Analyzing_Sleep

March 31, 2025

Occupational Impact on Sleep and Stress: A Health Insights Report

[1348]:
```
#first, import libraries

import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np

#let's open the dataset
df=pd.read_csv('Sleep_health_and_lifestyle_dataset.csv')
```

[1350]:
```
#I always like to get a sense of the data and what kind of information it holds
df.head(10)
```

[1350]:

	Person ID	Gender	Age	Occupation	Sleep Duration	Quality of Sleep	Physical Activity Level	Stress Level	BMI Category
0	1	Male	27	Software Engineer	6.1	6	42	6	Overweight
1	2	Male	28	Doctor	6.2	6	60	8	Normal
2	3	Male	28	Doctor	6.2	6	60	8	Normal
3	4	Male	28	Sales Representative	5.9	4	30	8	Obese
4	5	Male	28	Sales Representative	5.9	4	30	8	Obese
5	6	Male	28	Software Engineer	5.9	4	30	8	Obese
6	7	Male	29	Teacher	6.3	6	40	7	Obese
7	8	Male	29	Doctor	7.8	7	75	6	Normal
8	9	Male	29	Doctor	7.8	7	75	6	Normal
9	10	Male	29	Doctor	7.8	7	75	6	Normal

```
  Blood Pressure  Heart Rate  Daily Steps Sleep Disorder
0         126/83          77         4200            NaN
1         125/80          75        10000            NaN
2         125/80          75        10000            NaN
3         140/90          85         3000    Sleep Apnea
4         140/90          85         3000    Sleep Apnea
5         140/90          85         3000       Insomnia
6         140/90          82         3500       Insomnia
7         120/80          70         8000            NaN
8         120/80          70         8000            NaN
9         120/80          70         8000            NaN
```

[1352]:
```
#checking the size of the dataset
df.shape
```

[1352]:
```
(374, 13)
```

0.1 Let's start the data cleaning process

[1355]:
```
#check info
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 374 entries, 0 to 373
Data columns (total 13 columns):
 #   Column                   Non-Null Count  Dtype  
---  ------                   --------------  -----  
 0   Person ID                374 non-null    int64  
 1   Gender                   374 non-null    object 
 2   Age                      374 non-null    int64  
 3   Occupation               374 non-null    object 
 4   Sleep Duration           374 non-null    float64
 5   Quality of Sleep         374 non-null    int64  
 6   Physical Activity Level  374 non-null    int64  
 7   Stress Level             374 non-null    int64  
 8   BMI Category             374 non-null    object 
 9   Blood Pressure           374 non-null    object 
 10  Heart Rate               374 non-null    int64  
 11  Daily Steps              374 non-null    int64  
 12  Sleep Disorder           155 non-null    object 
dtypes: float64(1), int64(7), object(5)
memory usage: 38.1+ KB
```

[1357]:
```
#Let's identify missing values, NaNs, and zeros

df.isnull()
```

[1357]:
```
     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            True
1         False        False            True
2         False        False            True
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]
```

[1359]:
```
#As we can see, there are some null values

df.isnull().sum()
```

[1359]:
```
Person ID                  0
Gender                     0
```

```
Age                          0
Occupation                   0
Sleep Duration               0
Quality of Sleep             0
Physical Activity Level      0
Stress Level                 0
BMI Category                 0
Blood Pressure               0
Heart Rate                   0
Daily Steps                  0
Sleep Disorder             219
dtype: int64
```

[1360]:
```
#All of the missing values are in the 'Sleep Disorder' column. Let's examine it.

df['Sleep Disorder'].value_counts()
```

[1360]:
```
Sleep Disorder
Sleep Apnea    78
Insomnia       77
Name: count, dtype: int64
```

[1361]:
```
#It is observed that the NaN values represent patients who do not have a sleep␣
 ↪disorder. These will be replaced with 'None'.

df['Sleep Disorder'] = df['Sleep Disorder'].fillna('None')
```

[1362]:
```
#let's check it

df.head(10)
```

[1362]:

	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
0	1	Male	27	Software Engineer	6.1	6	42	6	Overweight	126/83	77	4200	None
1	2	Male	28	Doctor	6.2	6	60	8	Normal	125/80	75	10000	None
2	3	Male	28	Doctor	6.2	6	60	8	Normal	125/80	75	10000	None
3	4	Male	28	Sales Representative	5.9	4	30	8	Obese	140/90	85	3000	Sleep Apnea
4	5	Male	28	Sales Representative	5.9	4	30	8	Obese	140/90	85	3000	Sleep Apnea
5	6	Male	28	Software Engineer	5.9	4	30	8	Obese	140/90	85	3000	Insomnia
6	7	Male	29	Teacher	6.3	6	40	7	Overweight	140/90	82	3500	Insomnia
7	8	Male	29	Doctor	7.8	7	75	6	Normal	120/80	70	8000	None
8	9	Male	29	Doctor	7.8	7	75	6	Normal	120/80	70	8000	None
9	10	Male	29	Doctor	7.8	7	75	6	Normal	120/80	70	8000	None

```
3                 4                        30              8         Obese
4                 4                        30              8         Obese
5                 4                        30              8         Obese
6                 6                        40              7         Obese
7                 7                        75              6        Normal
8                 7                        75              6        Normal
9                 7                        75              6        Normal
```

```
  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
5         140/90          85         3000       Insomnia
6         140/90          82         3500       Insomnia
7         120/80          70         8000           None
8         120/80          70         8000           None
9         120/80          70         8000           None
```

[1363]:
```
#now,I will check for duplicates

s = df.duplicated()

print(s)
```

```
0      False
1      False
2      False
3      False
4      False
       …
369    False
370    False
371    False
372    False
373    False
Length: 374, dtype: bool
```

[1364]:
```
#We cannot manually check all the 'True' values. I will use sum()

s=df.duplicated().sum()

print(s)
```

```
0
```

[1365]:
```
#there's no duplicates!gooood
```

[1366]:
```
#We will now analyze the descriptive statistics using the describe() function
```

[1367]:
```
df.describe()
```

[1367]:
```
        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
```

[1368]:
```
df.columns
```

[1368]:
```
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')
```

[1369]:
```
#Let's analyze the gender distribution


df['Gender'].nunique(dropna=False)
```

[1369]:
```
2
```

[1370]:
```
#There are two categories. We can identify them using unique() and view them as␣
 ↪an array.

df['Gender'].unique()
```

[1370]:
```
array(['Male', 'Female'], dtype=object)
```

[1371]:
```
gender_count = df['Gender'].value_counts()
gender_percentage = df['Gender'].value_counts(normalize=True)
gender=(df['Gender'].unique())
```

[1372]:
```
print(gender_count)
```

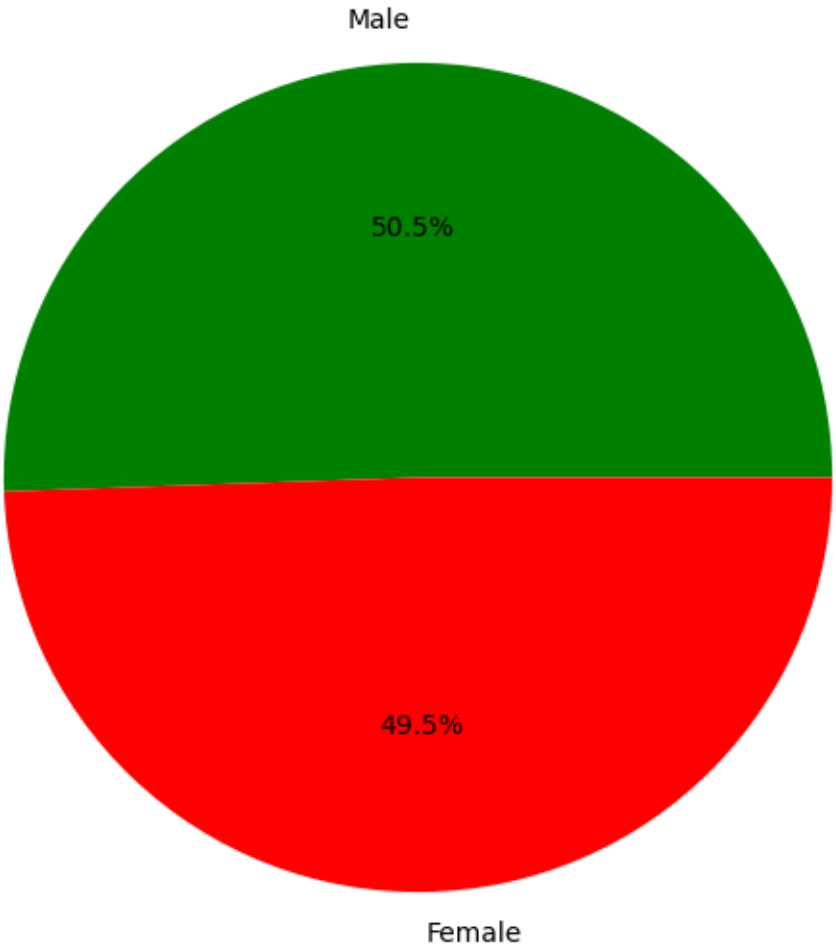
```
Gender
Male      189
Female    185
Name: count, dtype: int64
```

[1373]:
```
print(gender_percentage)
```

```
Gender
Male      0.505348
Female    0.494652
Name: proportion, dtype: float64
```

[1374]:
```
#Let's represent this graphically.
fig = plt.figure(figsize=(10, 7))
plt.pie(gender_percentage, labels=gender,  autopct='%.1f%%', colors= 'green')
```

[1374]:
```
([<matplotlib.patches.Wedge at 0x1f689453700>,
  <matplotlib.patches.Wedge at 0x1f689453400>],
 [Text(-0.01847922934548801, 1.0998447699938374, 'Male'),
  Text(0.01847906327354787, -1.0998447727841107, 'Female')],
 [Text(-0.010079579642993459, 0.5999153290875475, '50.5%'),
  Text(0.010079489058298837, -0.599915330609515, '49.5%')])
```



We can conclude that the counts for males and females are closely aligned, suggesting a balanced distribution between the genders

[1376]:
```
# Now, I will check the age
```

[1377]:
```
df['Age']
```

[1377]:
```
0      27
1      28
2      28
3      28
4      28
      ..
369    59
370    59
```

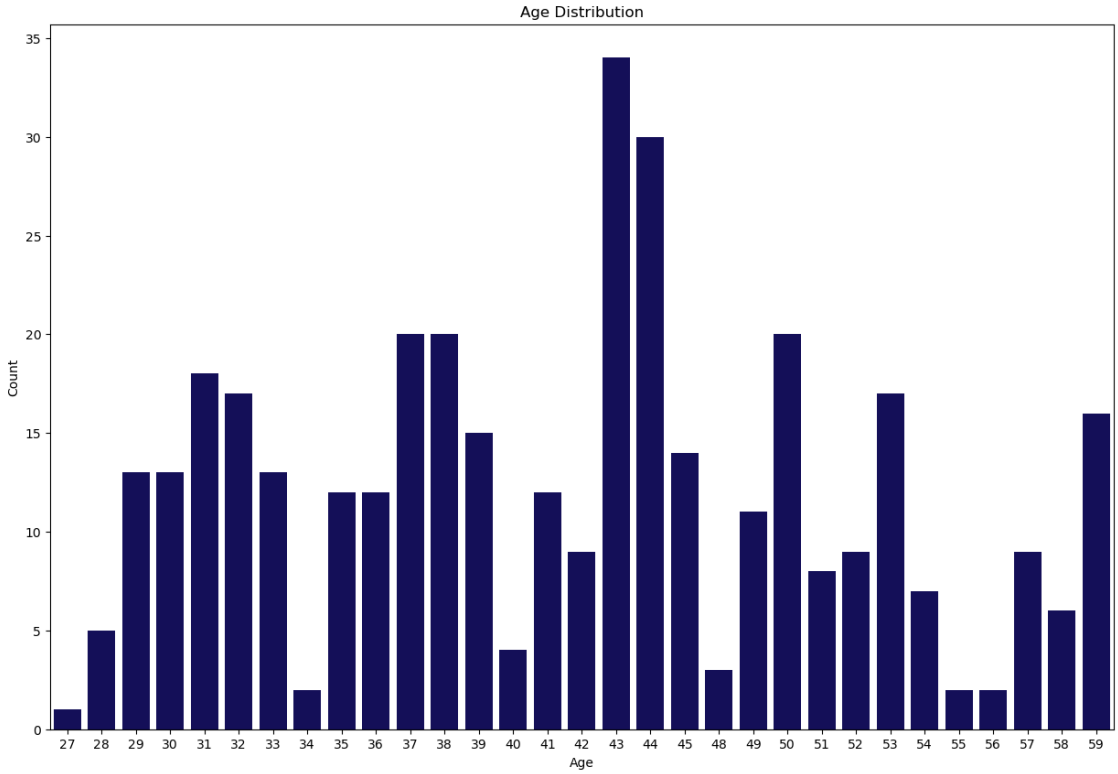
```
371    59
372    59
373    59
Name: Age, Length: 374, dtype: int64
```

[1378]:
```
#Let's convert this to percentages.

df['Age'].describe()
```

[1378]:
```
count    374.000000
mean      42.184492
std        8.673133
min       27.000000
25%       35.250000
50%       43.000000
75%       50.000000
max       59.000000
Name: Age, dtype: float64
```

There are 374 participants in the dataset, with ages ranging from 27 to 59 years. The average age is 42.2 years, with a standard deviation of 8.7 years. The youngest participant is 27 years old, while the oldest is 59 years.'

[1380]:
```
#Let's visualize this with a graphic for better understanding. I've chosen␣
 ↪Seaborn over Plotly to gain more experience with Seaborn.



plt.figure(figsize=(15, 10))
sns.countplot(data = df, x='Age')
plt.ylabel("Count")
plt.title('Age Distribution')
plt.show()
```



[1381]:
```
# Let's analyze the participants' occupations.

df['Occupation']
```

[1381]:
```
0         Software Engineer
1                    Doctor
2                    Doctor
3      Sales Representative
4      Sales Representative
              …
369                  Nurse
370                  Nurse
371                  Nurse
372                  Nurse
373                  Nurse
Name: Occupation, Length: 374, dtype: object
```

[1398]:
```
df['Occupation'].describe()
```

[1398]:
```
count       374
unique       11
top       Nurse
```

```
freq         73
Name: Occupation, dtype: object
```

[1399]:
```
df['Occupation'].unique()
```

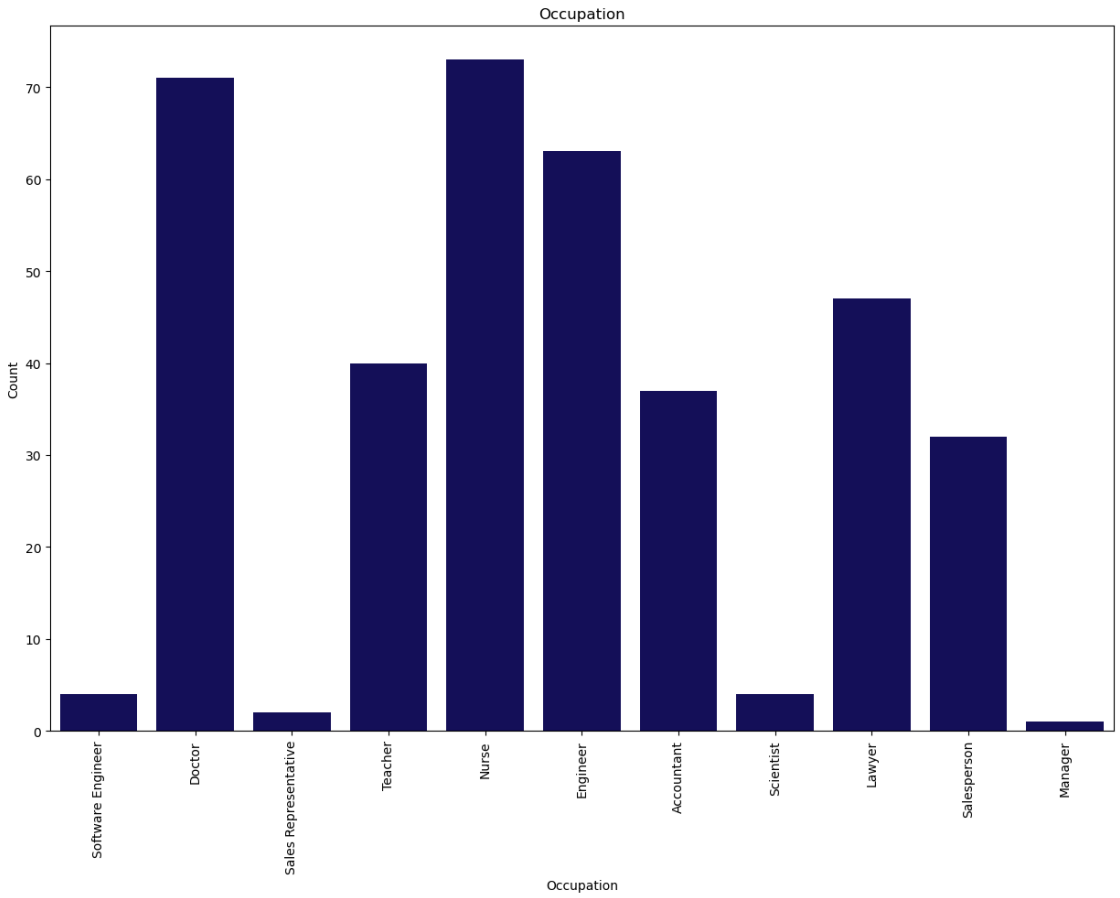
[1399]:
```
array(['Software Engineer', 'Doctor', 'Sales Representative', 'Teacher',
       'Nurse', 'Engineer', 'Accountant', 'Scientist', 'Lawyer',
       'Salesperson', 'Manager'], dtype=object)
```

[1400]:
```
occupation_count = df['Occupation'].value_counts().reset_index()
```

[1401]:
```
print(occupation_count)
```

```
              Occupation  count
0                  Nurse     73
1                 Doctor     71
2               Engineer     63
3                 Lawyer     47
4                Teacher     40
5             Accountant     37
6            Salesperson     32
7              Scientist      4
8      Software Engineer      4
9   Sales Representative      2
10               Manager      1
```

[1402]:
```
plt.figure(figsize=(15, 10))
sns.countplot(data = df, x='Occupation')
plt.ylabel("Count")
plt.xticks(rotation=90)
plt.title('Occupation')
plt.show()
```



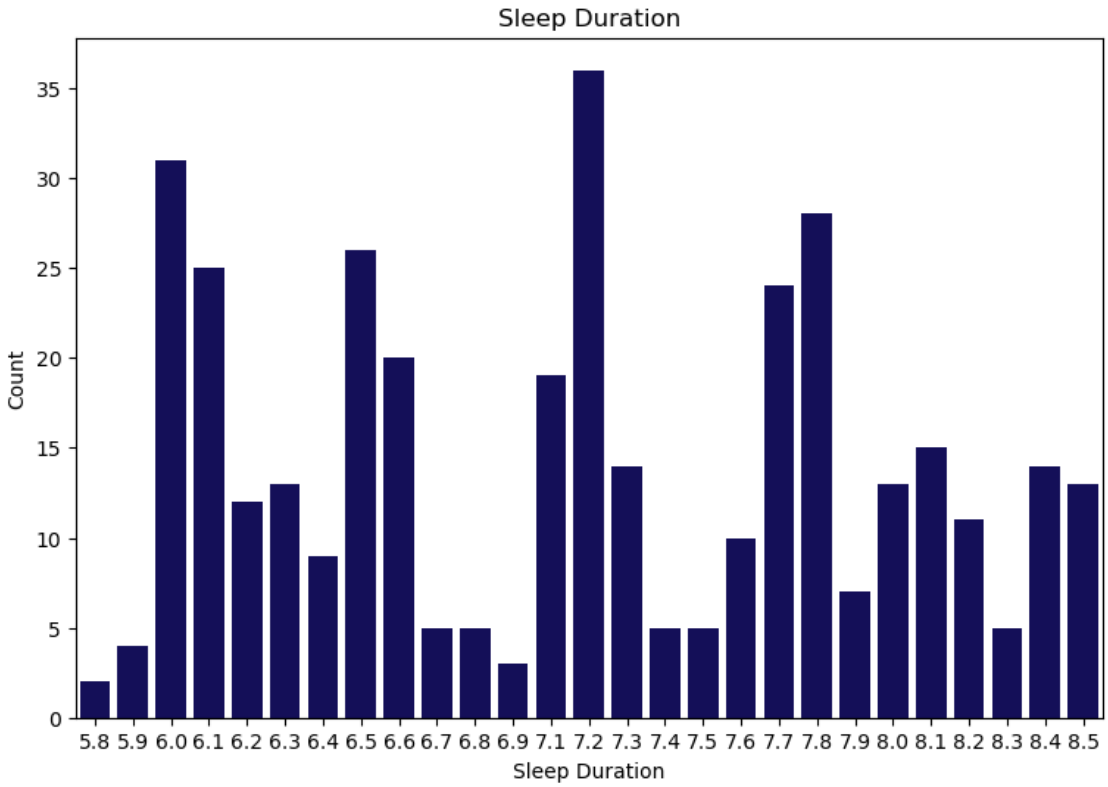
[1403]:
```
#Now I will check the sleep duration

df['Sleep Duration']
```

[1403]:
```
0      6.1
1      6.2
2      6.2
3      5.9
4      5.9
      ...
369    8.1
370    8.0
371    8.1
372    8.1
373    8.1
Name: Sleep Duration, Length: 374, dtype: float64
```

[1404]:
```
df['Sleep Duration'].describe().round(1)
```

[1404]:
```
count    374.0
mean       7.1
std        0.8
min        5.8
25%        6.4
50%        7.2
75%        7.8
max        8.5
Name: Sleep Duration, dtype: float64
```

[1405]:
```
plt.figure(figsize=(9, 6))
sns.countplot(data=df, x='Sleep Duration')
plt.ylabel("Count")
plt.title('Sleep Duration')
plt.show()
```



The average participant sleep duration was 7.1 hours, and the majority of participants slept between 6.4 and 7.8 hours.

[1407]:
```
#We have another interesting index: quality of sleep.

df['Quality of Sleep'].unique()
```

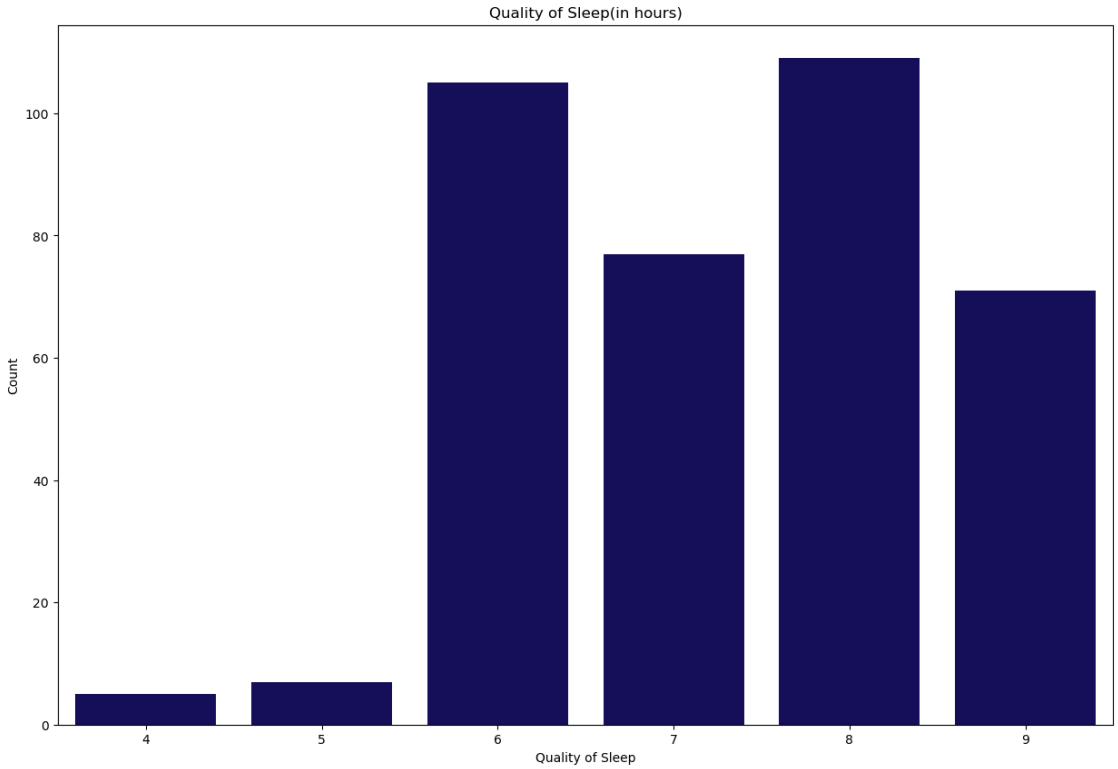
[1407]:
```
array([6, 4, 7, 5, 8, 9])
```

[1408]:
```
quality_of_sleep_count = df['Quality of Sleep'].value_counts().reset_index()
quality_of_sleep_count
```

[1408]:

	Quality of Sleep	count
0	8	109
1	6	105
2	7	77
3	9	71
4	5	7
5	4	5

[1409]:
```
plt.figure(figsize=(15, 10))
sns.countplot(data = df, x='Quality of Sleep')
plt.ylabel("Count")
plt.title('Quality of Sleep(in hours)')
plt.show()
```



[1410]:
```
# Let's examine the activity levels of these participants.

df['Physical Activity Level']
```

[1410]:
```
0      42
1      60
2      60
3      30
4      30
       ..
369    75
370    75
371    75
372    75
373    75
Name: Physical Activity Level, Length: 374, dtype: int64
```

[1411]:
```
df['Physical Activity Level'].describe()
```

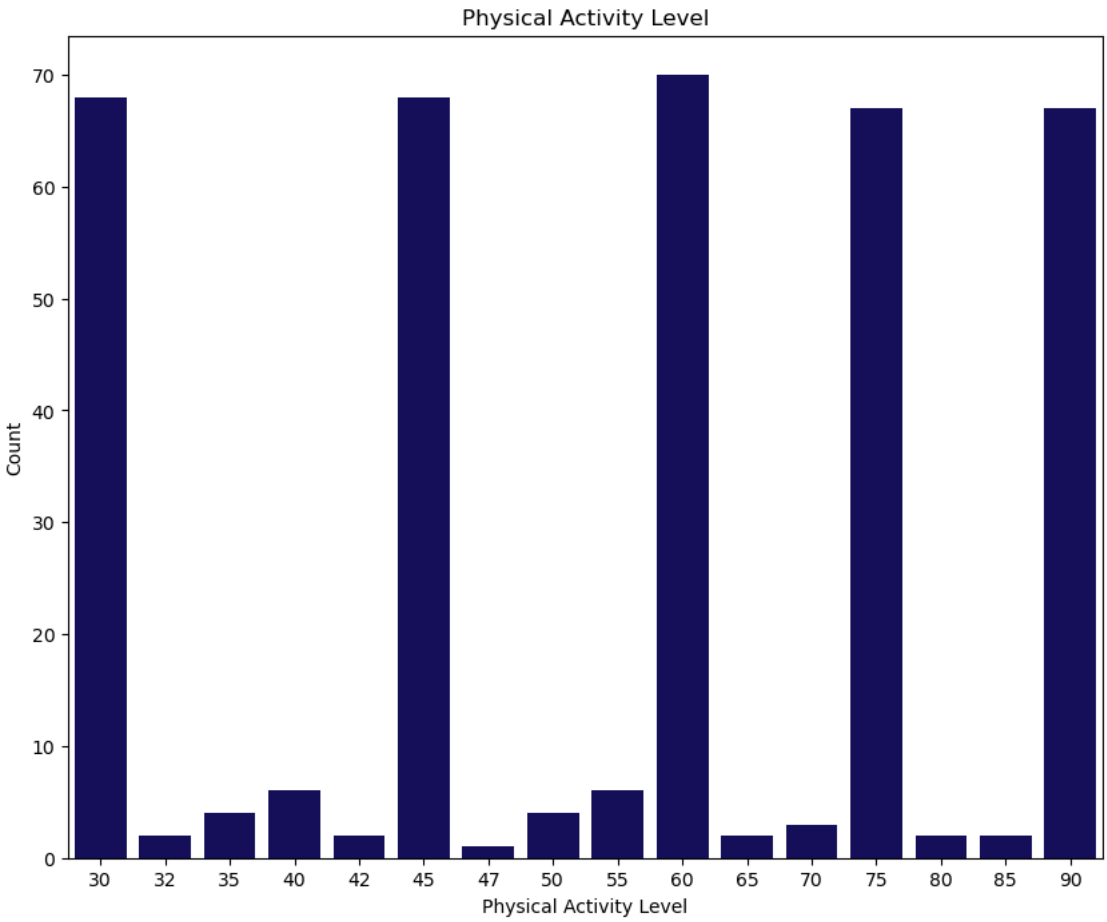
[1411]:
```
count    374.000000
mean      59.171123
std       20.830804
min       30.000000
25%       45.000000
50%       60.000000
75%       75.000000
max       90.000000
Name: Physical Activity Level, dtype: float64
```

[1412]:
```
physical_count = df['Physical Activity Level'].value_counts().reset_index()
physical_count
```

[1412]:

	Physical Activity Level	count
0	60	70
1	30	68
2	45	68
3	75	67
4	90	67
5	40	6
6	55	6
7	35	4
8	50	4
9	70	3
10	42	2
11	32	2
12	80	2
13	65	2
14	85	2
15	47	1

[1413]:
```
plt.figure(figsize=(10, 8))
sns.countplot(data = df, x='Physical Activity Level')
plt.ylabel("Count")
plt.title('Physical Activity Level')
plt.show()
```



[1414]:
```
#It can be concluded that the index quantifies activity on a scale ranging from␣
↪0 (non-active) to 100 (very active)
```

The average physical activity level reported by participants is 59, with a standard deviation of approximately 20.83, indicating some variability in reported activity levels.

[1416]:
```
#Now, let's check the stress level

stress_level_counts=df['Stress Level'].value_counts().reset_index()

stress_level_counts
```

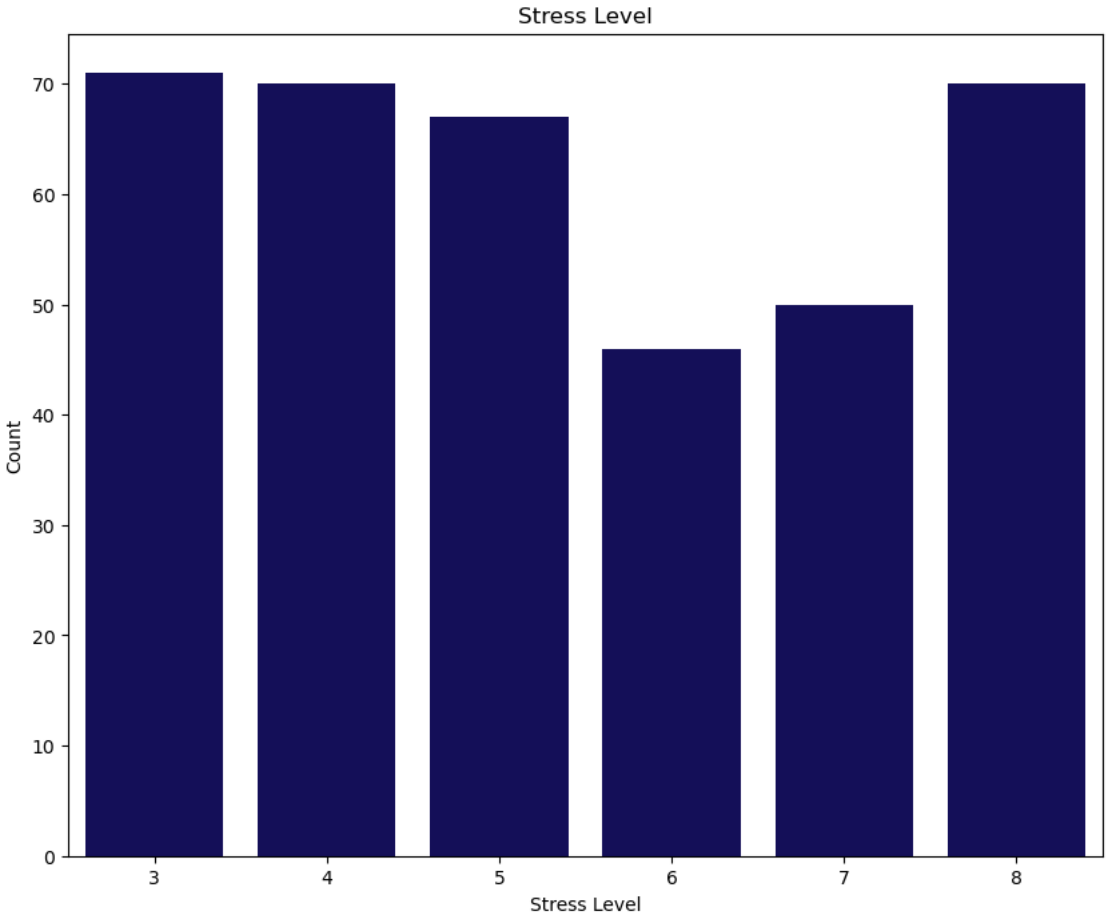
[1416]:

	Stress Level	count
0	3	71
1	8	70
2	4	70
3	5	67
4	7	50
5	6	46

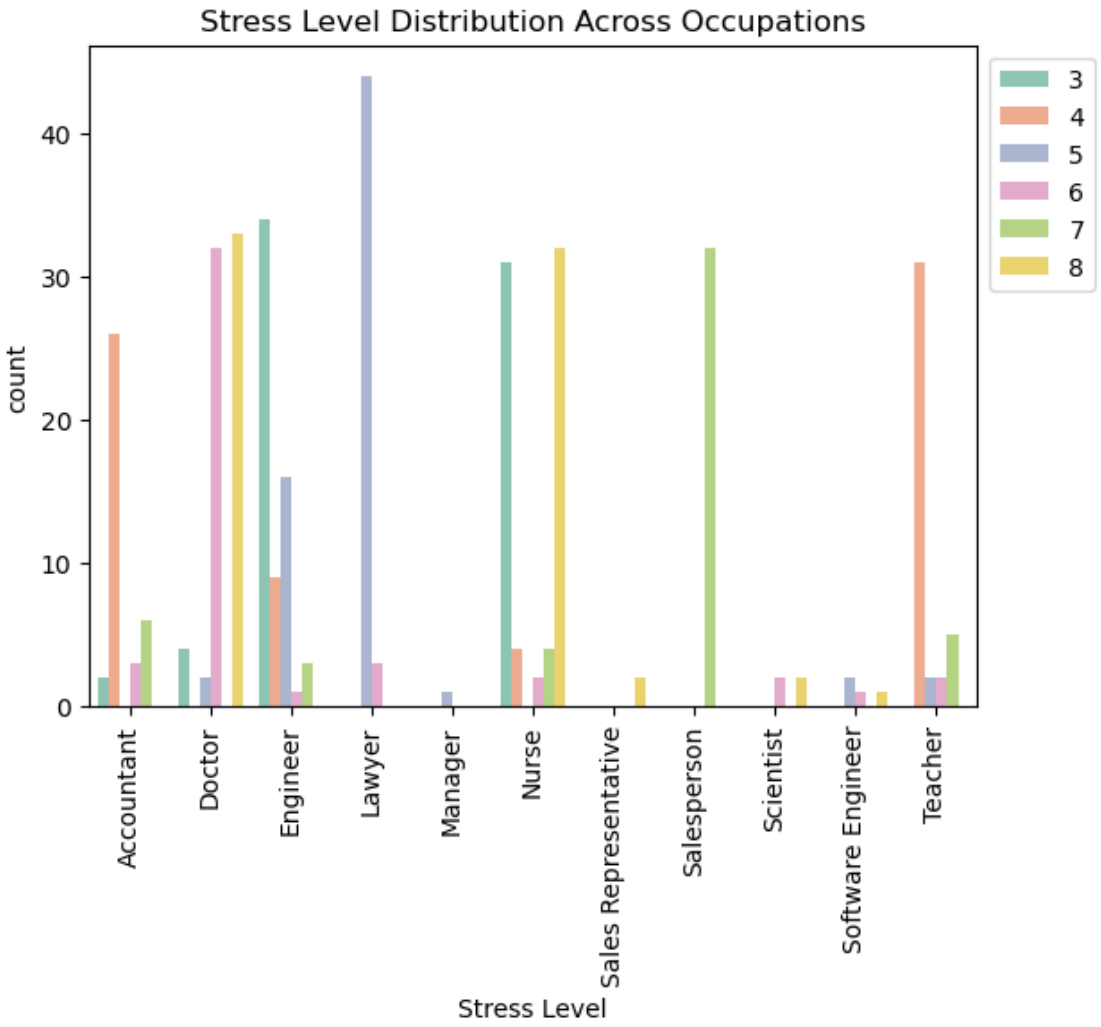
[1417]:
```
df['Stress Level'].describe()
```

[1417]:
```
count    374.000000
mean       5.385027
std        1.774526
min        3.000000
25%        4.000000
50%        5.000000
75%        7.000000
max        8.000000
Name: Stress Level, dtype: float64
```

[1418]:
```
plt.figure(figsize=(10, 8))
sns.countplot(data = df, x='Stress Level')
plt.ylabel("Count")
plt.title('Stress Level')
plt.show()
```



[1419]:
```
#Let's analyze stress levels across different occupations. We will group the␣
 ↪data by 'Occupation'
#and 'Stress Level' to count occurrences. I'll also experiment with the 'Set2'␣
 ↪color palette for visualization.

occupationstress = df.groupby('Occupation')['Stress Level'].value_counts().
 ↪reset_index()
sns.barplot(data=occupationstress,x='Occupation',y='count',palette='Set2',␣
 ↪hue='Stress Level', alpha=0.8,width=0.8)
plt.title('Stress Level Distribution Across Occupations')
plt.xlabel('Stress Level')
plt.ylabel('count')
plt.xticks(rotation=90)
plt.legend(loc='upper left',bbox_to_anchor=(1, 1))
plt.show()
```



[1425]:
```
#Check the BMI

df['BMI Category'].unique()
```

[1425]:
```
array(['Overweight', 'Normal', 'Obese', 'Normal Weight'], dtype=object)
```

[1426]:
```
#As we can see, there are two similar categories: 'Normal' and 'Normal Weight'.␣
 ↪Let's investigate the differences between them
df['BMI Category'].describe()
```

[1426]:
```
count        374
unique         4
top       Normal
freq         195
Name: BMI Category, dtype: object
```

[1427]:
```
df['BMI Category']
```

[1427]:
```
0      Overweight
1          Normal
2          Normal
3           Obese
4           Obese
          …
369    Overweight
370    Overweight
371    Overweight
372    Overweight
373    Overweight
Name: BMI Category, Length: 374, dtype: object
```

[1428]:
```
check=df['BMI Category'].str.contains('Normal').any()
print(check)
```

```
True
```

[1429]:
```
check1 = df[df['BMI Category'].str.contains('Normal')]
print(check1)
```

```
     Person ID  Gender  Age Occupation  Sleep Duration  Quality of Sleep  \
1            2    Male   28     Doctor             6.2                 6
2            3    Male   28     Doctor             6.2                 6
7            8    Male   29     Doctor             7.8                 7
8            9    Male   29     Doctor             7.8                 7
9           10    Male   29     Doctor             7.8                 7
..         …     …  …       …               …                …
336        337  Female   54   Engineer             8.4                 9
337        338  Female   54   Engineer             8.4                 9
338        339  Female   54   Engineer             8.5                 9
341        342  Female   56     Doctor             8.2                 9
342        343  Female   56     Doctor             8.2                 9

     Physical Activity Level  Stress Level   BMI Category Blood Pressure  \
1                         60             8         Normal         125/80
2                         60             8         Normal         125/80
7                         75             6         Normal         120/80
8                         75             6         Normal         120/80
9                         75             6         Normal         120/80
..                       …           …            …              …
336                       30             3         Normal         125/80
337                       30             3         Normal         125/80
338                       30             3         Normal         125/80
341                       90             3  Normal Weight         118/75
342                       90             3  Normal Weight         118/75
```

```
     Heart Rate  Daily Steps Sleep Disorder
1            75        10000           None
2            75        10000           None
7            70         8000           None
8            70         8000           None
9            70         8000           None
..          …           …              …
336          65         5000           None
337          65         5000           None
338          65         5000           None
341          65        10000           None
342          65        10000           None

[216 rows x 13 columns]
```

[1430]:
```
df['BMI Category'].unique()
```

[1430]:
```
array(['Overweight', 'Normal', 'Obese', 'Normal Weight'], dtype=object)
```

[1431]:
```
#We conclude that 'Normal' and 'Normal Weight' represent the same category.␣
 ↪Therefore, I will replace 'Normal' with 'Normal Weight'.

df['BMI Category'] = df['BMI Category'].replace({'Normal': 'Normal Weight'})
```

[1432]:
```
df['BMI Category'].unique()
```

[1432]:
```
array(['Overweight', 'Normal Weight', 'Obese'], dtype=object)
```

[1433]:
```
bmi_category_count=df['BMI Category'].value_counts()
bmi_category_percentage = df['BMI Category'].value_counts(normalize=True)
```

[1434]:
```
print(bmi_category_count.head(10))
```

```
BMI Category
Normal Weight    216
Overweight       148
Obese             10
Name: count, dtype: int64
```

[1435]:
```
#A subset of the data will be generated to demonstrate this information
```

[1436]:
```
bmi_df = pd.DataFrame({
    'Count': bmi_category_count,
    'Proportion': bmi_category_percentage
})
bmi_df['Proportion'] = bmi_df['Proportion'].apply("{:.1%}".format)
```

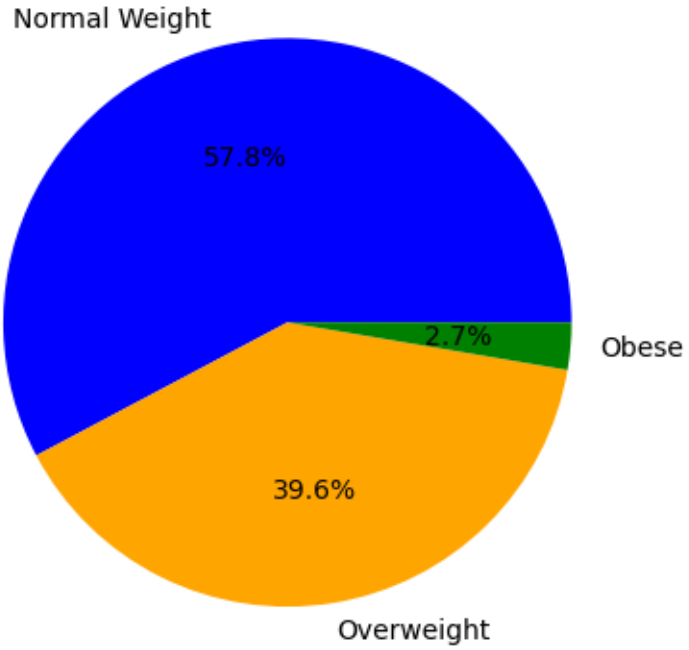
```
bmi_df
```

[1436]:

BMI Category	Count	Proportion
Normal Weight	216	57.8%
Overweight	148	39.6%
Obese	10	2.7%

[1437]:
```
# will use a pie chart to better represent this part of the dataset.
bmi_df['Proportion'] = pd.to_numeric(bmi_df['Proportion'], downcast='float',␣
 ↪errors='coerce')
my_colors=['blue','orange','green']

plt.pie(bmi_category_count, labels=bmi_category_count.index, autopct='%1.
 ↪1f%%',colors=my_colors)
```

[1437]:
```
([<matplotlib.patches.Wedge at 0x1f68b9c46a0>,
  <matplotlib.patches.Wedge at 0x1f68b9c45e0>,
  <matplotlib.patches.Wedge at 0x1f68b9cd370>],
 [Text(-0.26531710677461573, 1.0675236919397841, 'Normal Weight'),
  Text(0.17481540841434265, -1.0860200610398165, 'Overweight'),
  Text(1.0961215313084505, -0.09229078286599182, 'Obese')],
 [Text(-0.1447184218770631, 0.5822856501489732, '57.8%'),
  Text(0.09535385913509598, -0.5923745787489908, '39.6%'),
  Text(0.5978844716227911, -0.050340427017813716, '2.7%')])
```



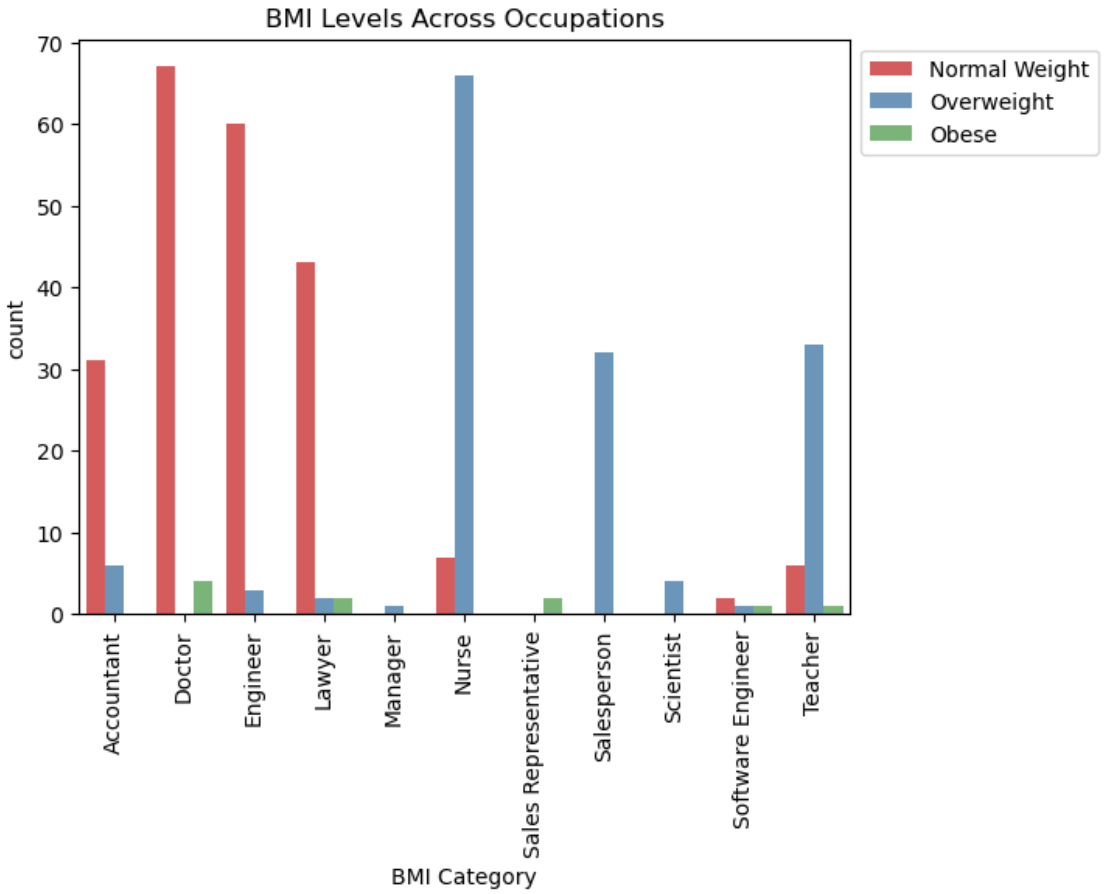
We have the information :

Normal Weight: 216 participants (57.8%)

Overweight: 148 participants (39.6%)

Obese: 10 participants (2.7%)

[1439]:
```
#Let's examine across the professions.

BMI_professions=df.groupby('Occupation')['BMI Category'].value_counts().
 ↪reset_index()

sns.barplot(data=BMI_professions,x='Occupation',y='count',palette='Set1',␣
 ↪hue='BMI Category', alpha=0.8,width=0.8)
plt.title('BMI Levels Across Occupations')
plt.xlabel('BMI Category')
plt.ylabel('count')
plt.xticks(rotation=90)
plt.legend(loc='upper left',bbox_to_anchor=(1, 1))
plt.show()
```



[1440]:
```
#now, let's check the blood pressure
```

[1441]:
```
df['Blood Pressure']
```

[1441]:
```
0      126/83
1      125/80
2      125/80
3      140/90
4      140/90
        ...
369    140/95
370    140/95
371    140/95
372    140/95
373    140/95
Name: Blood Pressure, Length: 374, dtype: object
```

[1442]:
```
#As we can see, 'pressure' has two distinct categories. Let's investigate this␣
↪further.
```

[1443]:
```
#The 'Blood Pressure' column will be split into two separate columns, 'Systolic␣
↪Pressure' and 'Diastolic Pressure'

splitting_pressure = df['Blood Pressure'].str.split('/', n=1, expand=True)
```

[1448]:
```
splitting_pressure.head(10)
```

[1448]:

	0	1
0	126	83
1	125	80
2	125	80
3	140	90
4	140	90
5	140	90
6	140	90
7	120	80
8	120	80
9	120	80

[1452]:
```
#as we can see, there are 2 columns, let's rename it
df['Systolic Pressure'] = splitting_pressure[0].astype(float)
df['Diastolic Pressure'] = splitting_pressure[1].astype(float)
```

[1454]:
```
df['Systolic Pressure'].head(10)
```

[1454]:
```
0    126.0
1    125.0
2    125.0
3    140.0
4    140.0
5    140.0
6    140.0
7    120.0
8    120.0
9    120.0
Name: Systolic Pressure, dtype: float64
```

[1457]:
```
df['Diastolic Pressure'].head(10)
```

[1457]:
```
0    83.0
1    80.0
2    80.0
3    90.0
4    90.0
5    90.0
6    90.0
7    80.0
```

```
8    80.0
9    80.0
Name: Diastolic Pressure, dtype: float64
```

Research, as cited by Harvard Health, indicates that although both systolic and diastolic pressures are significant indicators of cardiovascular health, higher systolic pressures are associated with a greater risk of stroke and heart disease. Consequently, systolic pressure should be prioritized in monitoring

https://www.health.harvard.edu/staying-healthy/which-blood-pressure-number-is-important

[1463]:
```
df['Systolic Pressure'].describe()
```

[1463]:
```
count    374.000000
mean     128.553476
std        7.748118
min      115.000000
25%      125.000000
50%      130.000000
75%      135.000000
max      142.000000
Name: Systolic Pressure, dtype: float64
```

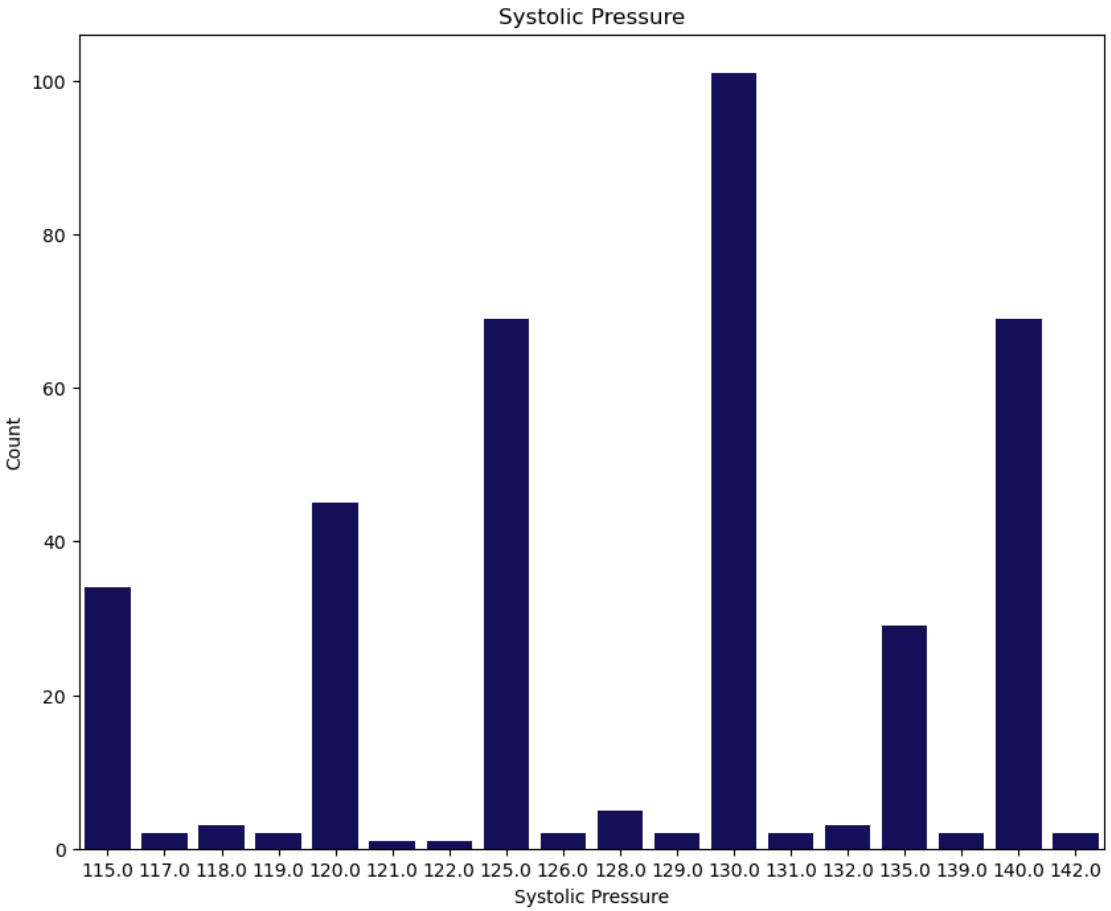
[1464]:
```
df['Systolic Pressure'].value_counts().reset_index()
```

[1464]:

	Systolic Pressure	count
0	130.0	101
1	125.0	69
2	140.0	69
3	120.0	45
4	115.0	34
5	135.0	29
6	128.0	5
7	132.0	3
8	118.0	3
9	126.0	2
10	131.0	2
11	117.0	2
12	129.0	2
13	119.0	2
14	139.0	2
15	142.0	2
16	122.0	1
17	121.0	1

[1469]:
```
plt.figure(figsize=(10, 8))
sns.countplot(data = df, x=df['Systolic Pressure'])
plt.ylabel("Count")
```

```
plt.title('Systolic Pressure')
plt.show()
```



[1470]:
```
from IPython.display import Image

# get the image
Image(url="table.png", width=1000, height=1000)
```

[1470]: <IPython.core.display.Image object>

[1472]:
```
#We will now construct a graphical representation of the association between␣
 ↪occupation and elevated blood pressure

df[['Systolic Pressure', 'Diastolic Pressure']] = df['Blood Pressure'].str.
 ↪split('/', expand=True)
print(df.head(10))
```

```
   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	
5	6	Male	28	Software Engineer	5.9	
6	7	Male	29	Teacher	6.3	
7	8	Male	29	Doctor	7.8	
8	9	Male	29	Doctor	7.8	
9	10	Male	29	Doctor	7.8	

	Quality of Sleep	Physical Activity Level	Stress Level	BMI Category	\
0	6	42	6	Overweight	
1	6	60	8	Normal Weight	
2	6	60	8	Normal Weight	
3	4	30	8	Obese	
4	4	30	8	Obese	
5	4	30	8	Obese	
6	6	40	7	Obese	
7	7	75	6	Normal Weight	
8	7	75	6	Normal Weight	
9	7	75	6	Normal Weight	

	Blood Pressure	Heart Rate	Daily Steps	Sleep Disorder	Systolic Pressure	\
0	126/83	77	4200	None	126	
1	125/80	75	10000	None	125	
2	125/80	75	10000	None	125	
3	140/90	85	3000	Sleep Apnea	140	
4	140/90	85	3000	Sleep Apnea	140	
5	140/90	85	3000	Insomnia	140	
6	140/90	82	3500	Insomnia	140	
7	120/80	70	8000	None	120	
8	120/80	70	8000	None	120	
9	120/80	70	8000	None	120	

	Diastolic Pressure
0	83
1	80
2	80
3	90
4	90
5	90
6	90
7	80
8	80
9	80

[1474]:
```
#let's find out more about participants with high blood pressure

# Filter for systolic blood pressure > 130 mmHg( high blood pressure
df[['Systolic Pressure', 'Diastolic Pressure']] = df['Blood Pressure'].str.
 ↪split('/', expand=True)

# Convert to integers (optional)
df['Systolic Pressure'] = df['Systolic Pressure'].astype(int)
df['Diastolic Pressure'] = df['Diastolic Pressure'].astype(int)

high_pressure = df[df['Systolic Pressure'] > 130]

#now let's analize which professions have high blood pressure
high_pressure
```

[1474]:

	Person ID	Gender	Age	Occupation	Sleep Duration	\
3	4	Male	28	Sales Representative	5.9	
4	5	Male	28	Sales Representative	5.9	
5	6	Male	28	Software Engineer	5.9	
6	7	Male	29	Teacher	6.3	
16	17	Female	29	Nurse	6.5	
..	…	…	…	…	…	
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	\
3	4	30	8	Obese	
4	4	30	8	Obese	
5	4	30	8	Obese	
6	6	40	7	Obese	
16	5	40	7	Normal Weight	
..	…	…	…	…	
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	Systolic Pressure	\
3	140/90	85	3000	Sleep Apnea	140	
4	140/90	85	3000	Sleep Apnea	140	
5	140/90	85	3000	Insomnia	140	
6	140/90	82	3500	Insomnia	140	
16	132/87	80	4000	Sleep Apnea	132	

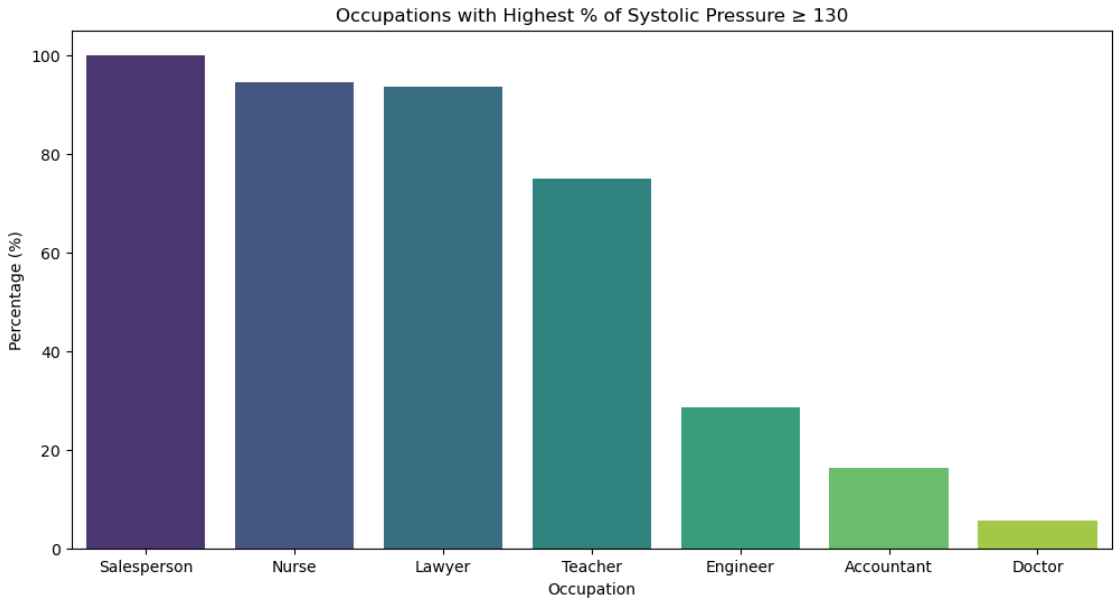
```
..              …          …          …              …                    …
369         140/95          68         7000    Sleep Apnea                  140
370         140/95          68         7000    Sleep Apnea                  140
371         140/95          68         7000    Sleep Apnea                  140
372         140/95          68         7000    Sleep Apnea                  140
373         140/95          68         7000    Sleep Apnea                  140

     Diastolic Pressure
3                    90
4                    90
5                    90
6                    90
16                   87
..                   …
369                  95
370                  95
371                  95
372                  95
373                  95

[107 rows x 15 columns]
```

[1475]:
```
occupation_percent = df.groupby('Occupation')['Systolic Pressure'].apply(␣
 ↪lambda x: (x >= 130).mean() * 100 ).sort_values(ascending=False).
 ↪reset_index(name='Percentage')

# Filter occupations with at least 5 people ( to avoid small samples)
occupation_percent = occupation_percent[df['Occupation'].
 ↪value_counts()[occupation_percent['Occupation']].values >= 5]
```

[1480]:
```
plt.figure(figsize=(12, 6))
sns.barplot(
    y='Percentage',
    x='Occupation',
    data=occupation_percent.head(10),  # Top 10 professions
    palette='viridis'
)
plt.title('Occupations with Highest % of Systolic Pressure  130')
plt.ylabel('Percentage (%)')
plt.xlabel('Occupation')
plt.show()
```

```
C:\Users\rodri\AppData\Local\Temp\ipykernel_32140\2201898581.py:2:
FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.
```

```
sns.barplot(
```



[1489]:
```
#Let's analyze the participants' step count

df['Daily Steps']
```

[1489]:
```
0       4200
1      10000
2      10000
3       3000
4       3000
       ...
369     7000
370     7000
371     7000
372     7000
373     7000
Name: Daily Steps, Length: 374, dtype: int64
```

[1491]:
```
df['Daily Steps'].describe()
```

[1491]:
```
count      374.000000
mean      6816.844920
std       1617.915679
min       3000.000000
25%       5600.000000
```

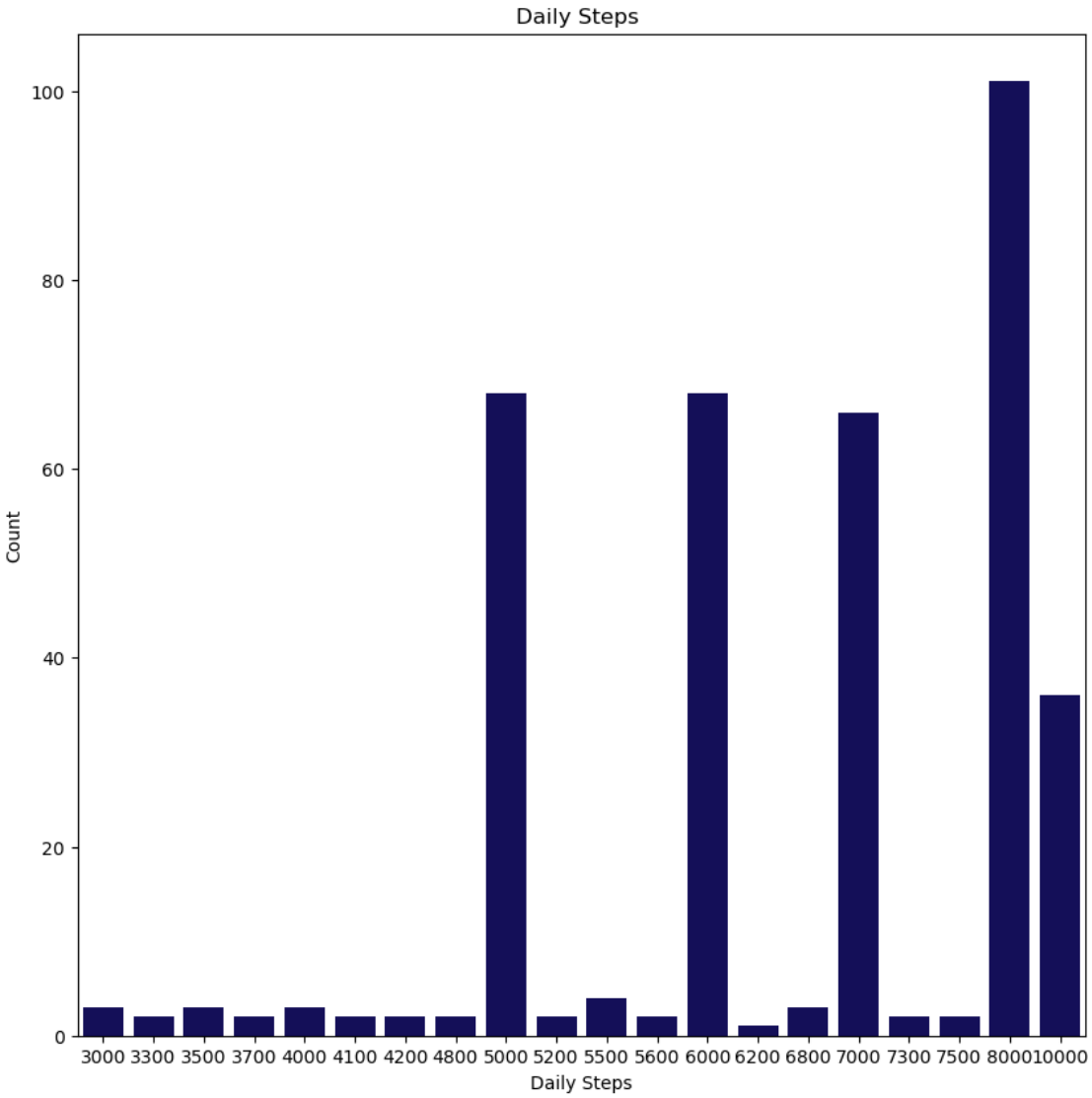
```
50%       7000.000000
75%       8000.000000
max      10000.000000
Name: Daily Steps, dtype: float64
```

[1492]:
```
df['Daily Steps'].value_counts().reset_index()
```

[1492]:

	Daily Steps	count
0	8000	101
1	5000	68
2	6000	68
3	7000	66
4	10000	36
5	5500	4
6	3000	3
7	3500	3
8	6800	3
9	4000	3
10	4200	2
11	4100	2
12	5200	2
13	5600	2
14	4800	2
15	3300	2
16	7500	2
17	7300	2
18	3700	2
19	6200	1

[1493]:
```
plt.figure(figsize=(10,10))
sns.countplot(data = df, x=df['Daily Steps'])
plt.ylabel("Count")
plt.title('Daily Steps ')
plt.show()
```



Participants took an average of 6,816.84 steps per day, with a range from 3,000 to 10,000 steps.

[1495]:
```
#We will now examine the 'Sleep Disorder' column.

df['Sleep Disorder']
```

[1495]:
```
0              None
1              None
2              None
3       Sleep Apnea
4       Sleep Apnea
           ...
369     Sleep Apnea
```

```
370    Sleep Apnea
371    Sleep Apnea
372    Sleep Apnea
373    Sleep Apnea
Name: Sleep Disorder, Length: 374, dtype: object
```

[1496]:
```
#I will try to find out more about what conditions we have as sleep disorder
df['Sleep Disorder'].unique()
```

[1496]:
```
array(['None', 'Sleep Apnea', 'Insomnia'], dtype=object)
```

[1497]:
```
sleep_disorder_counts = df['Sleep Disorder'].value_counts()
```

[1498]:
```
print(sleep_disorder_counts)
```

```
Sleep Disorder
None           219
Sleep Apnea     78
Insomnia        77
Name: count, dtype: int64
```

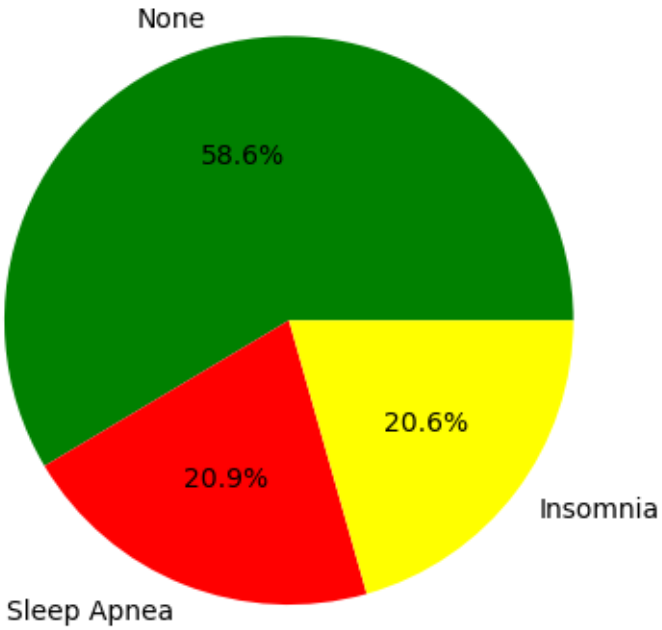
[1499]:
```
sleep_disorder_perc= df['Sleep Disorder'].value_counts(normalize=True)
```

[1505]:
```
print(sleep_disorder_perc)
```

```
Sleep Disorder
None           0.585561
Sleep Apnea    0.208556
Insomnia       0.205882
Name: proportion, dtype: float64
```

[1507]:
```
#I will put it in a pie graphic
my_colors=('green','red','yellow')

plt.pie(sleep_disorder_counts, labels=sleep_disorder_perc.index, autopct='%1.
↪1f%%',colors=my_colors)
```

```
([<matplotlib.patches.Wedge at 0x1f685d771c0>,
  <matplotlib.patches.Wedge at 0x1f685d77fd0>,
  <matplotlib.patches.Wedge at 0x1f6839b9490>],
 [Text(-0.29213162751863764, 1.0604994635563527, 'None'),
  Text(-0.40596743002101227, -1.022345560836518, 'Sleep Apnea'),
  Text(0.8778189842549604, -0.6628980546672238, 'Insomnia')],
 [Text(-0.15934452410107505, 0.5784542528489196, '58.6%'),
  Text(-0.22143678001146122, -0.5576430331835552, '20.9%'),
  Text(0.47881035504816016, -0.361580757091213, '20.6%')])
```



Websites: This is a useful resource from which I obtain most commands and steps: .

https://www.geeksforgeeks.org/python-pandas-dataframe-groupby/.

.

https://www.geeksforgeeks.org/python-pandas-dataframe/.

.

https://www.geeksforgeeks.org/matplotlib-tutorial/.

.

https://www.geeksforgeeks.org/python-seaborn-tutorial/.

.

https://www.markdownguide.org/hacks/#:~:text=Markdown%20doesn't%20allow%20you,or%20the%20hex

[ ]: