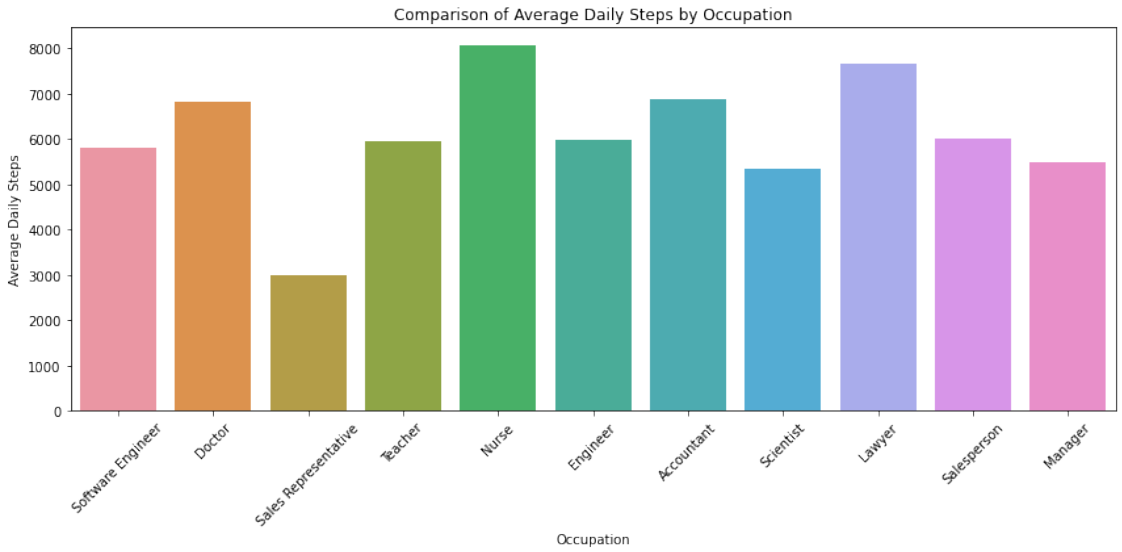

## 20 How does sleep quality vary with age and gender?

[22]:
```
plt.figure(figsize=(12, 6))
sns.boxplot(x="Age", y="Quality of Sleep", hue="Gender", data=df,␣
 ↪palette="Set3")
plt.title("Sleep Quality Variation by Age and Gender")
plt.xlabel("Age")
plt.ylabel("Quality of Sleep")
plt.xticks(rotation=45)
plt.legend(title="Gender")
plt.tight_layout()
plt.show()
```



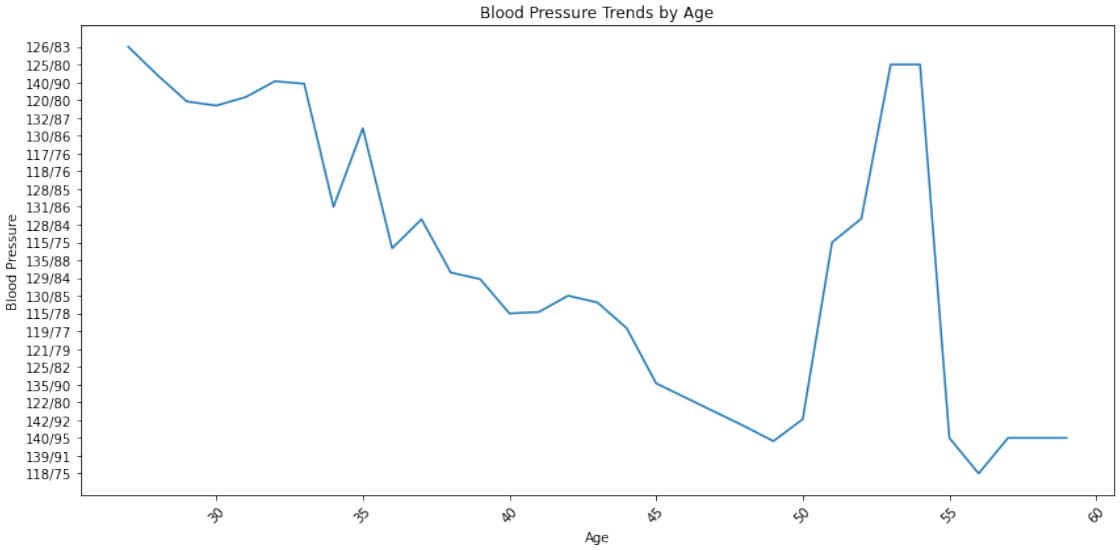

## 21 How does occupation affect daily steps taken?

[23]:
```
plt.figure(figsize=(12, 6))
sns.barplot(x="Occupation", y="Daily Steps", data=df, ci=None)
plt.title("Comparison of Average Daily Steps by Occupation")
plt.xlabel("Occupation")
plt.ylabel("Average Daily Steps")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



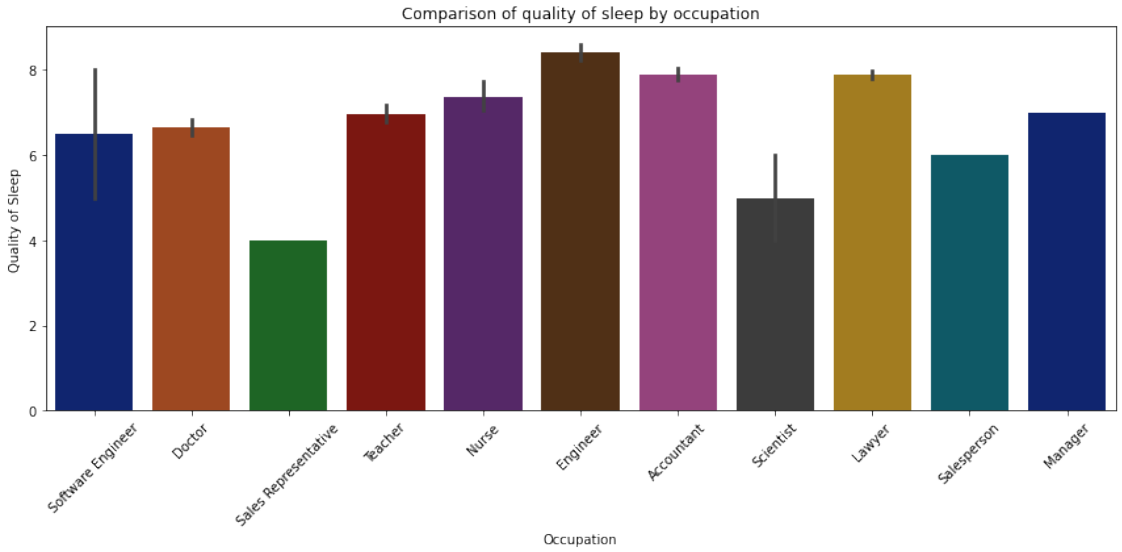
## 22 Are there any patterns in blood pressure across different age groups?

[24]:
```
plt.figure(figsize=(12, 6))
sns.lineplot(x="Age", y="Blood Pressure", data=df, ci=None)
plt.title("Blood Pressure Trends by Age")
plt.xlabel("Age")
plt.ylabel("Blood Pressure")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

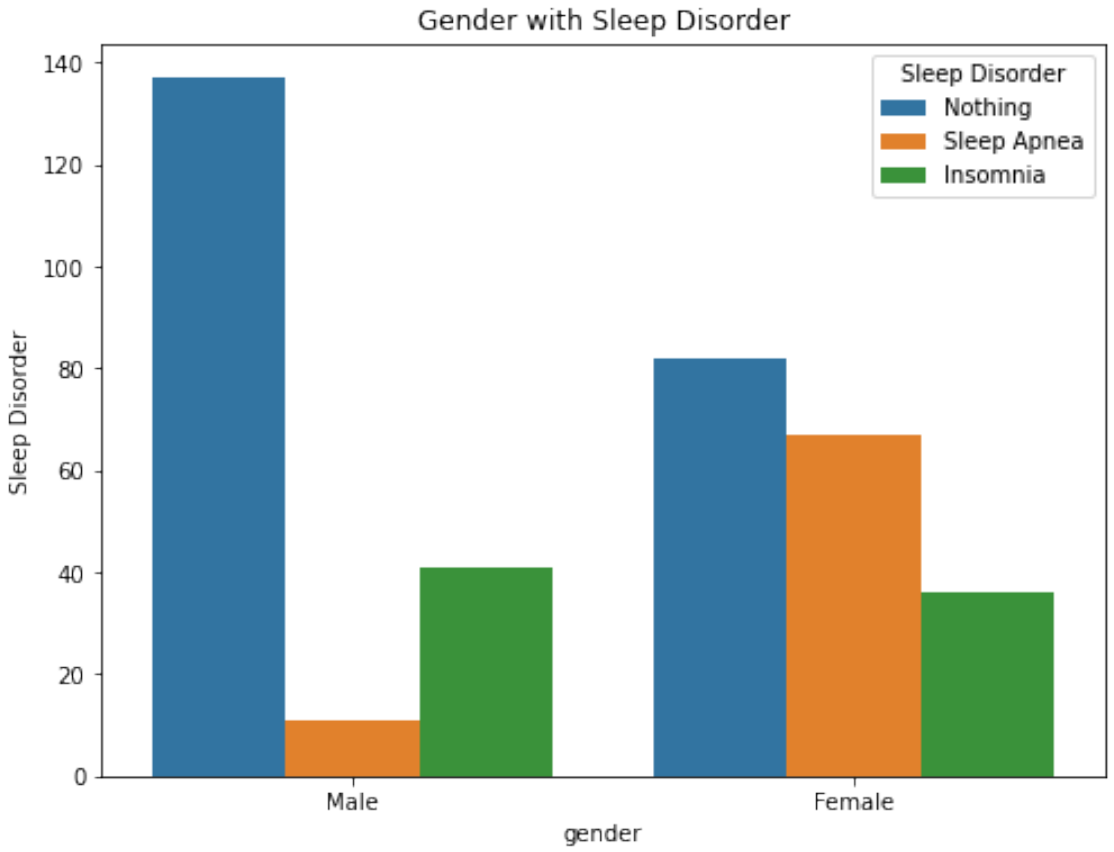



## 23 Do people in specific occupations tend to have better or worse quality of sleep?

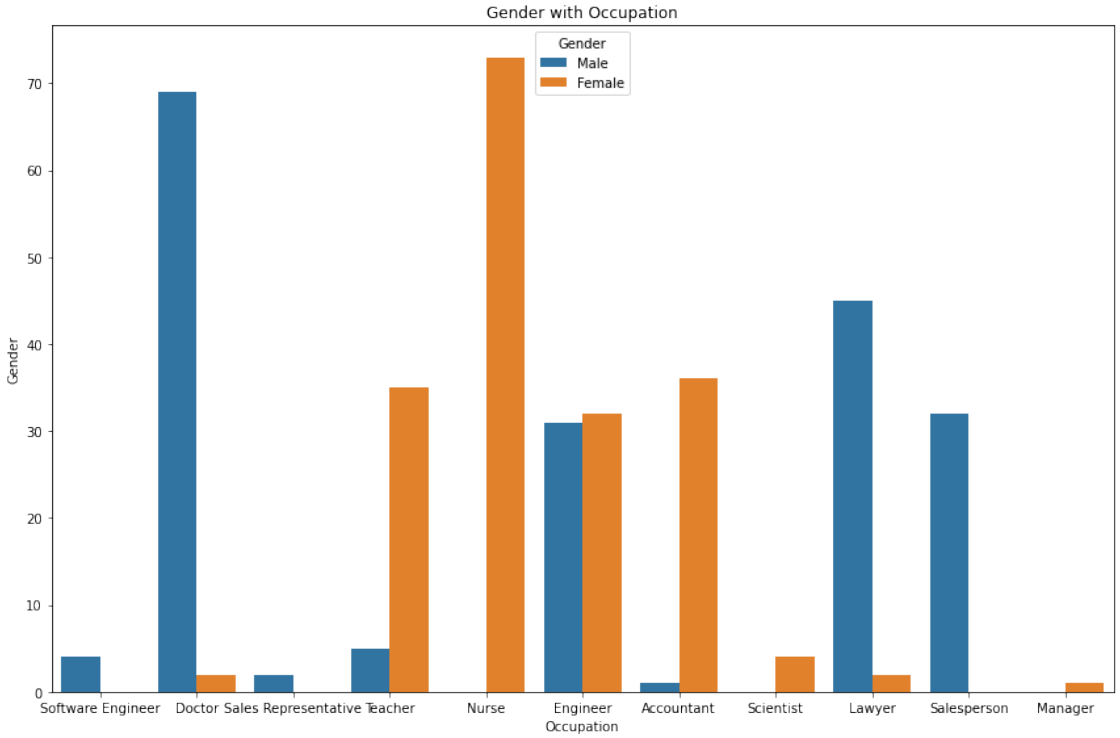
[25]:
```
plt.figure(figsize=(12, 6))
sns.barplot( data = df ,x='Occupation', y='Quality of Sleep',palette="dark")
plt.xticks(rotation=45)
plt.xlabel('Occupation')
plt.ylabel('Quality of Sleep')
plt.title('Comparison of quality of sleep by occupation')
plt.tight_layout()
plt.show()
```



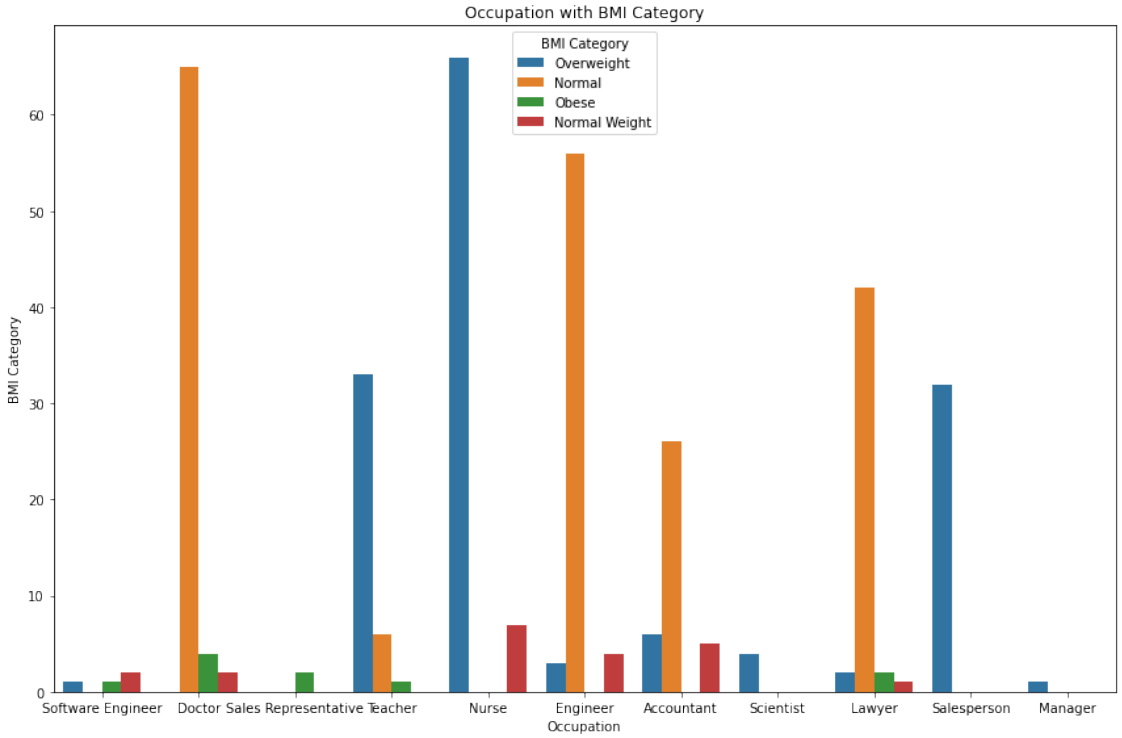

[26]:
```
plt.figure(figsize=(8, 6))
sns.countplot(data=df, x='Gender', hue='Sleep Disorder')
plt.xlabel('gender')
plt.ylabel('Sleep Disorder')
plt.title('Gender with Sleep Disorder')
plt.show()
```




[35]:
```
plt.figure(figsize=(12, 8))
sns.countplot(data=df, x='Occupation', hue='Gender')
plt.xlabel('Occupation')
plt.ylabel('Gender')
plt.title('Gender with Occupation')
plt.tight_layout()
plt.show()
```




[36]:
```
plt.figure(figsize=(12, 8))
sns.countplot(data=df, x='Occupation', hue='BMI Category')
plt.xlabel('Occupation')
plt.ylabel('BMI Category')
plt.title('Occupation with BMI Category')
plt.tight_layout()
plt.show()
```


Occupation with BMI Category
BMI Category
Overweight
Normal
Obese
Normal Weight
BMI Category
0
10
20
30
40
50
60
Software Engineer
Doctor
Sales Representative
Teacher
Nurse
Engineer
Accountant
Scientist
Lawyer
Salesperson
Manager
Occupation

[ ]: