```
#import the necessary python libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
# Read the csv file
df = pd.read_csv('/content/NPHA-doctor-visits.csv')
```

```
#check for the first five rows of the dataset
df.head()
```

	Number of Doctors Visited	Age	Phyiscal Health	Mental Health	Dental Health	Employment	Stress Keeps Patient from Sleeping	Medication Keeps Patient from Sleeping	Pain Keeps Patient from Sleeping	Bathroom Needs Keeps Patient from Sleeping	Uknown Keeps Patient from Sleeping	Trouble Sleeping	Prescription Sleep Medication	Ra
0	3	2	4	3	3	3	0	0	0	0	1	2	3	
1	2	2	4	2	3	3	1	0	0	1	0	3	3	
2	3	2	3	2	3	3	0	0	0	0	1	3	3	
3	1	2	3	2	3	3	0	0	0	1	0	3	3	
4	3	2	3	3	3	3	1	0	0	0	0	2	3	

Next steps: Generate code with df View recommended plots New interactive sheet

```
#check for the last five rows of the dataset
df.tail()
```

	Number of Doctors Visited	Age	Phyiscal Health	Mental Health	Dental Health	Employment	Stress Keeps Patient from Sleeping	Medication Keeps Patient from Sleeping	Pain Keeps Patient from Sleeping	Bathroom Needs Keeps Patient from Sleeping	Uknown Keeps Patient from Sleeping	Trouble Sleeping	Prescription Sleep Medication
709	2	2	2	2	2	3	0	0	0	1	0	3	3
710	3	2	2	2	2	2	1	0	0	0	1	2	3
711	3	2	4	2	3	3	0	0	0	0	0	3	3
712	3	2	3	1	3	3	1	0	1	1	1	3	3
713	2	2	3	2	2	1	1	0	1	1	0	2	3

```
#check for the number of rows and columns in the dataset
df.shape
```

```
(714, 15)
```

```
#check for the columns together with their datatypes
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 714 entries, 0 to 713
Data columns (total 15 columns):
 #   Column                                  Non-Null Count  Dtype
---  ------                                  --------------  -----
 0   Number of Doctors Visited               714 non-null    int64
 1   Age                                     714 non-null    int64
 2   Phyiscal Health                         714 non-null    int64
 3   Mental Health                           714 non-null    int64
 4   Dental Health                           714 non-null    int64
 5   Employment                              714 non-null    int64
 6   Stress Keeps Patient from Sleeping      714 non-null    int64
 7   Medication Keeps Patient from Sleeping  714 non-null    int64
 8   Pain Keeps Patient from Sleeping        714 non-null    int64
 9   Bathroom Needs Keeps Patient from Sleeping  714 non-null  int64
 10  Uknown Keeps Patient from Sleeping      714 non-null    int64
 11  Trouble Sleeping                        714 non-null    int64
 12  Prescription Sleep Medication           714 non-null    int64
 13  Race                                    714 non-null    int64
 14  Gender                                  714 non-null    int64
dtypes: int64(15)
```

```
memory usage: 83.8 KB
```

```
#check for the number of unique elements in the dataset
df.nunique()
```

	0
Number of Doctors Visited	3
Age	1
Phyiscal Health	6
Mental Health	6
Dental Health	7
Employment	4
Stress Keeps Patient from Sleeping	2
Medication Keeps Patient from Sleeping	2
Pain Keeps Patient from Sleeping	2
Bathroom Needs Keeps Patient from Sleeping	2
Uknown Keeps Patient from Sleeping	2
Trouble Sleeping	4
Prescription Sleep Medication	4
Race	5
Gender	2

```
#obtain a summary of the dataset/ descriptive statistics
df.describe().T
```

	count	mean	std	min	25%	50%	75%	max
Number of Doctors Visited	714.0	2.112045	0.683441	1.0	2.0	2.0	3.0	3.0
Age	714.0	2.000000	0.000000	2.0	2.0	2.0	2.0	2.0
Phyiscal Health	714.0	2.794118	0.900939	-1.0	2.0	3.0	3.0	5.0
Mental Health	714.0	1.988796	0.939928	-1.0	1.0	2.0	3.0	5.0
Dental Health	714.0	3.009804	1.361117	-1.0	2.0	3.0	4.0	6.0
Employment	714.0	2.806723	0.586582	1.0	3.0	3.0	3.0	4.0
Stress Keeps Patient from Sleeping	714.0	0.247899	0.432096	0.0	0.0	0.0	0.0	1.0
Medication Keeps Patient from Sleeping	714.0	0.056022	0.230126	0.0	0.0	0.0	0.0	1.0
Pain Keeps Patient from Sleeping	714.0	0.218487	0.413510	0.0	0.0	0.0	0.0	1.0
Bathroom Needs Keeps Patient from Sleeping	714.0	0.504202	0.500333	0.0	0.0	1.0	1.0	1.0
Uknown Keeps Patient from Sleeping	714.0	0.417367	0.493470	0.0	0.0	0.0	1.0	1.0
Trouble Sleeping	714.0	2.407563	0.670349	-1.0	2.0	3.0	3.0	3.0
Prescription Sleep Medication	714.0	2.829132	0.546767	-1.0	3.0	3.0	3.0	3.0
Race	714.0	1.425770	1.003896	1.0	1.0	1.0	1.0	5.0
Gender	714.0	1.550420	0.497800	1.0	1.0	2.0	2.0	2.0

```
df.describe()
```

	Number of Doctors Visited	Age	Phyiscal Health	Mental Health	Dental Health	Employment	Stress Keeps Patient from Sleeping	Medication Keeps Patient from Sleeping	Pain Keeps Patient from Sleeping	Bathroom Needs Keeps Patient from Sleeping	Uknown Keeps Patient from Sleeping	S
count	714.000000	714.0	714.000000	714.000000	714.000000	714.000000	714.000000	714.000000	714.000000	714.000000	714.000000	71
mean	2.112045	2.0	2.794118	1.988796	3.009804	2.806723	0.247899	0.056022	0.218487	0.504202	0.417367	
std	0.683441	0.0	0.900939	0.939928	1.361117	0.586582	0.432096	0.230126	0.413510	0.500333	0.493470	
min	1.000000	2.0	-1.000000	-1.000000	-1.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-
25%	2.000000	2.0	2.000000	1.000000	2.000000	3.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
50%	2.000000	2.0	3.000000	2.000000	3.000000	3.000000	0.000000	0.000000	0.000000	1.000000	0.000000	
75%	3.000000	2.0	3.000000	3.000000	4.000000	3.000000	0.000000	0.000000	0.000000	1.000000	1.000000	
max	3.000000	2.0	5.000000	5.000000	6.000000	4.000000	1.000000	1.000000	1.000000	1.000000	1.000000	

```
#checking for missing values
df.isnull().sum()
```

	0
Number of Doctors Visited	0
Age	0
Phyiscal Health	0
Mental Health	0
Dental Health	0
Employment	0
Stress Keeps Patient from Sleeping	0
Medication Keeps Patient from Sleeping	0
Pain Keeps Patient from Sleeping	0
Bathroom Needs Keeps Patient from Sleeping	0
Uknown Keeps Patient from Sleeping	0
Trouble Sleeping	0
Prescription Sleep Medication	0
Race	0
Gender	0

```
#checking for missing values
df.isnull().sum()/df.shape[0]*100
```

	0
Number of Doctors Visited	0.0
Age	0.0
Phyiscal Health	0.0
Mental Health	0.0
Dental Health	0.0
Employment	0.0
Stress Keeps Patient from Sleeping	0.0
Medication Keeps Patient from Sleeping	0.0
Pain Keeps Patient from Sleeping	0.0
Bathroom Needs Keeps Patient from Sleeping	0.0
Uknown Keeps Patient from Sleeping	0.0
Trouble Sleeping	0.0
Prescription Sleep Medication	0.0
Race	0.0
Gender	0.0

```
#checking for duplicates in the dataset
df.duplicated().sum()
```

```
42
```

```
#dropping or eliminating the duplicated values
df.drop_duplicates()
```

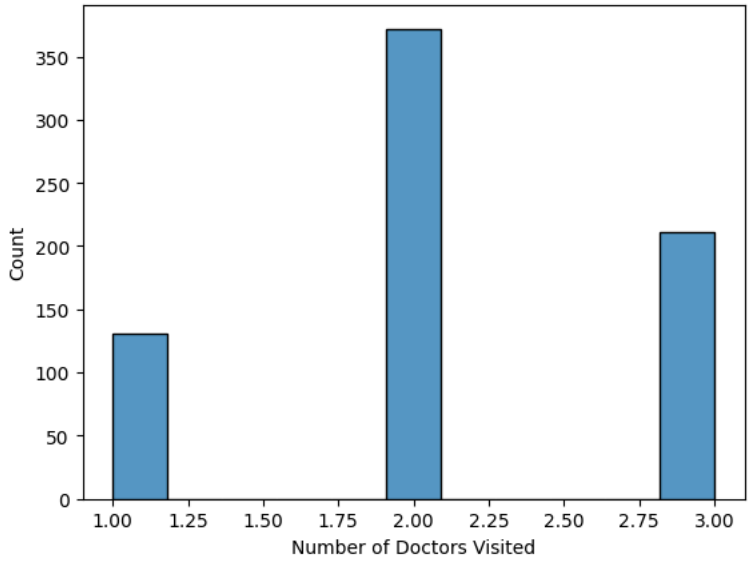
	Number of Doctors Visited	Age	Phyiscal Health	Mental Health	Dental Health	Employment	Stress Keeps Patient from Sleeping	Medication Keeps Patient from Sleeping	Pain Keeps Patient from Sleeping	Bathroom Needs Keeps Patient from Sleeping	Uknown Keeps Patient from Sleeping	Trouble Sleeping	Prescription Sleep Medication
0	3	2	4	3	3	3	0	0	0	0	1	2	3
1	2	2	4	2	3	3	1	0	0	1	0	3	3
2	3	2	3	2	3	3	0	0	0	0	1	3	3
3	1	2	3	2	3	3	0	0	0	1	0	3	3
4	3	2	3	3	3	3	1	0	0	0	0	2	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...
706	3	2	4	2	2	3	0	0	1	1	0	-1	3
710	3	2	2	2	2	2	1	0	0	0	1	2	3
711	3	2	4	2	3	3	0	0	0	0	0	3	3
712	3	2	3	1	3	3	1	0	1	1	1	3	3
713	2	2	3	2	2	1	1	0	1	1	0	2	3

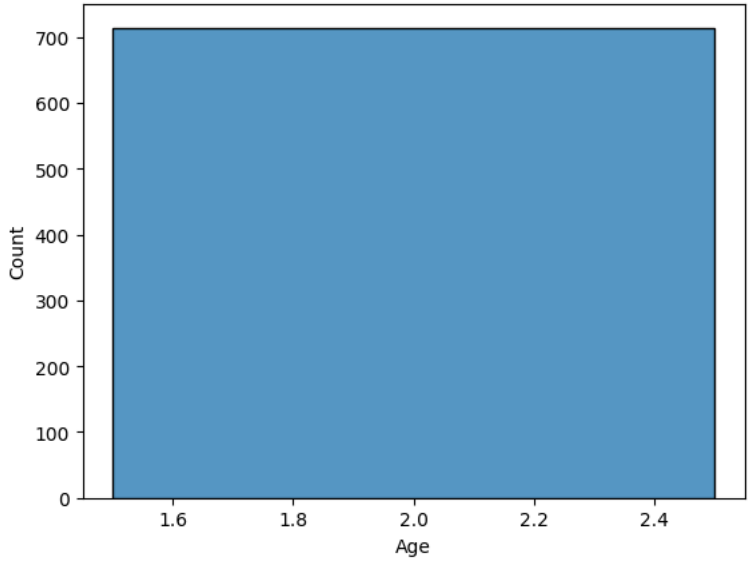
672 rows × 15 columns

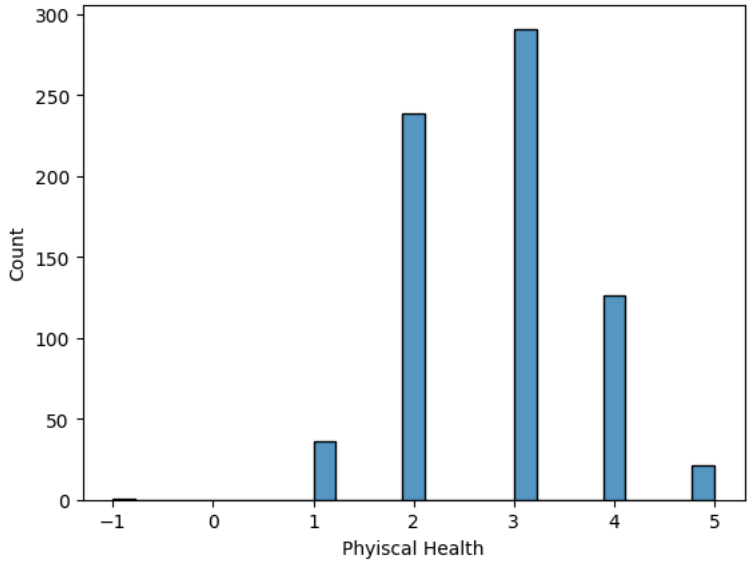
```
#checking for garbage values
for i in df.select_dtypes(include='object').columns:
  print(df[i].value_counts())
  print("***"*10)
```

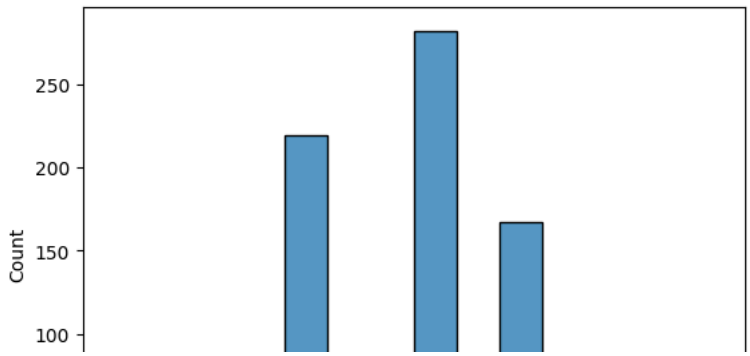
```
#understanding the distribution of the data using a histogram
for i in df.select_dtypes(include='number').columns:
  sns.histplot(data=df, x=i)
  plt.show()
```

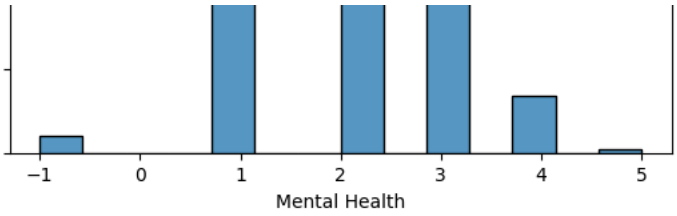
[4]

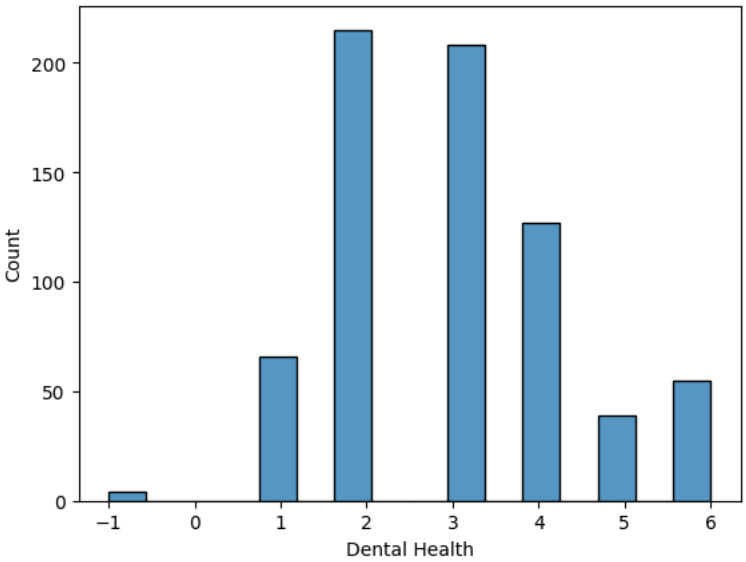

Count
Number of Doctors Visited

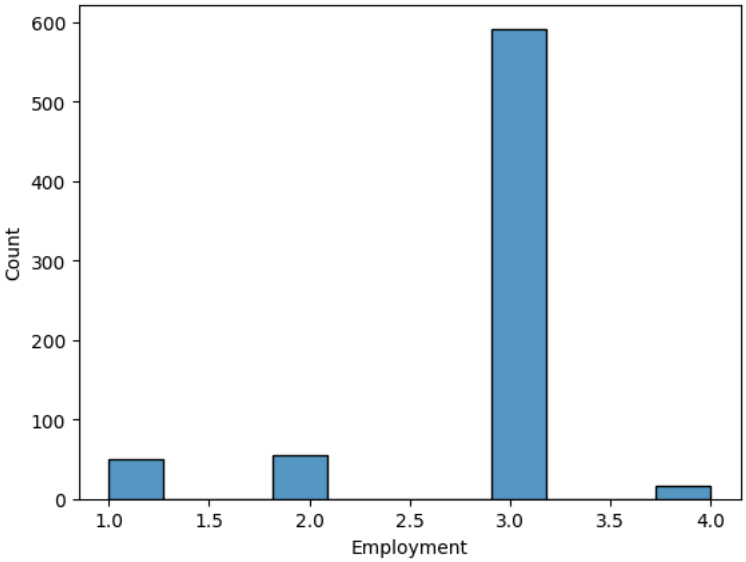

Count
Age

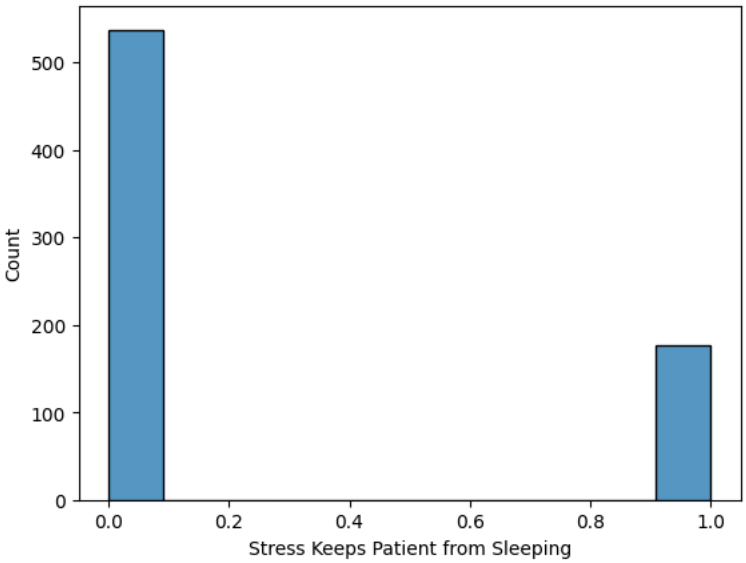

Count
Phyiscal Health


Count

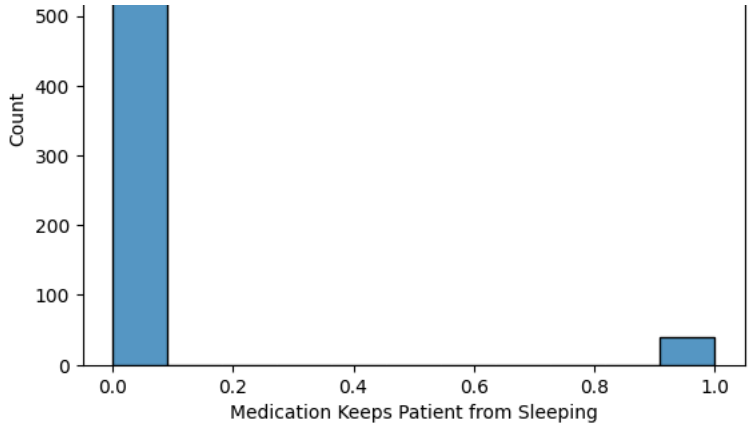

50
0
−1
0
1
2
3
4
5
Mental Health

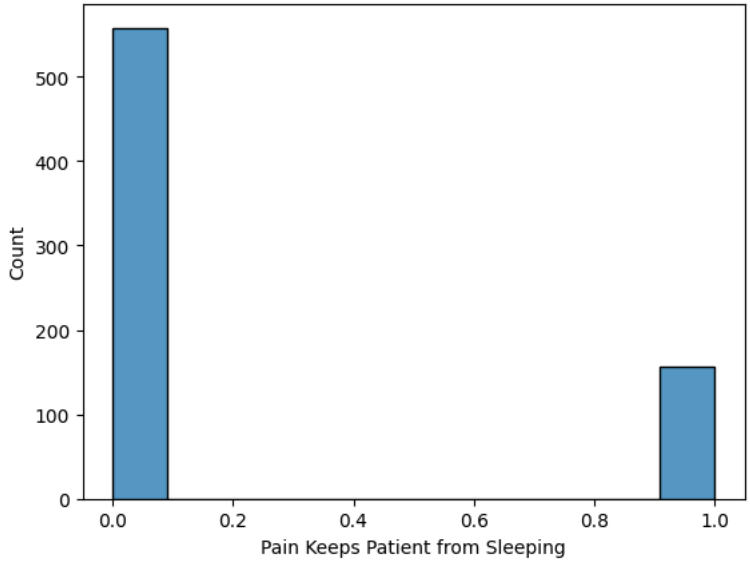

200
150
100
50
0
Count
−1
0
1
2
3
4
5
6
Dental Health

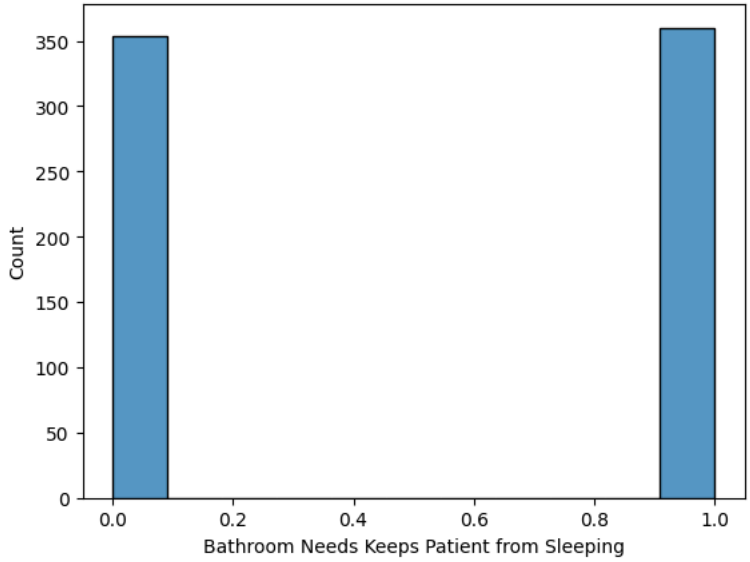

600
500
400
300
200
100
0
Count
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Employment

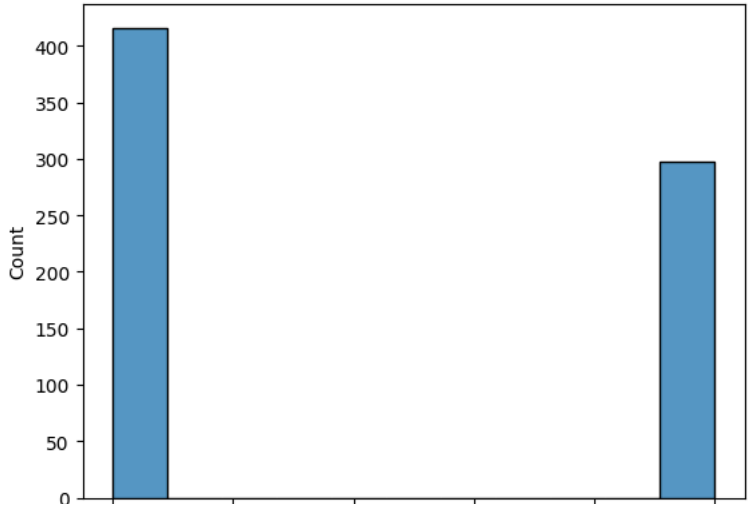

500
400
300
200
100
0
Count
0.0
0.2
0.4
0.6
0.8
1.0
Stress Keeps Patient from Sleeping

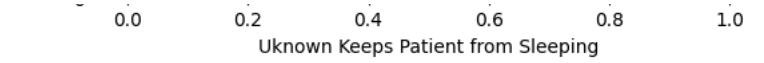

700
600

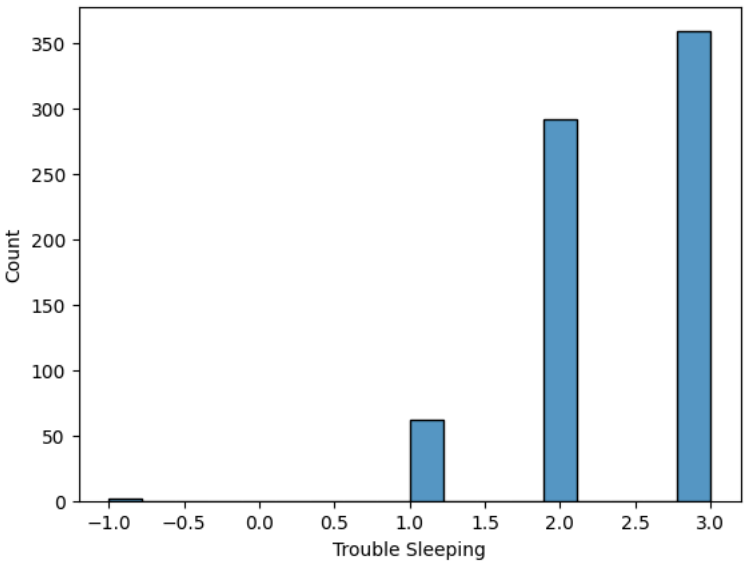

Count
Medication Keeps Patient from Sleeping

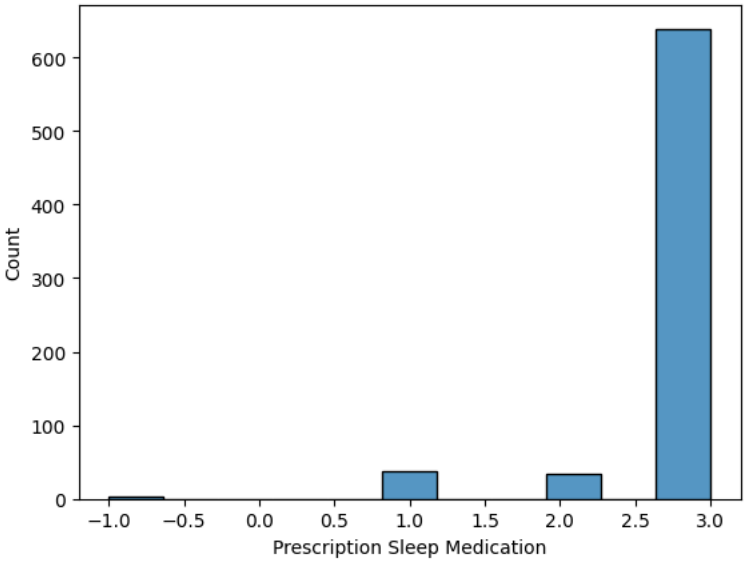

Count
Pain Keeps Patient from Sleeping

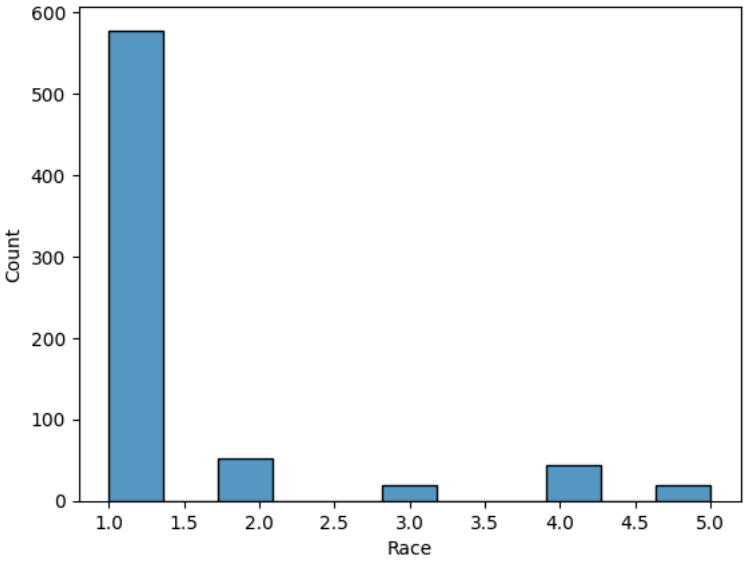

Count
Bathroom Needs Keeps Patient from Sleeping


Count

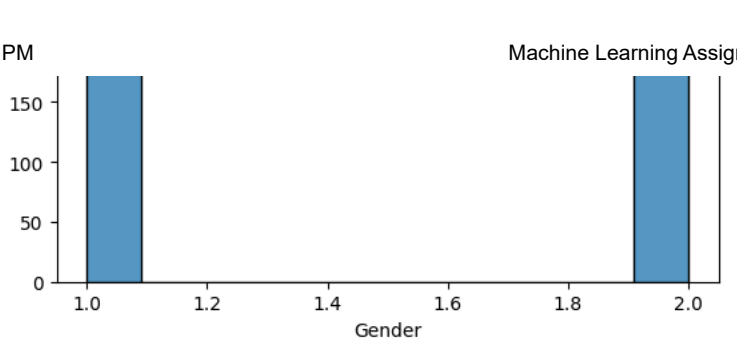

0.0
0.2
0.4
0.6
0.8
1.0
Uknown Keeps Patient from Sleeping


Count
Trouble Sleeping

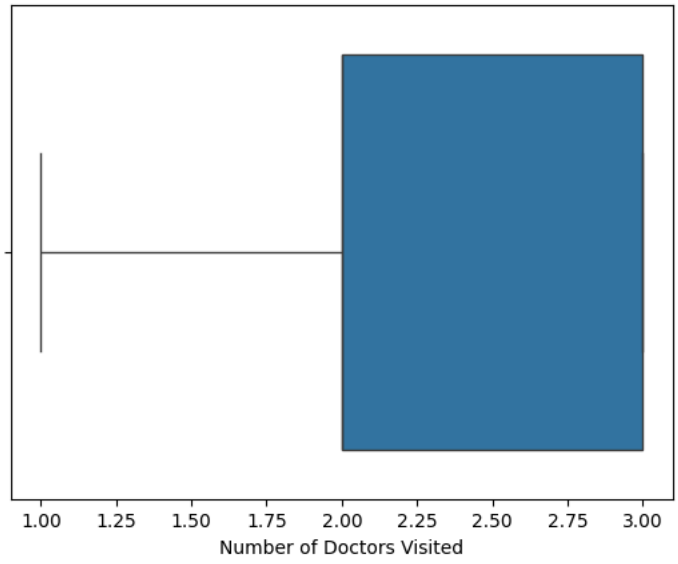

Count
Prescription Sleep Medication

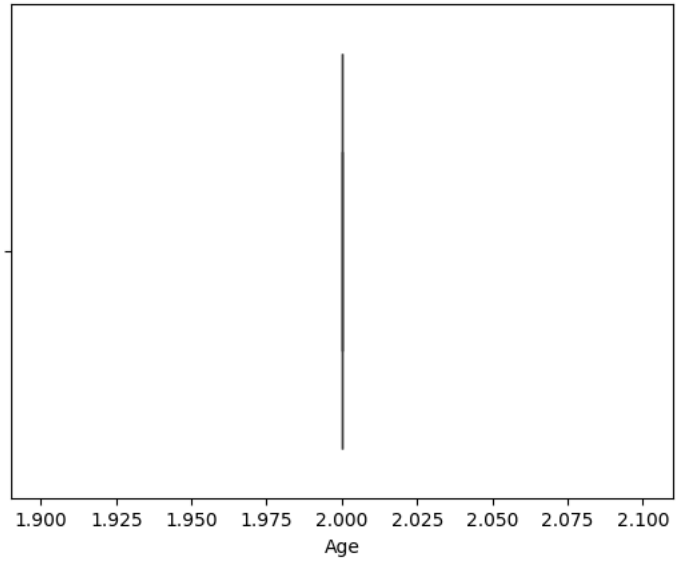

Count
Race

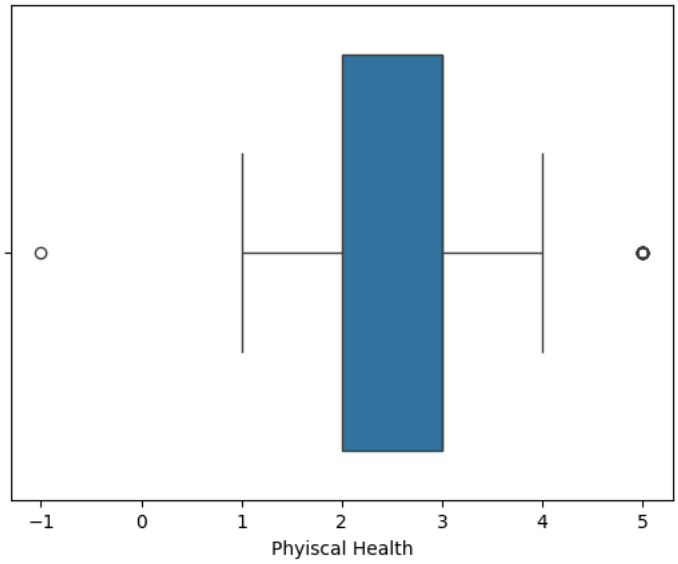

Count

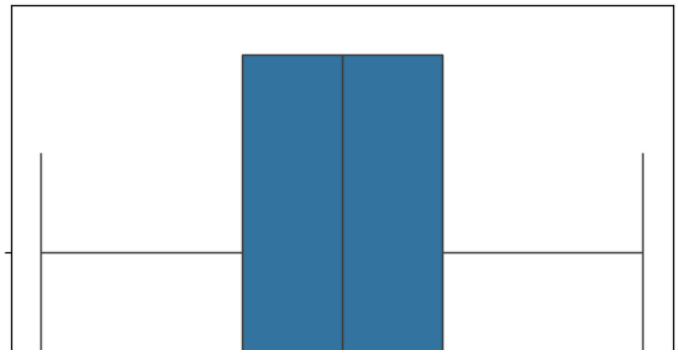

150
100
50
0
1.0
1.2
1.4
1.6
1.8
2.0
Gender

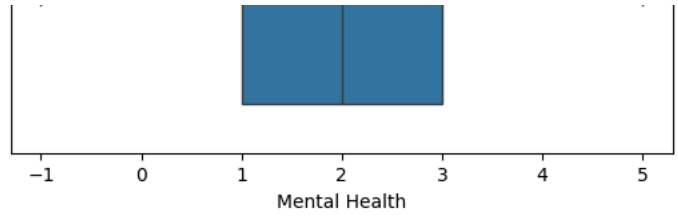
```
#identifying outliers in the dataset
for i in df.select_dtypes(include='number').columns:
  sns.boxplot(data=df, x=i)
  plt.show()
```

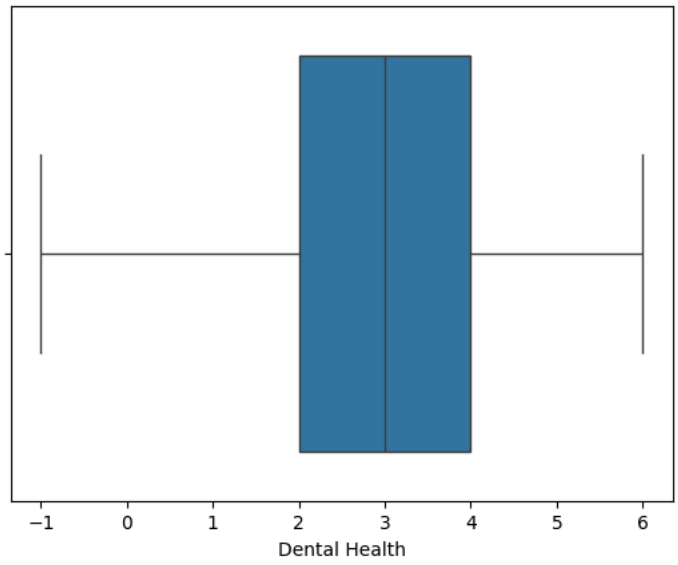

1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
Number of Doctors Visited

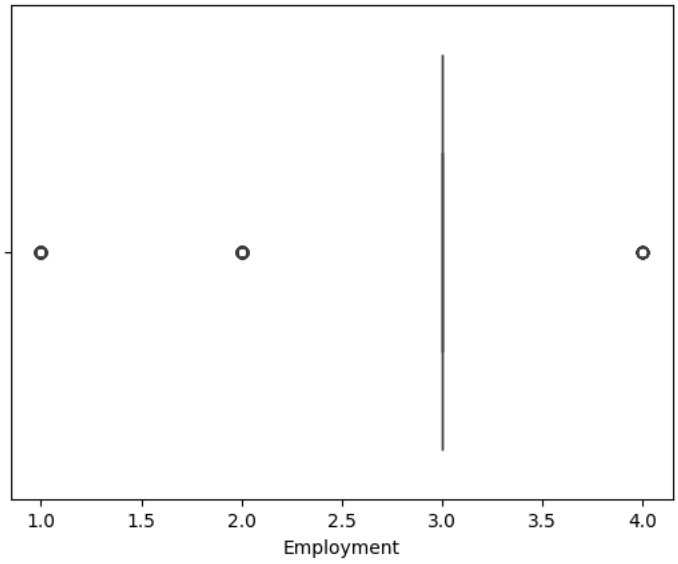

1.900
1.925
1.950
1.975
2.000
2.025
2.050
2.075
2.100
Age

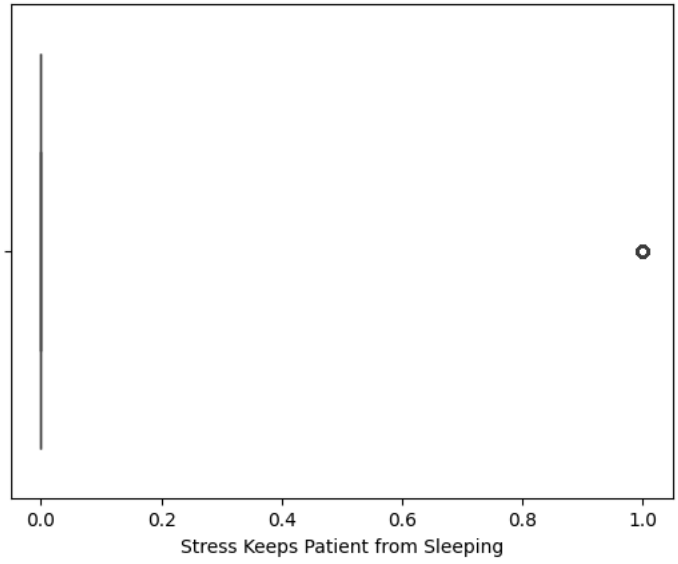

−1
0
1
2
3
4
5
Phyiscal Health

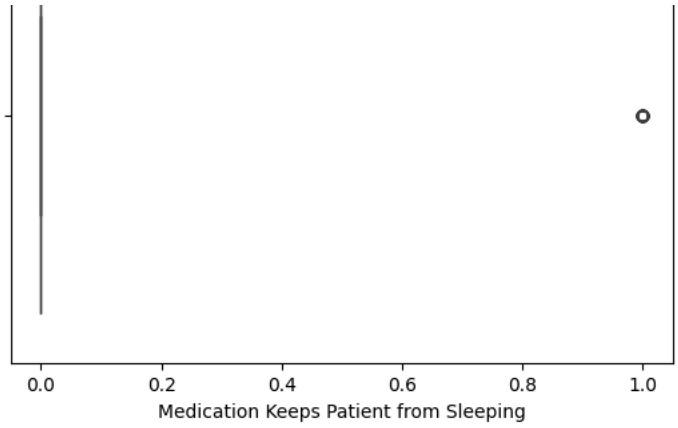


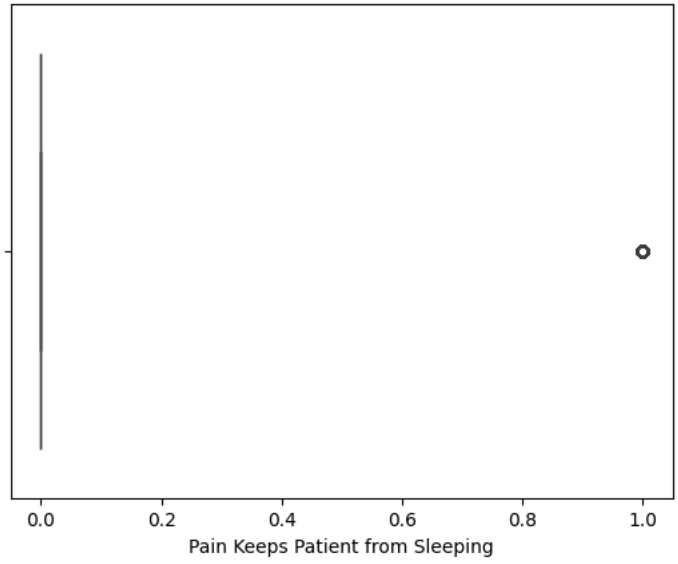

−1
0
1
2
3
4
5
Mental Health

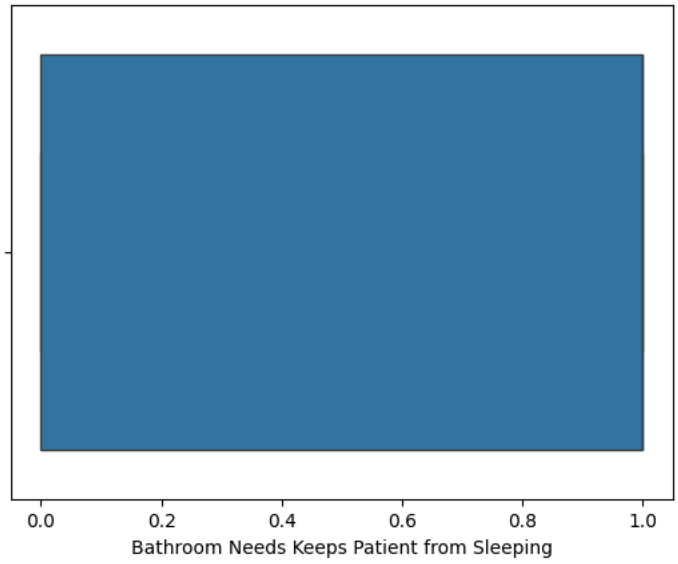

−1
0
1
2
3
4
5
6
Dental Health

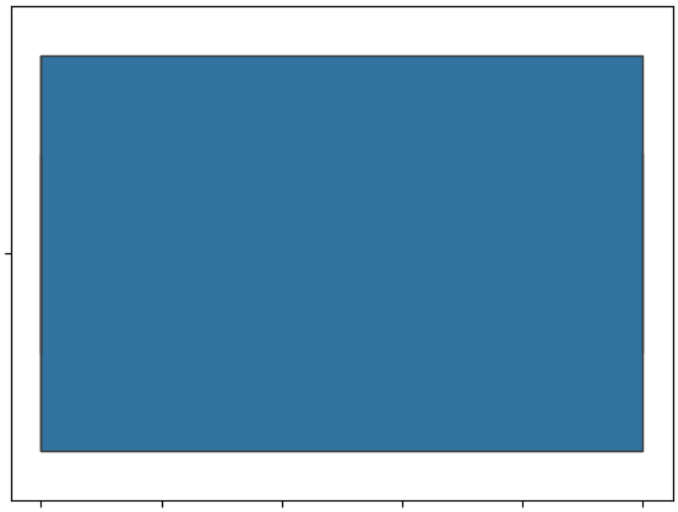

1.0
1.5
2.0
2.5
3.0
3.5
4.0
Employment

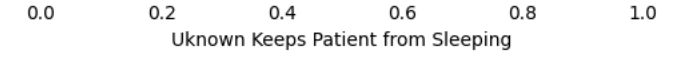

0.0
0.2
0.4
0.6
0.8
1.0
Stress Keeps Patient from Sleeping

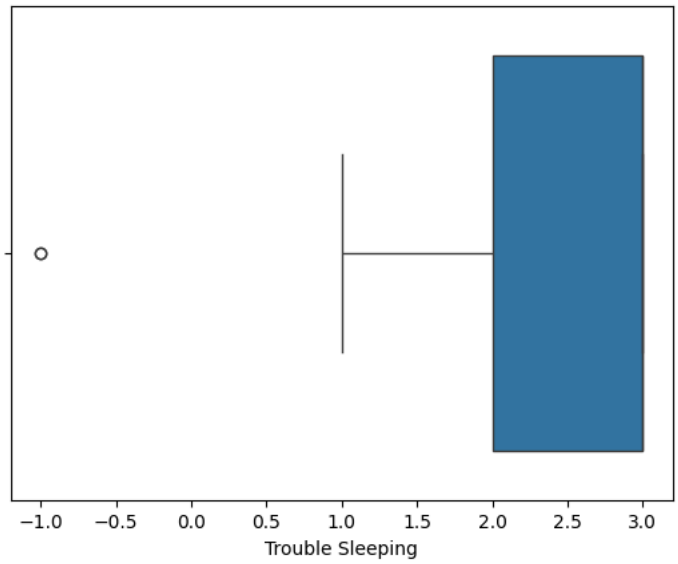

0.0
0.2
0.4
0.6
0.8
1.0
Medication Keeps Patient from Sleeping

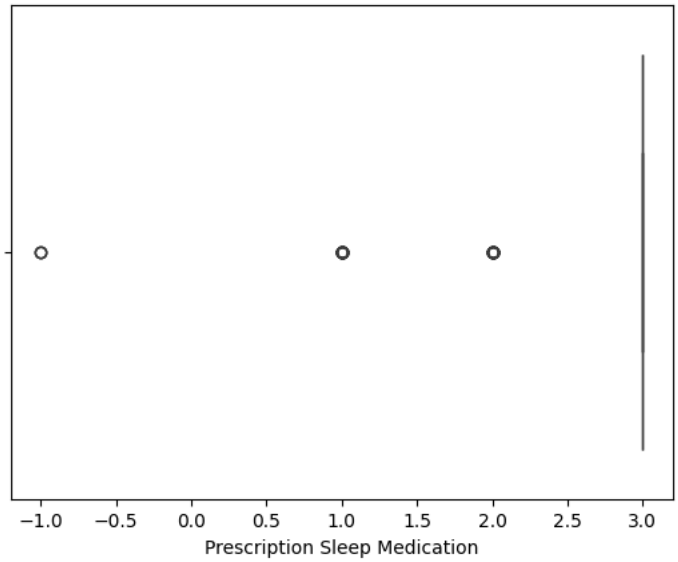

0.0
0.2
0.4
0.6
0.8
1.0
Pain Keeps Patient from Sleeping

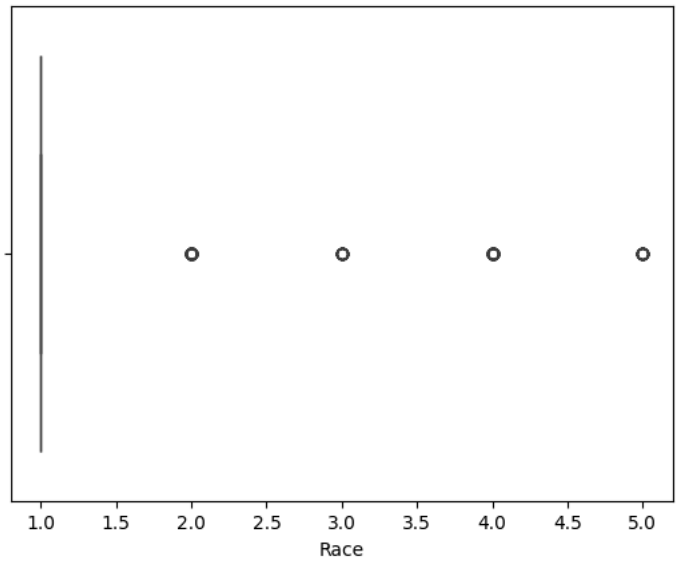

0.0
0.2
0.4
0.6
0.8
1.0
Bathroom Needs Keeps Patient from Sleeping

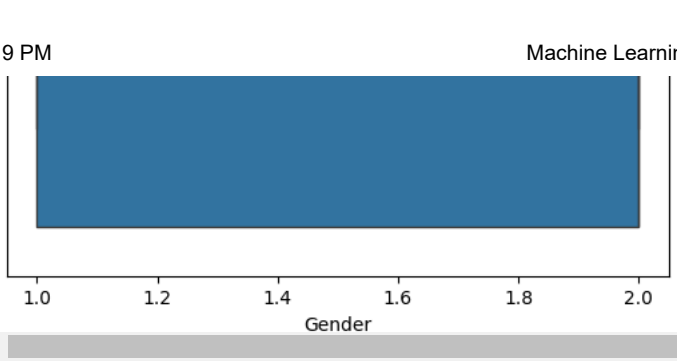



0.0
0.2
0.4
0.6
0.8
1.0
Uknown Keeps Patient from Sleeping


−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Trouble Sleeping


−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Prescription Sleep Medication


1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Race


1.0
1.2
1.4
1.6
1.8
2.0
Gender

```
#dealing with the outliers
#def out_liers(col):
 # q1,q3=np.percentile(col,[25,75])
  #iqr=q3-q1
  #upper_bound=q3+(1.5*iqr)
  #lower_bound=q1-(1.5*iqr)
  #return upper_bound,lower_bound
```

```
#for i in ['Phyiscal Health', 'Employment', 'Stress Keeps Patient from Sleeping', 'Medication Keeps Patient from Sleeping',
 #         'Pain Keeps Patient from Sleeping', 'Trouble Sleeping', 'Prescription Sleep Medication', 'Race']:
  #upper_bound,lower_bound=out_liers(df[i])
  #df[i]=np.where(df[i]>upper_bound,upper_bound,df[i])
  #df[i]=np.where(df[i]<lower_bound,lower_bound,df[i])
```

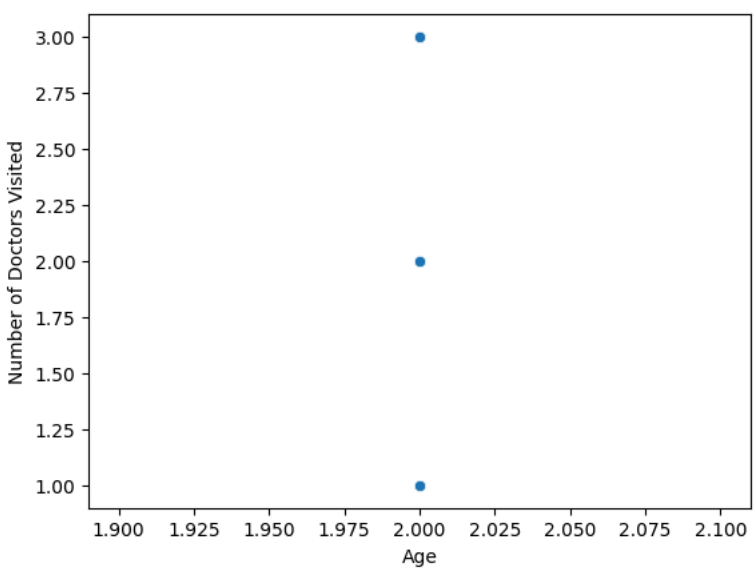
```
#for i in ['Phyiscal Health', 'Employment', 'Stress Keeps Patient from Sleeping', 'Medication Keeps Patient from Sleeping',
   #       'Pain Keeps Patient from Sleeping', 'Trouble Sleeping', 'Prescription Sleep Medication', 'Race']:
    #      sns.boxplot(df[i])
    #      plt.show()
```

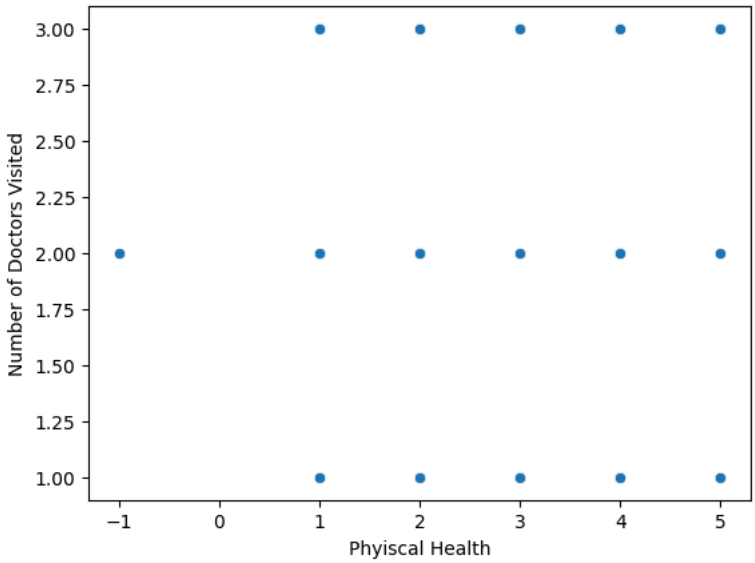
```
df.select_dtypes(include='number').columns
```

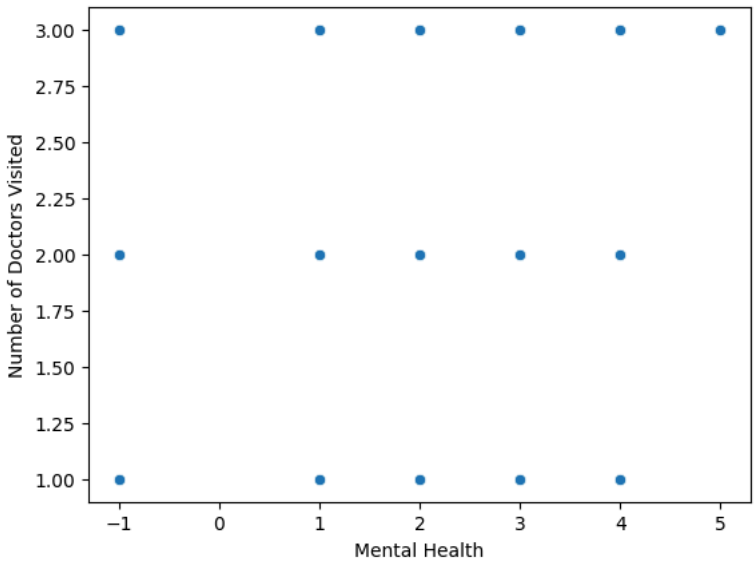
```
Index(['Number of Doctors Visited', 'Age', 'Phyiscal Health', 'Mental Health',
       'Dental Health', 'Employment', 'Stress Keeps Patient from Sleeping',
       'Medication Keeps Patient from Sleeping',
       'Pain Keeps Patient from Sleeping',
       'Bathroom Needs Keeps Patient from Sleeping',
       'Uknown Keeps Patient from Sleeping', 'Trouble Sleeping',
       'Prescription Sleep Medication', 'Race', 'Gender'],
      dtype='object')
```

```
#scatter plot to understand the relationship between my target variable and other variables
for i in ['Age', 'Phyiscal Health', 'Mental Health',
       'Dental Health', 'Employment', 'Stress Keeps Patient from Sleeping',
       'Medication Keeps Patient from Sleeping',
       'Pain Keeps Patient from Sleeping',
       'Bathroom Needs Keeps Patient from Sleeping',
       'Uknown Keeps Patient from Sleeping', 'Trouble Sleeping',
       'Prescription Sleep Medication', 'Race', 'Gender']:
       sns.scatterplot(data=df, x=i, y='Number of Doctors Visited')
       plt.show()
```

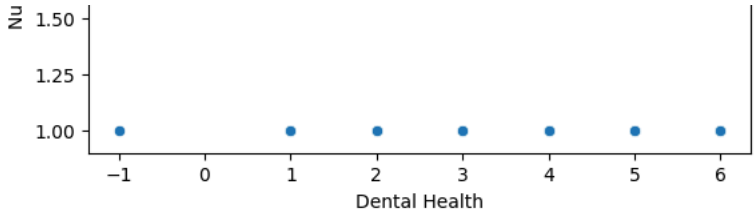
[4]

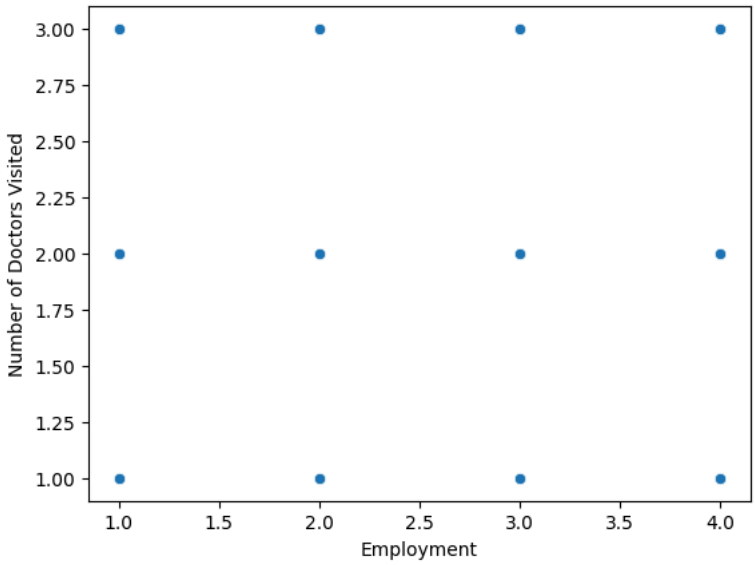

Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
1.900
1.925
1.950
1.975
2.000
2.025
2.050
2.075
2.100
Age

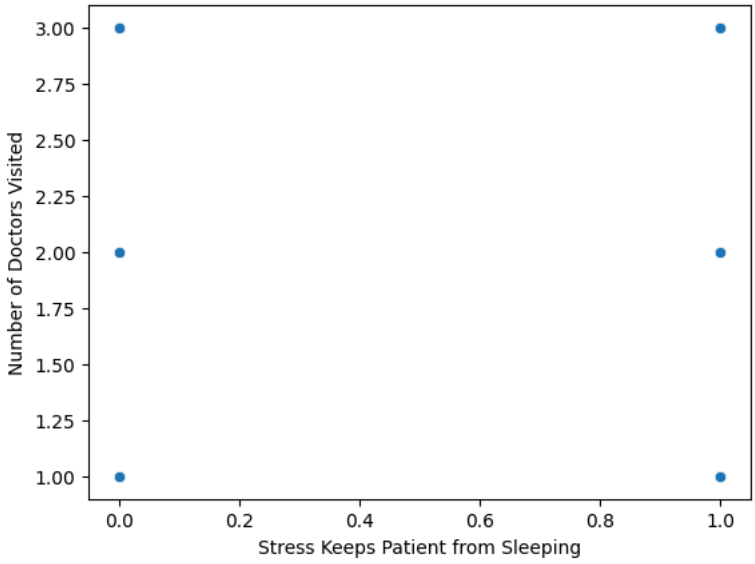

Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
−1
0
1
2
3
4
5
Phyiscal Health

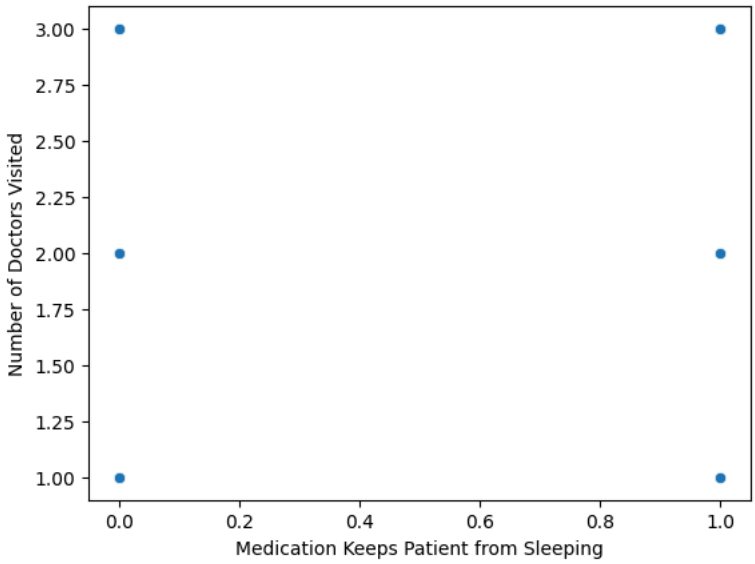

Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
−1
0
1
2
3
4
5
Mental Health


mber of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75

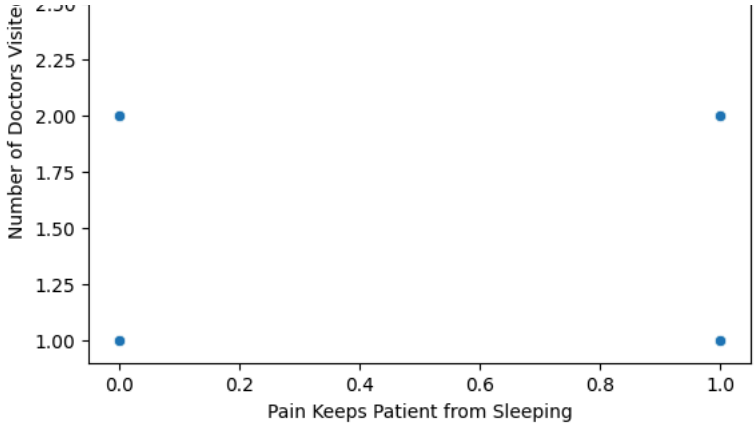

Nu
1.50
1.25
1.00
−1
0
1
2
3
4
5
6
Dental Health

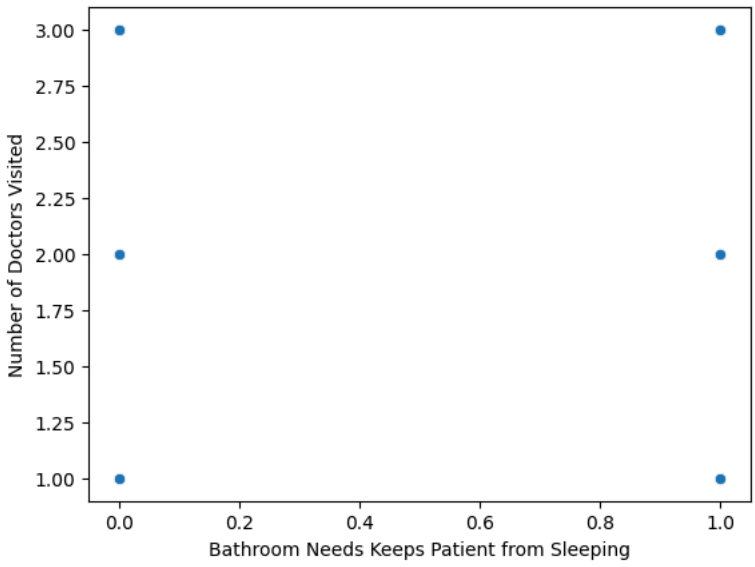

Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Employment

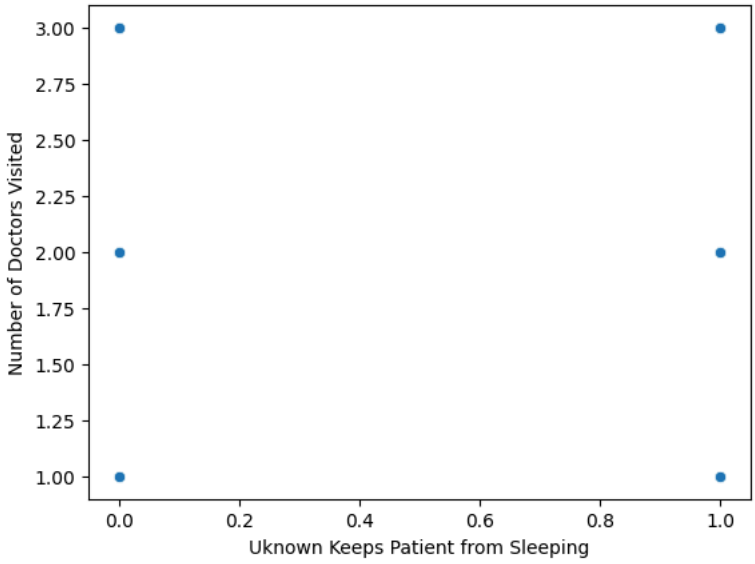

Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.0
0.2
0.4
0.6
0.8
1.0
Stress Keeps Patient from Sleeping

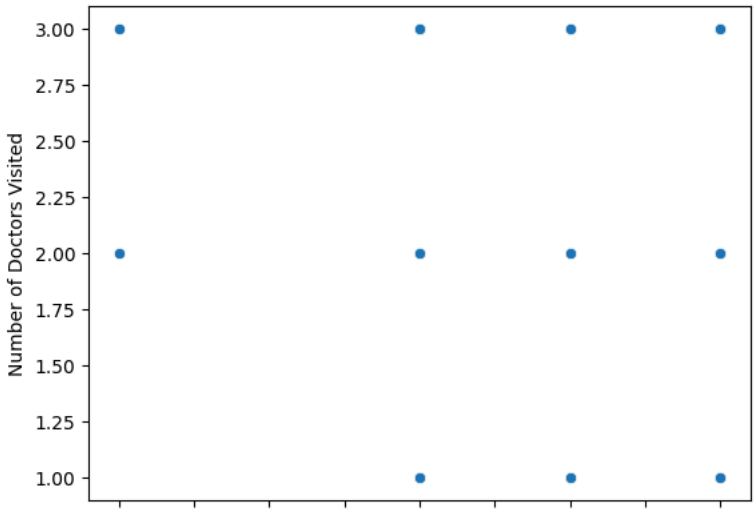

Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.0
0.2
0.4
0.6
0.8
1.0
Medication Keeps Patient from Sleeping

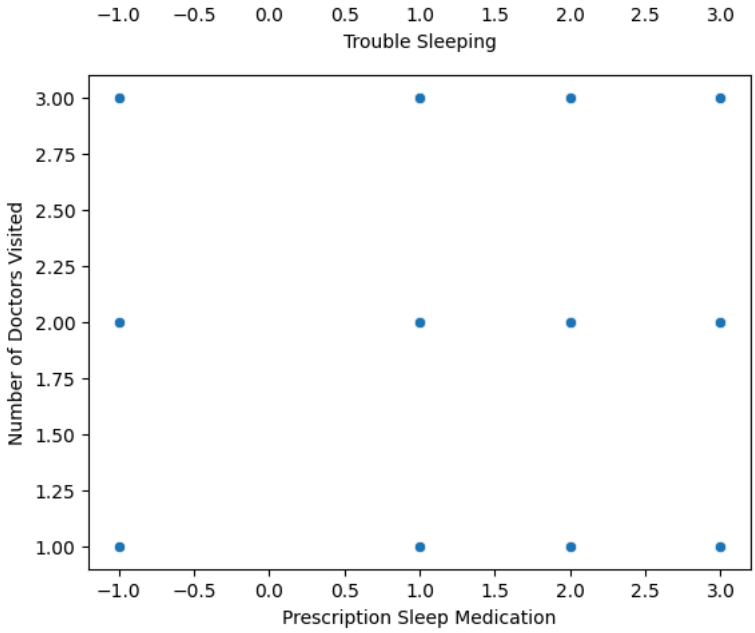

3.00
2.75

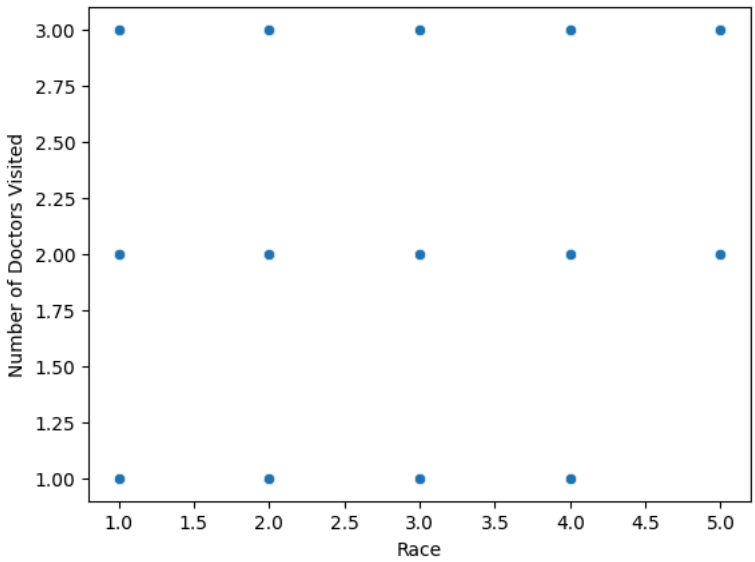

Number of Doctors Visited
2.25
2.00
1.75
1.50
1.25
1.00
0.0
0.2
0.4
0.6
0.8
1.0
Pain Keeps Patient from Sleeping

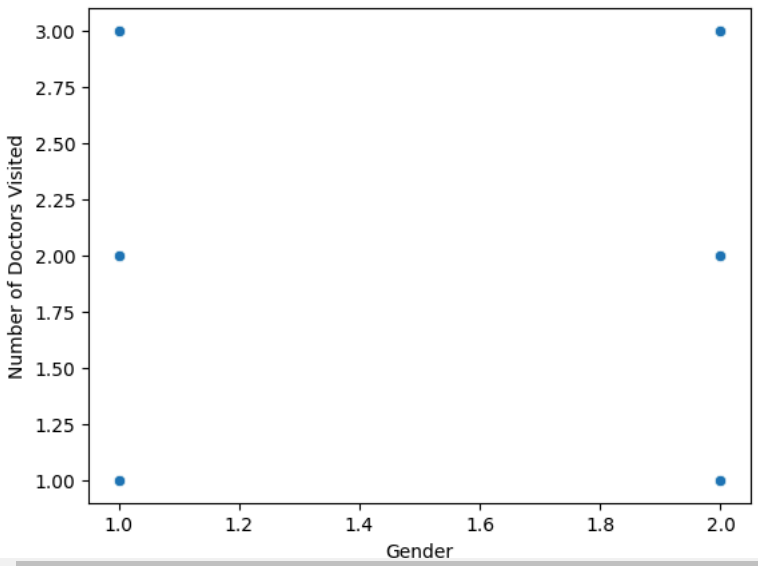

Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.0
0.2
0.4
0.6
0.8
1.0
Bathroom Needs Keeps Patient from Sleeping


Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.0
0.2
0.4
0.6
0.8
1.0
Uknown Keeps Patient from Sleeping


Number of Doctors Visited
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00


Trouble Sleeping
Number of Doctors Visited
Prescription Sleep Medication


Number of Doctors Visited
Race

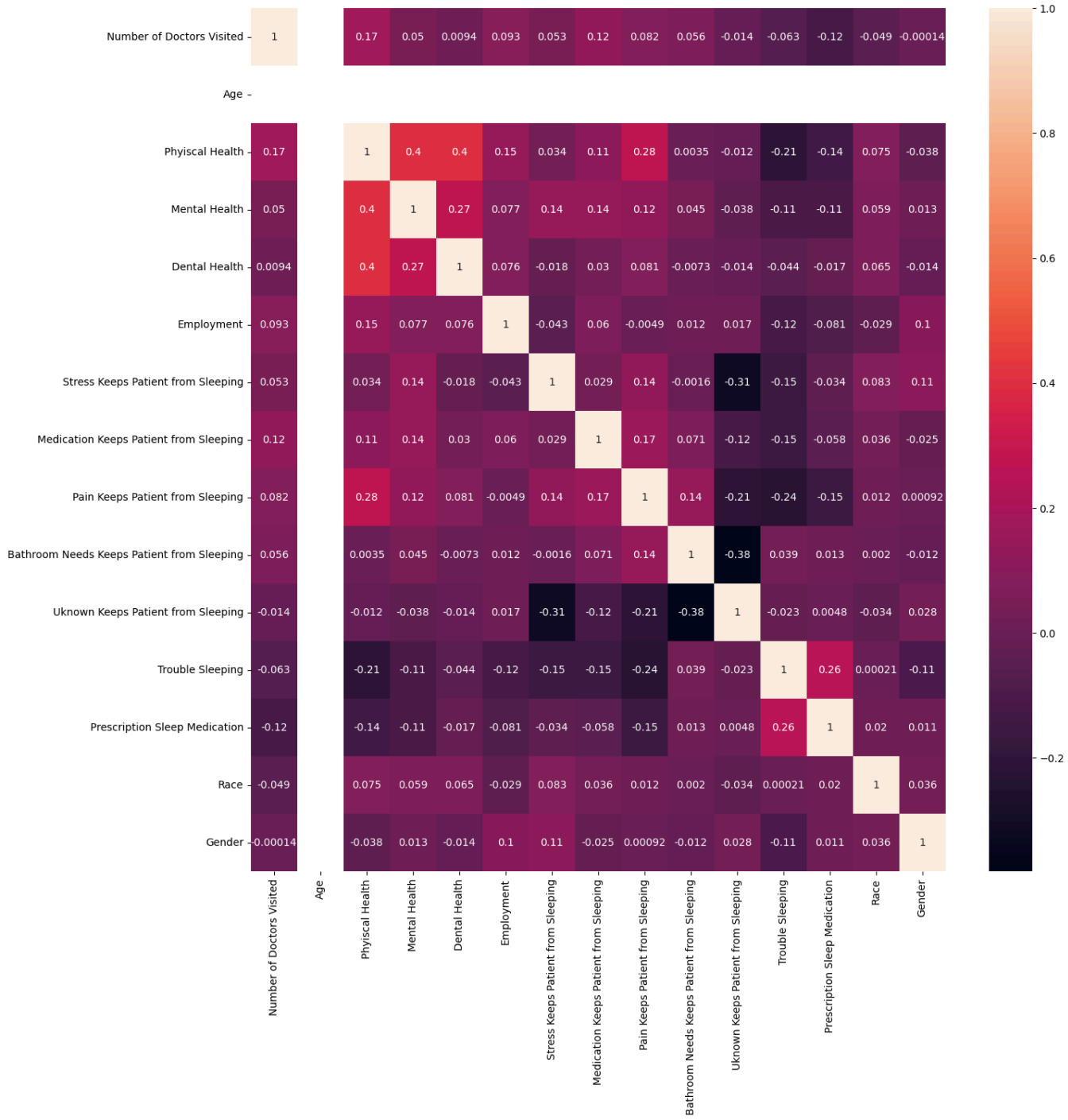

Number of Doctors Visited
Gender

```
#checking for the correlation with heatmap to interpret the relation and multicollinearity
df.select_dtypes(include='number').corr()
```

	Number of Doctors Visited	Age	Phyiscal Health	Mental Health	Dental Health	Employment	Stress Keeps Patient from Sleeping	Medication Keeps Patient from Sleeping	Pain Keeps Patient from Sleeping	Bathroom Needs Keeps Patient from Sleeping	Uknown Keeps Patient from Sleeping	Troub Sleepi
Number of Doctors Visited	1.000000	NaN	0.169629	0.049990	0.009371	0.092578	0.053040	0.120549	0.081990	0.056043	-0.014095	-0.063(
Age	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	N
Phyiscal Health	0.169629	NaN	1.000000	0.404705	0.404238	0.147526	0.034014	0.109827	0.275266	0.003477	-0.011505	-0.213
Mental Health	0.049990	NaN	0.404705	1.000000	0.269770	0.077469	0.138074	0.139072	0.121780	0.044835	-0.038285	-0.110
Dental Health	0.009371	NaN	0.404238	0.269770	1.000000	0.076156	-0.018446	0.029588	0.080913	-0.007269	-0.014453	-0.044
Employment	0.092578	NaN	0.147526	0.077469	0.076156	1.000000	-0.043106	0.059546	-0.004908	0.012329	0.017427	-0.116
Stress Keeps Patient from Sleeping	0.053040	NaN	0.034014	0.138074	-0.018446	-0.043106	1.000000	0.029395	0.136015	-0.001581	-0.314897	-0.150
Medication Keeps Patient from Sleeping	0.120549	NaN	0.109827	0.139072	0.029588	0.059546	0.029395	1.000000	0.165965	0.071039	-0.119734	-0.148
Pain Keeps Patient from Sleeping	0.081990	NaN	0.275266	0.121780	0.080913	-0.004908	0.136015	0.165965	1.000000	0.144695	-0.213823	-0.235
Bathroom Needs Keeps Patient from Sleeping	0.056043	NaN	0.003477	0.044835	-0.007269	0.012329	-0.001581	0.071039	0.144695	1.000000	-0.382029	0.038
Uknown Keeps Patient from Sleeping	-0.014095	NaN	-0.011505	-0.038285	-0.014453	0.017427	-0.314897	-0.119734	-0.213823	-0.382029	1.000000	-0.023
Trouble Sleeping	-0.063079	NaN	-0.213855	-0.110718	-0.044351	-0.116836	-0.150775	-0.148217	-0.235680	0.038795	-0.023123	1.000(
Prescription Sleep Medication	-0.121345	NaN	-0.136999	-0.110164	-0.016592	-0.081250	-0.034172	-0.057575	-0.151017	0.012882	0.004776	0.262
Race	-0.049186	NaN	0.075346	0.058572	0.064685	-0.029161	0.082897	0.036239	0.012095	0.002018	-0.033633	0.000
Gender	-0.000139	NaN	-0.037803	0.013199	-0.014185	0.100665	0.108080	-0.024692	0.000916	-0.012114	0.028403	-0.105

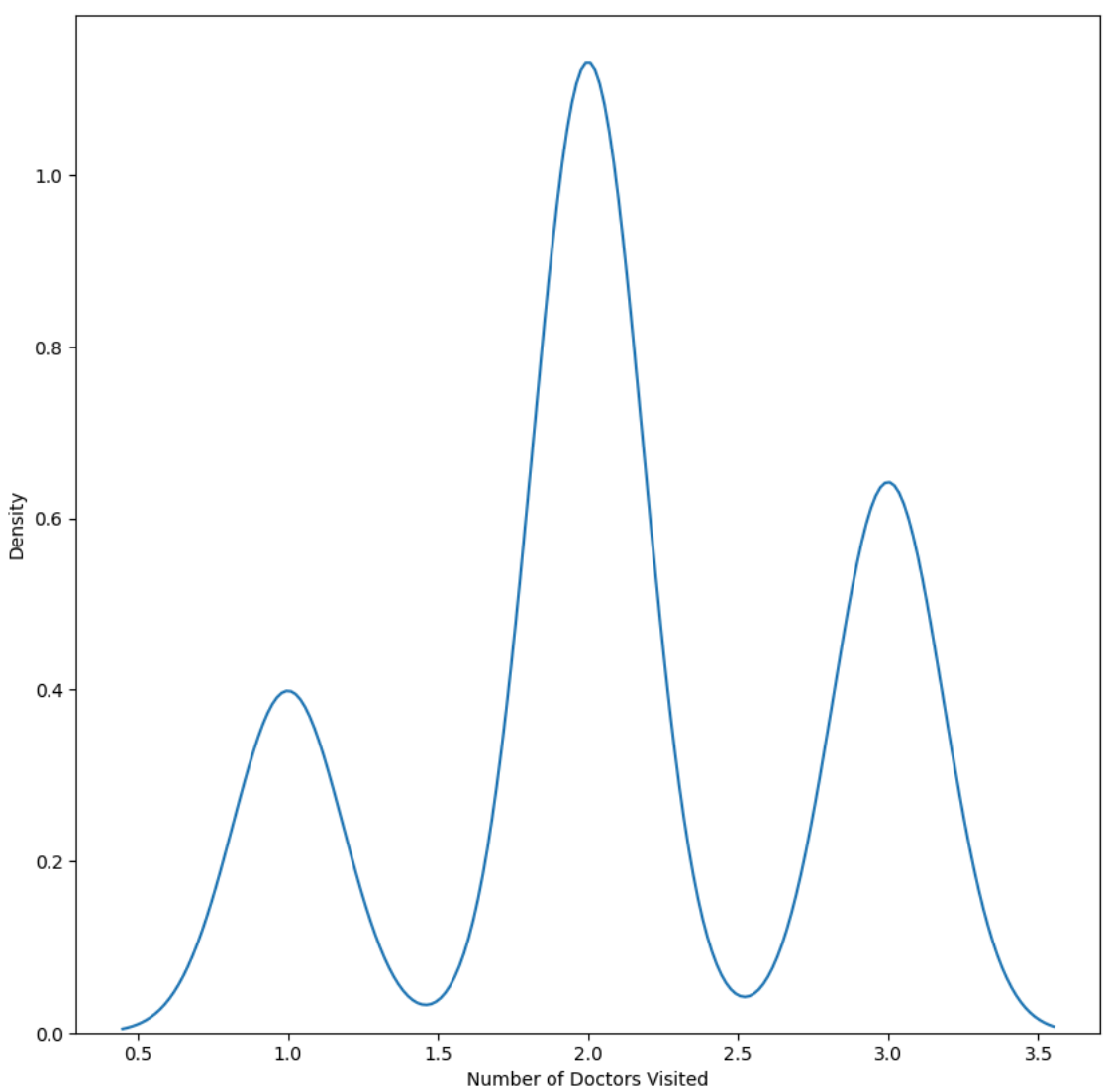
```
plt.figure(figsize=(15,15))
sns.heatmap(df.select_dtypes(include='number').corr(), annot=True)
```

<Axes: >

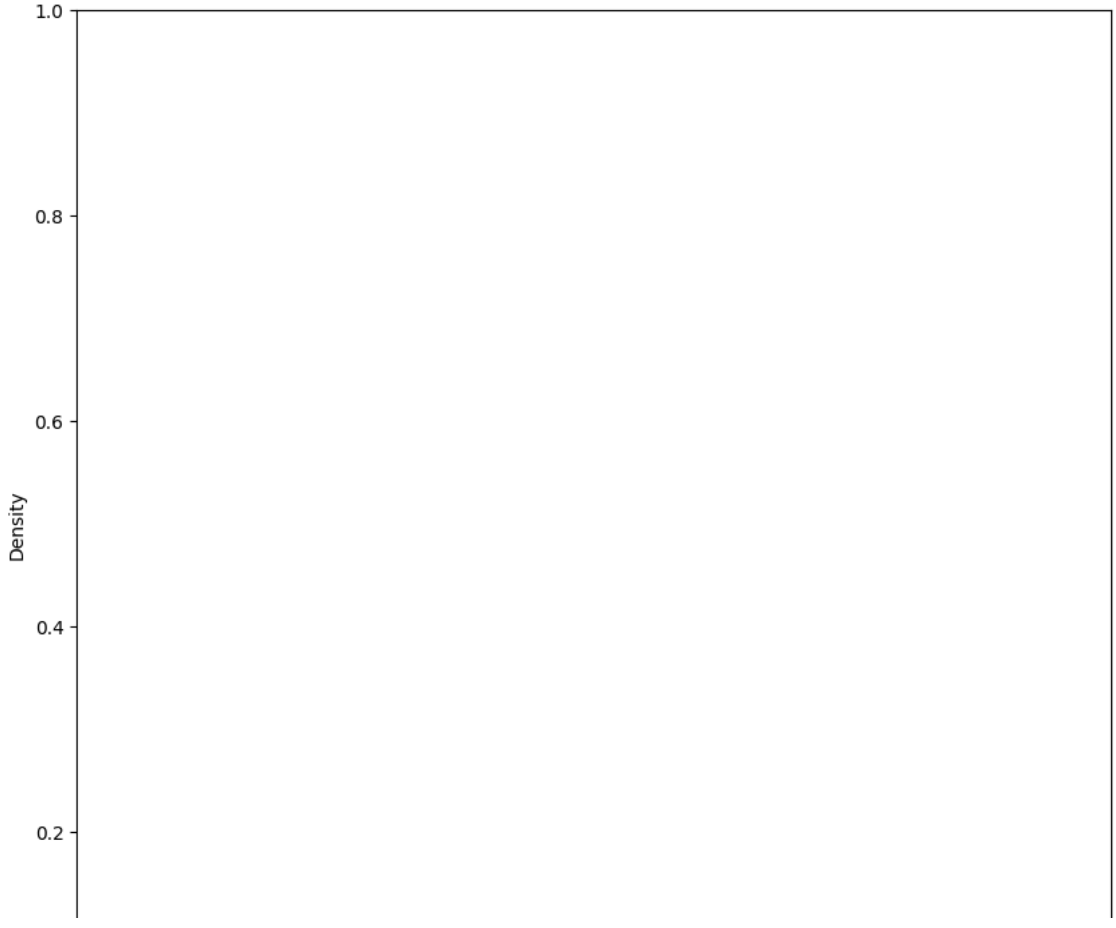


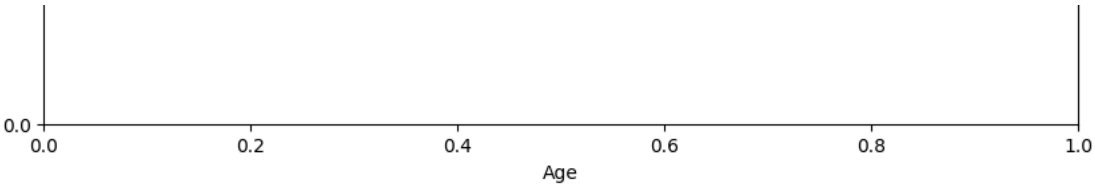

```
for i in df.select_dtypes(include='number').columns:
  plt.figure(figsize=(10,10))
  sns.kdeplot(data=df, x=i)
  plt.show()
```

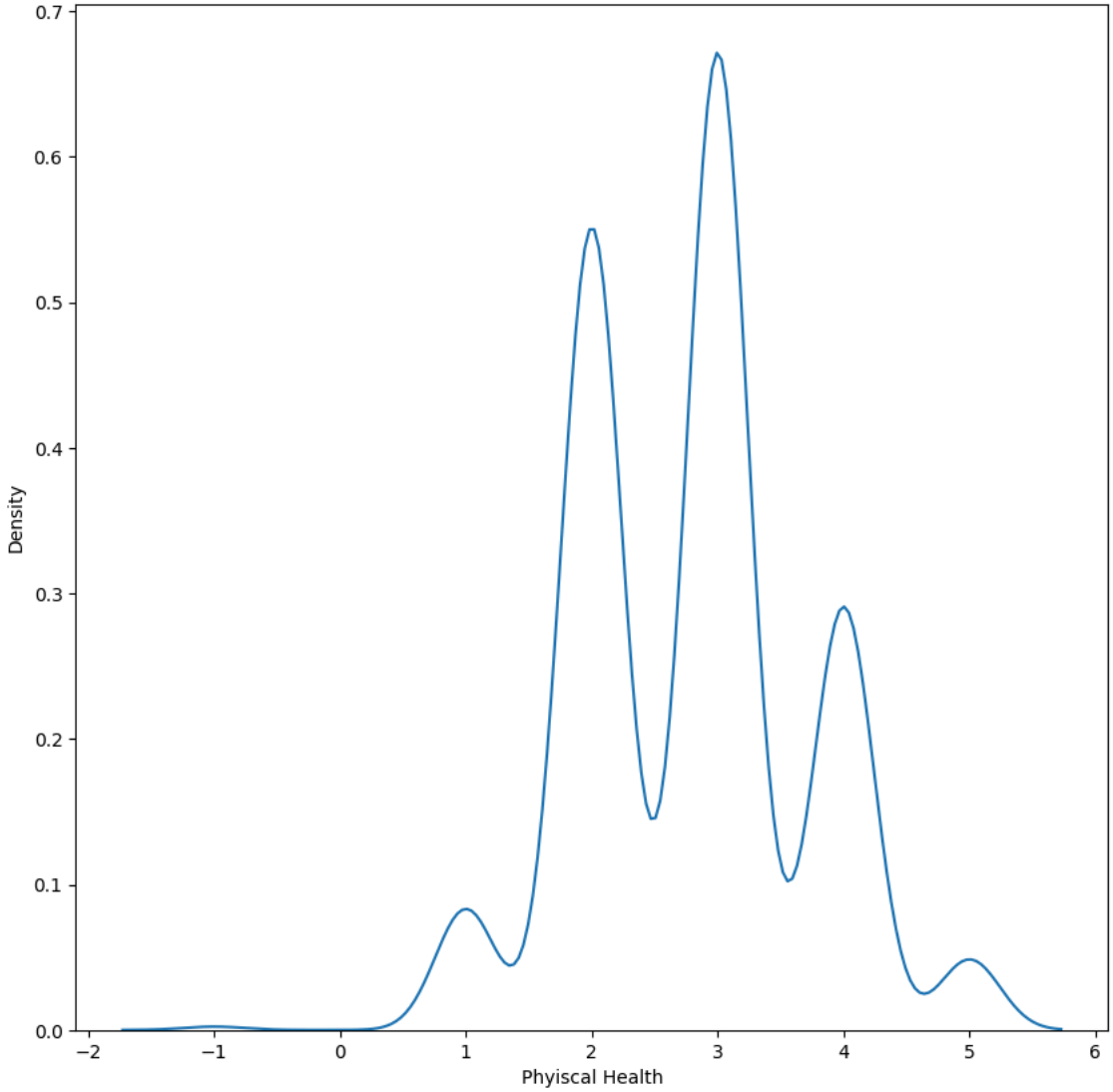
[+]

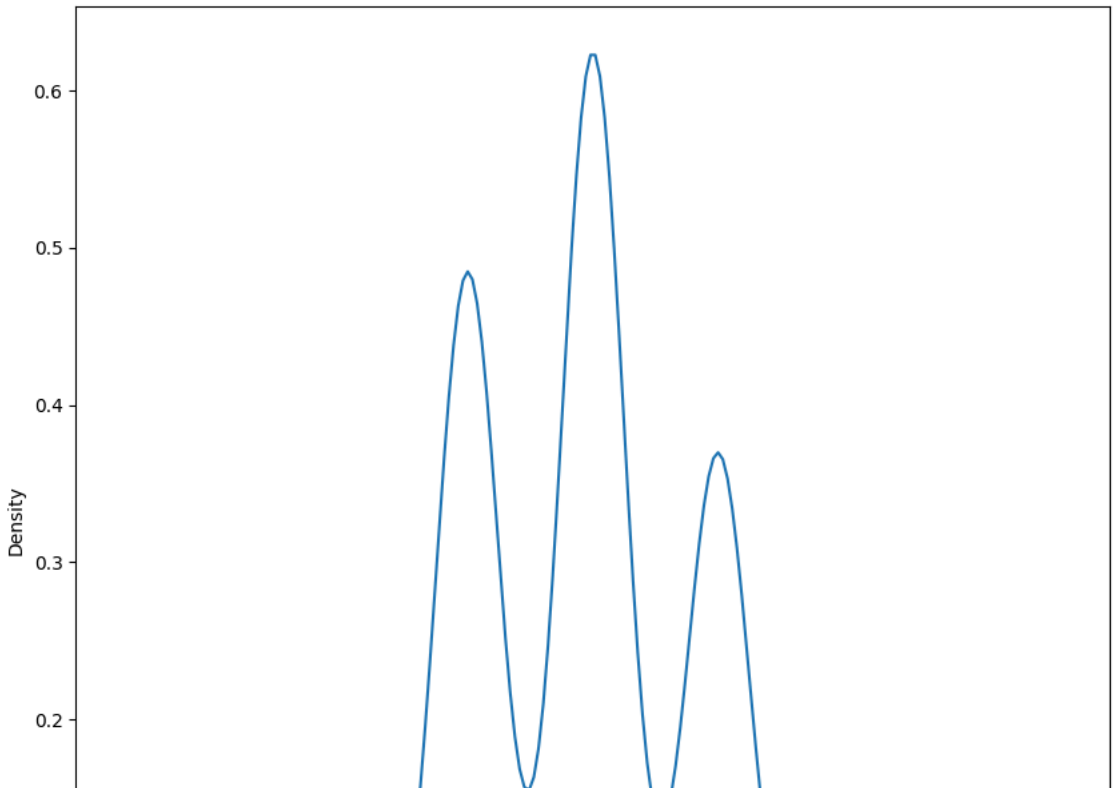


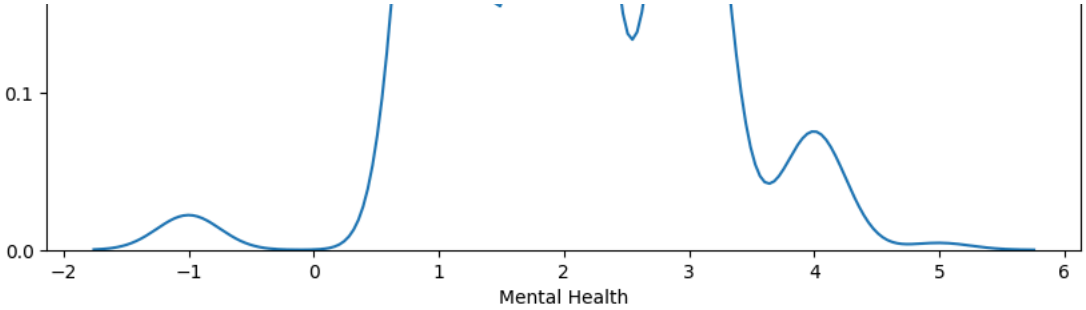

```
<ipython-input-15-8369a3293a54>:3: UserWarning: Dataset has 0 variance; skipping density estimate. Pass `warn_singular=False` to dis
  sns.kdeplot(data=df, x=i)
```

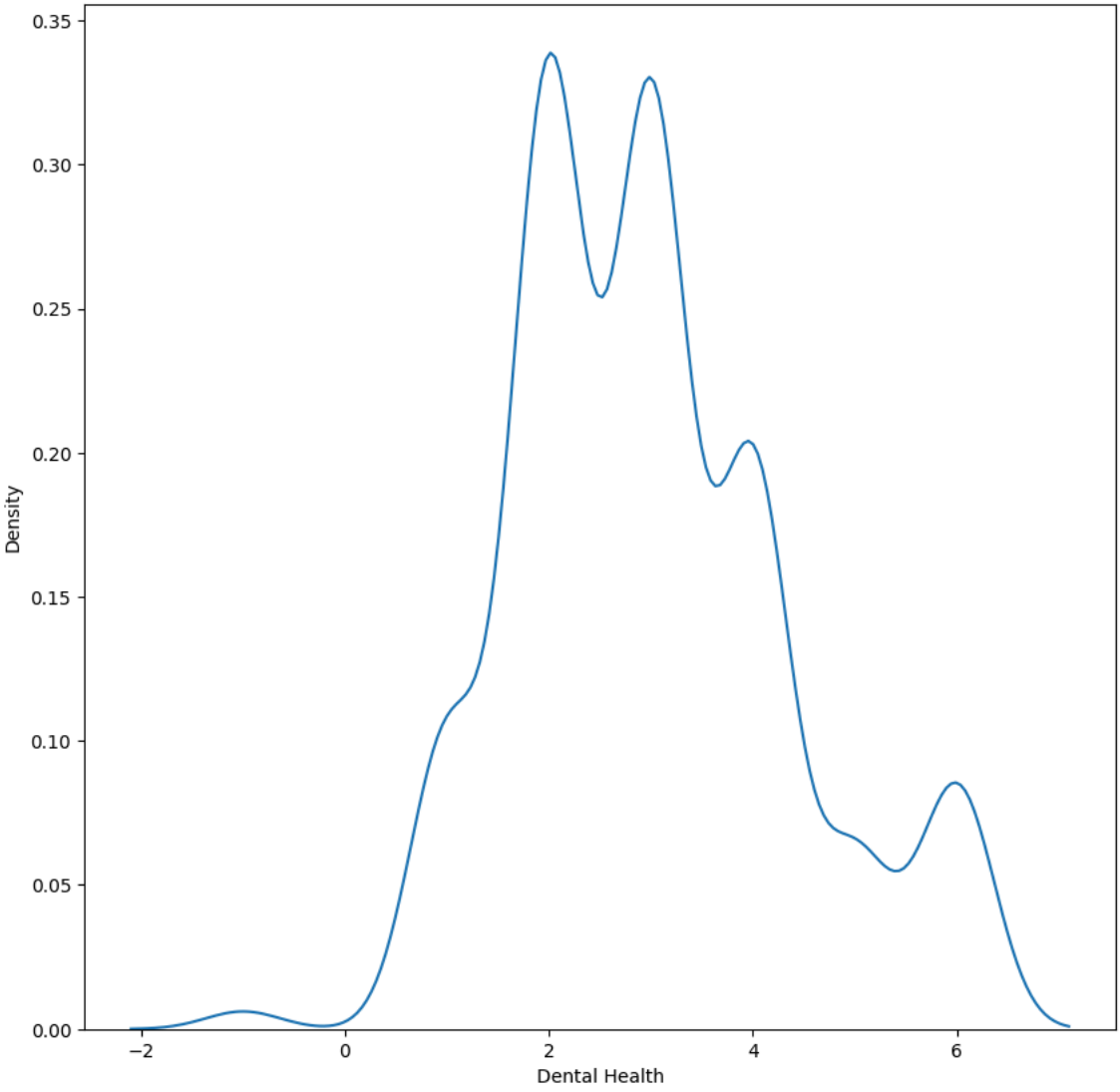



0.0
0.0
0.2
0.4
0.6
0.8
1.0
Age


0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Density
−2
−1
0
1
2
3
4
5
6
Phyiscal Health


0.6
0.5
0.4
0.3
0.2
Density


0.1
0.0
−2
−1
0
1
2
3
4
5
6
Mental Health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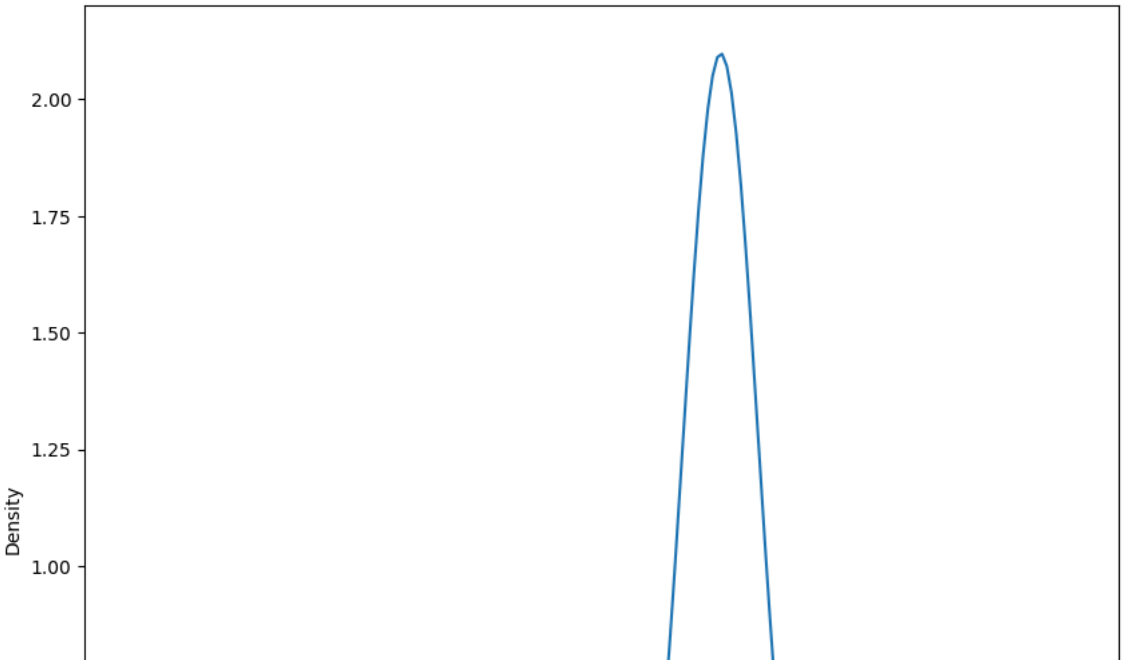
4
6
Dental Health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1.50
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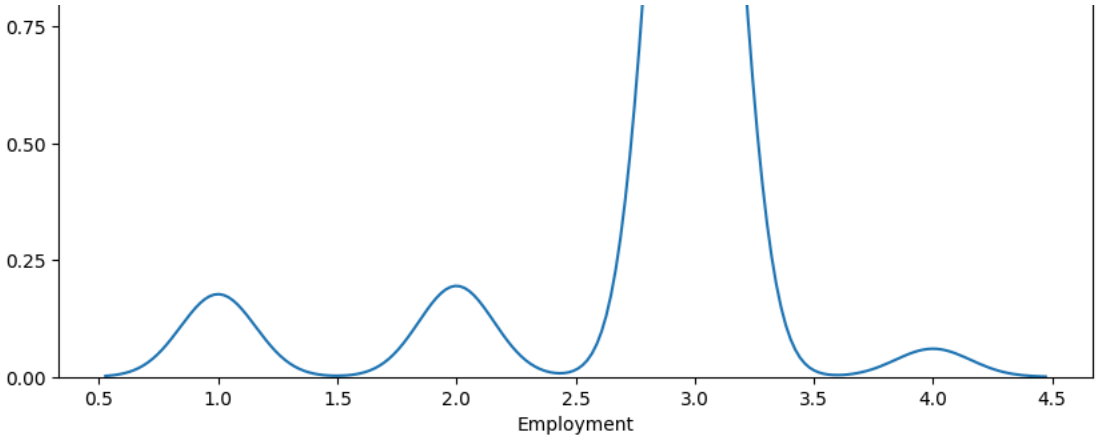
1.00
Density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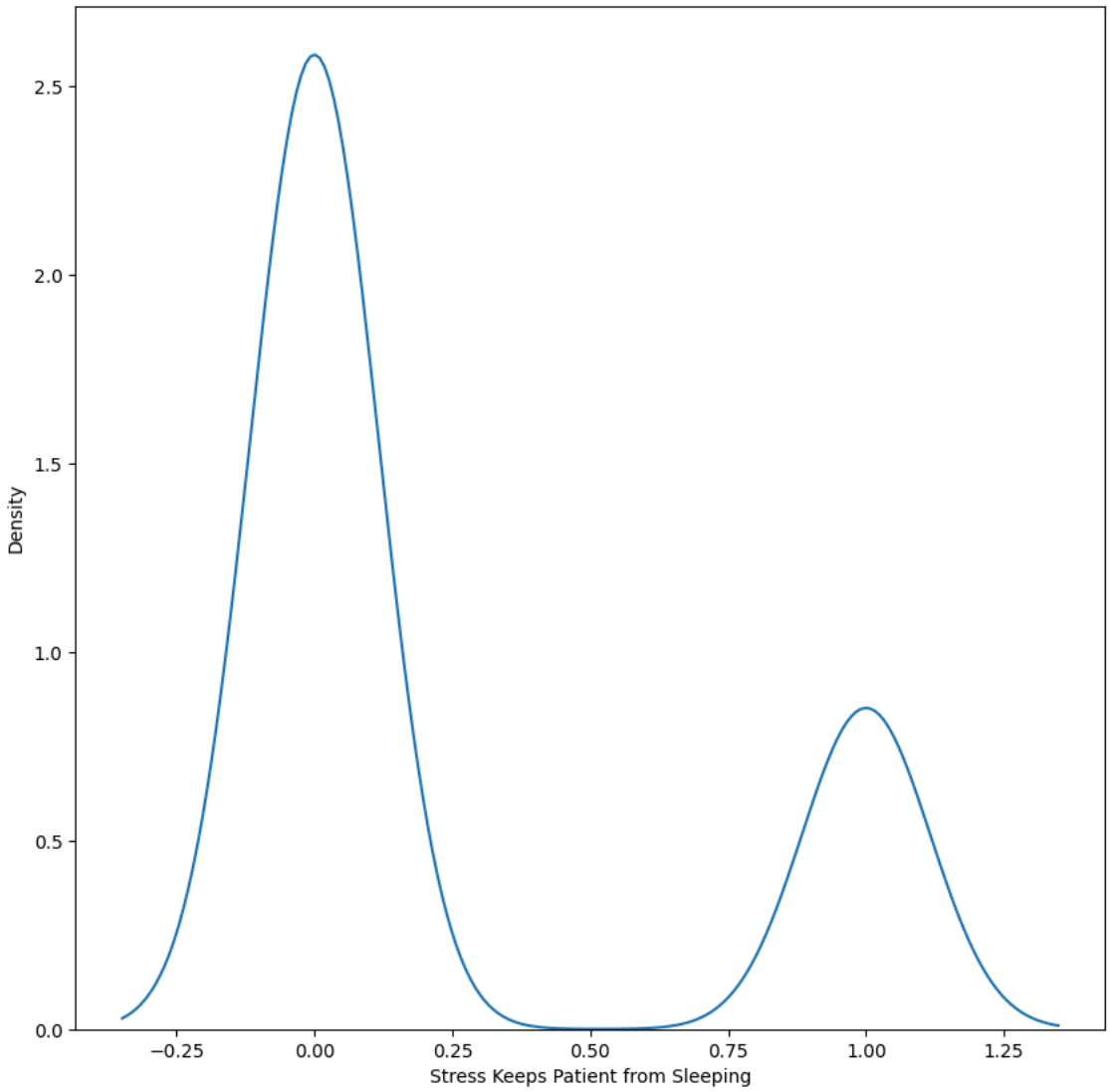
4.5
Employment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Density
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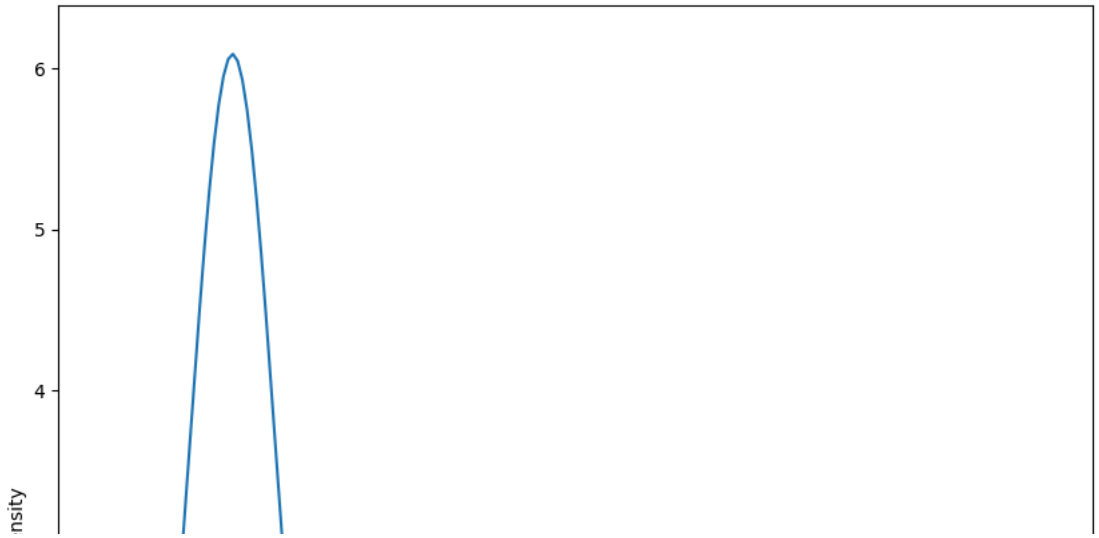
1.25
Stress Keeps Patient from Sleeping


6
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4
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