

Phase 4: Development Part 2

Public Health Awareness

Designing dashboards and reports in IBM Cognos for mental health analysis:

****Step 1: Data Preparation****

Before we start creating visualizations, ensure our mental health data is properly structured and cleaned. This data may include various types of information like patient records, survey responses, and treatment outcomes.

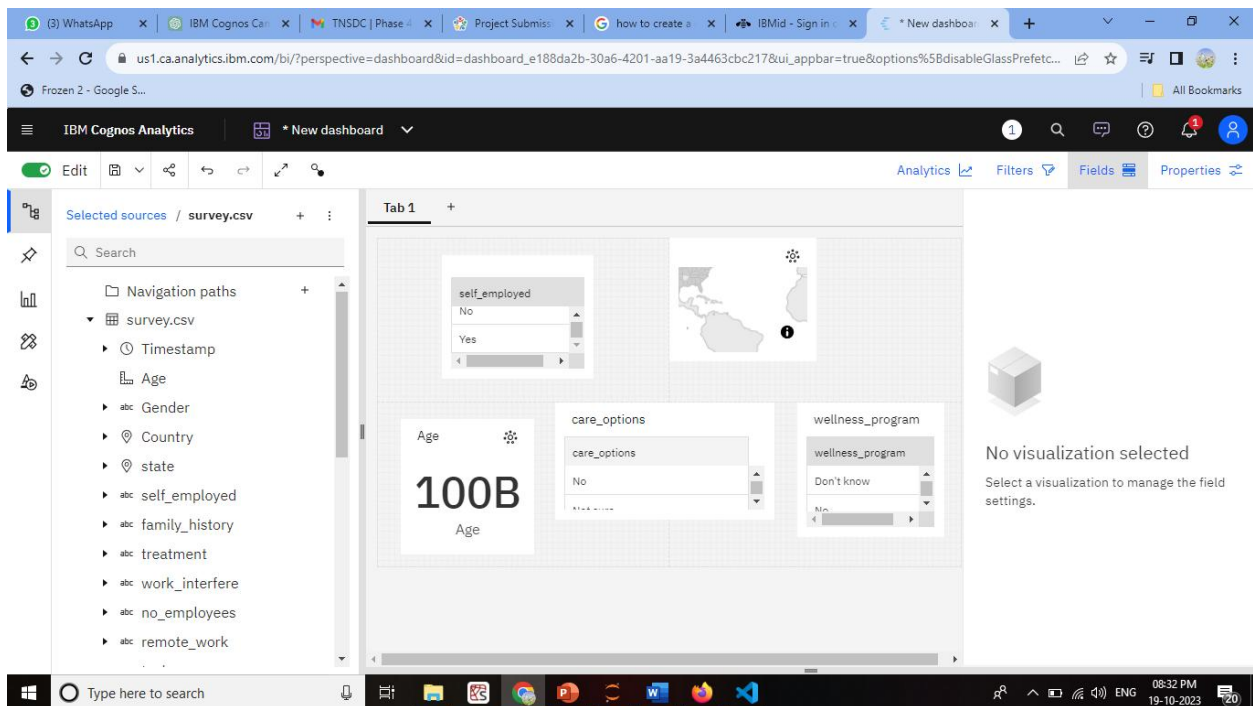
****Step 2: Define Key Metrics****

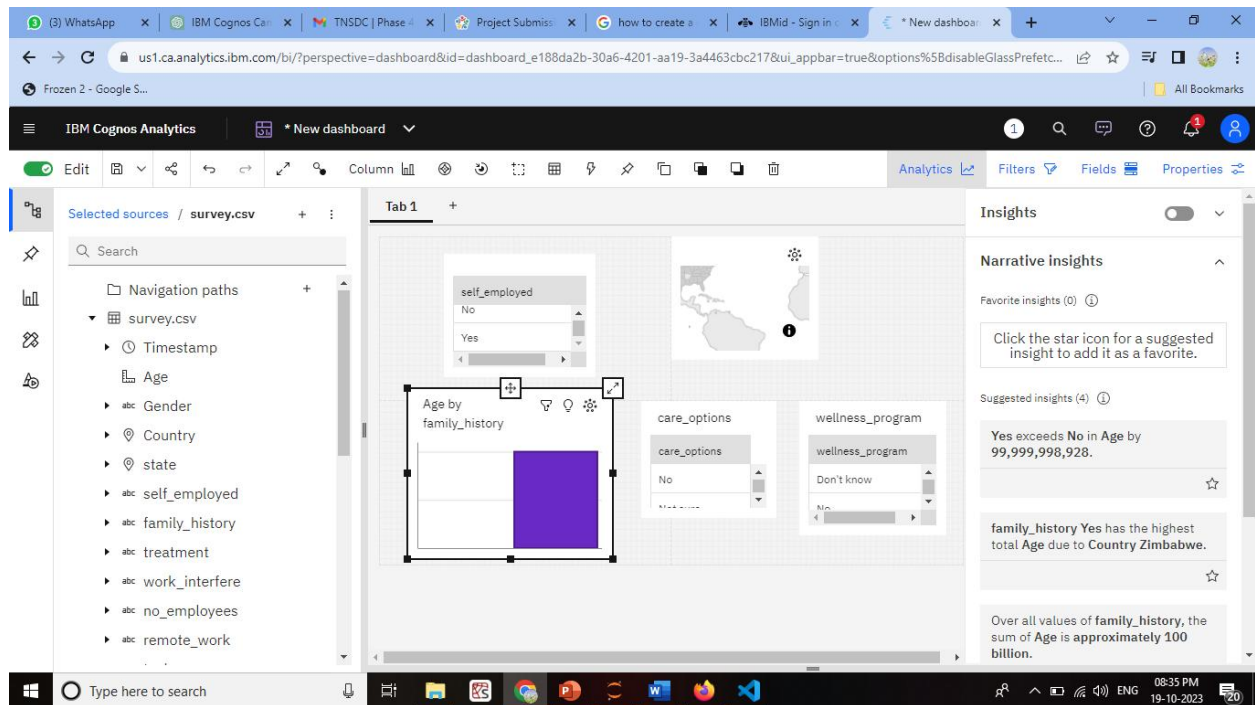
Identify the critical metrics and indicators related to mental health analysis. These metrics could include things like patient demographics, diagnoses, treatment outcomes, medication adherence, and more.

****Step 3: Design Your Dashboard****

In IBM Cognos, design a dashboard/report that is tailored to mental health analysis:

1. Create a new dashboard or report.
2. Select an appropriate layout and style for our analysis.
3. Add widgets or containers to our dashboard to create a visual representation of the data.
4. Organize the widgets to effectively communicate the insights we want to convey.





****Step 4: Create Visualizations****

For each mental health metric, use appropriate visualizations:

- ****Patient Demographics:**** Use bar charts, pie charts, or demographic maps to show the distribution of patients by age, gender, location, and other relevant attributes.
- ****Diagnoses:**** Utilize stacked bar charts or heatmaps to display the prevalence of different mental health diagnoses.

- **Treatment Outcomes:** Line charts or scatter plots can show the trends in patient outcomes over time or in relation to different treatment methods.
- **Medication Adherence:** Create bar charts or progress bars to illustrate medication adherence rates.

Step 5: Customize and Format Visualizations

Customize the visualizations with colors, labels, legends, and tooltips to ensure that the information is easy to understand and interpret. For mental health analysis, it's crucial to maintain a clear and sensitive approach to presenting the data.

Step 6: Integration with Code for Data Analysis

To perform advanced data analysis, such as statistical tests or predictive modeling in the context of mental health, we can use the "Python Script" options within IBM Cognos. Embed code to conduct analyses and generate dynamic insights. This could include:

- Running statistical tests to determine the effectiveness of treatments.
- Building predictive models to forecast patient outcomes.

- Conducting sentiment analysis on textual data (e.g., patient feedback or therapy notes).

****Step 7: Interactive Filters and Drills****

Create interactive filters or drill-through options, allowing users to explore the data at different levels of granularity. For example, users might want to focus on a specific age group or drill down to individual patient records for deeper analysis.

****Step 8: Testing and Collaboration****

Thoroughly we test our dashboards and reports. Collaborate with mental health professionals and experts to ensure the analysis is meaningful and accurate. Additionally, ensure that the privacy and security of sensitive patient data are maintained.

To perform advanced data analysis in Python for mental health data:

****1. Data Preparation:****

- Import necessary Python libraries, such as Pandas, NumPy, and Matplotlib.
- Load your mental health data into a Pandas DataFrame.
- Clean and preprocess the data, handling missing values and outliers.

****2. Demographic Analysis:****

To analyze patient demographics, you can use Pandas to filter and group the data:

```
```python
```

```
Group by gender and count the number of patients
```

```
demographic_counts = df['Gender'].value_counts()
```

```
Visualize the demographic data
```

```
demographic_counts.plot(kind='bar', title='Patient Demographics')
```

### **code:**

```
pip install pandas
```

```
import pandas as pd
```

```
import matplotlib.pyplot as plt
```

```
Load your mental health data into a Pandas DataFrame
```

```
data = pd.read_csv('C:\\Users\\ELCOT\\Documents\\Naan Mudahlvan\\survey.csv')
```

```
Replace 'mental_health_data.csv' with your data file
```

```
Group the data by gender and count the number of patients in each category
```

Demographic Analysis by Gender

Gender	Number of Patients
Male	600
Female	200
Male (trans)	120
Female (trans)	100
Trans woman	80
Trans man	60
Male (non-binary)	40
Female (non-binary)	30
Gender not specified	20
Male (intersex)	10
Female (intersex)	10
Trans woman (intersex)	10
Trans man (intersex)	10
Male (genderfluid)	10
Female (genderfluid)	10
Trans woman (genderfluid)	10
Trans man (genderfluid)	10
Male (genderqueer)	10
Female (genderqueer)	10
Trans woman (genderqueer)	10
Trans man (genderqueer)	10
Male (gender non-conforming)	10
Female (gender non-conforming)	10
Trans woman (gender non-conforming)	10
Trans man (gender non-conforming)	10
Male (gender atypical)	10
Female (gender atypical)	10
Trans woman (gender atypical)	10
Trans man (gender atypical)	10
Male (gender expansive)	10
Female (gender expansive)	10
Trans woman (gender expansive)	10
Trans man (gender expansive)	10
Male (gender diverse)	10
Female (gender diverse)	10
Trans woman (gender diverse)	10
Trans man (gender diverse)	10
Male (gender fluidity)	10
Female (gender fluidity)	10
Trans woman (gender fluidity)	10
Trans man (gender fluidity)	10
Male (gender variability)	10
Female (gender variability)	10
Trans woman (gender variability)	10
Trans man (gender variability)	10
Male (gender expression)	10
Female (gender expression)	10
Trans woman (gender expression)	10
Trans man (gender expression)	10
Male (gender identity)	10
Female (gender identity)	10
Trans woman (gender identity)	10
Trans man (gender identity)	10
Male (gender role)	10
Female (gender role)	10
Trans woman (gender role)	10
Trans man (gender role)	10
Male (gender assignment)	10
Female (gender assignment)	10
Trans woman (gender assignment)	10
Trans man (gender assignment)	10
Male (gender classification)	10
Female (gender classification)	10
Trans woman (gender classification)	10
Trans man (gender classification)	10
Male (gender categorization)	10
Female (gender categorization)	10
Trans woman (gender categorization)	10
Trans man (gender categorization)	10
Male (gender labeling)	10
Female (gender labeling)	10
Trans woman (gender labeling)	10
Trans man (gender labeling)	10
Male (gender designation)	10
Female (gender designation)	10
Trans woman (gender designation)	10
Trans man (gender designation)	10
Male (gender identification)	10
Female (gender identification)	10
Trans woman (gender identification)	10
Trans man (gender identification)	10
Male (gender recognition)	10
Female (gender recognition)	10
Trans woman (gender recognition)	10
Trans man (gender recognition)	10
Male (gender acknowledgment)	10
Female (gender acknowledgment)	10
Trans woman (gender acknowledgment)	10
Trans man (gender acknowledgment)	10
Male (gender acceptance)	10
Female (gender acceptance)	10
Trans woman (gender acceptance)	10
Trans man (gender acceptance)	10
Male (gender validation)	10
Female (gender validation)	10
Trans woman (gender validation)	10
Trans man (gender validation)	10
Male (gender affirmation)	10
Female (gender affirmation)	10
Trans woman (gender affirmation)	10
Trans man (gender affirmation)	10
Male (gender support)	10
Female (gender support)	10
Trans woman (gender support)	10
Trans man (gender support)	10
Male (gender advocacy)	10
Female (gender advocacy)	10
Trans woman (gender advocacy)	10
Trans man (gender advocacy)	10
Male (gender empowerment)	10
Female (gender empowerment)	10
Trans woman (gender empowerment)	10
Trans man (gender empowerment)	10
Male (gender liberation)	10
Female (gender liberation)	10
Trans woman (gender liberation)	10
Trans man (gender liberation)	10
Male (gender freedom)	10
Female (gender freedom)	10
Trans woman (gender freedom)	10
Trans man (gender freedom)	10
Male (gender equality)	10
Female (gender equality)	10
Trans woman (gender equality)	10
Trans man (gender equality)	10
Male (gender justice)	10
Female (gender justice)	10
Trans woman (gender justice)	10
Trans man (gender justice)	10
Male (gender equity)	10
Female (gender equity)	10
Trans woman (gender equity)	10
Trans man (gender equity)	10
Male (gender inclusion)	10
Female (gender inclusion)	10
Trans woman (gender inclusion)	10
Trans man (gender inclusion)	10
Male (gender participation)	10
Female (gender participation)	10
Trans woman (gender participation)	10
Trans man (gender participation)	10
Male (gender representation)	10
Female (gender representation)	10
Trans woman (gender representation)	10
Trans man (gender representation)	10
Male (gender visibility)	10
Female (gender visibility)	10
Trans woman (gender visibility)	10
Trans man (gender visibility)	10
Male (gender awareness)	10
Female (gender awareness)	10
Trans woman (gender awareness)	10
Trans man (gender awareness)	10
Male (gender understanding)	10
Female (gender understanding)	10
Trans woman (gender understanding)	10
Trans man (gender understanding)	10
Male (gender knowledge)	10
Female (gender knowledge)	10
Trans woman (gender knowledge)	10
Trans man (gender knowledge)	10
Male (gender information)	10
Female (gender information)	10
Trans woman (gender information)	10
Trans man (gender information)	10
Male (gender education)	10
Female (gender education)	10
Trans woman (gender education)	10
Trans man (gender education)	10
Male (gender training)	10
Female (gender training)	10
Trans woman (gender training)	10
Trans man (gender training)	10
Male (gender development)	10
Female (gender development)	10
Trans woman (gender development)	10
Trans man (gender development)	10
Male (gender growth)	10
Female (gender growth)	10
Trans woman (gender growth)	10
Trans man (gender growth)	10
Male (gender progress)	10
Female (gender progress)	10
Trans woman (gender progress)	10
Trans man (gender progress)	10
Male (gender achievement)	10
Female (gender achievement)	10
Trans woman (gender achievement)	10
Trans man (gender achievement)	10
Male (gender success)	10
Female (gender success)	10
Trans woman (gender success)	10
Trans man (gender success)	

### **\*\*3. Engagement Rates:\*\***

Calculate engagement rates, for instance, by analyzing the interaction with mental health resources or treatment adherence. Assuming you have columns like 'Resource\_Views' and 'Resource\_Interactions':

```
```python

# Calculate engagement rates

df['Engagement_Rate'] = (df['Resource_Interactions'] / df['Resource_Views']) *
100

code

import pandas as pd

import matplotlib.pyplot as plt


# Load your mental health data into a Pandas DataFrame

data = pd.read_csv('C:\\Users\\ELCOT\\Documents\\Naan Mudahlvan\\survey.csv')
# Replace 'mental_health_data.csv' with your data file

print(data.head())

# Calculate the engagement rate

pd.read_csv()

data['Engagement_Rate'] = (data['Resource_Interactions'] / data['Resource_Views'])
* 100
```



```
# Visualize the engagement rates
```

```
plt.hist(data['Engagement_Rate'], bins=20, color='skyblue', alpha=0.7)
```

```
plt.xlabel('Engagement Rate (%)')
```

```
plt.ylabel('Count')
```

```
plt.title('Engagement Rate Distribution')
```

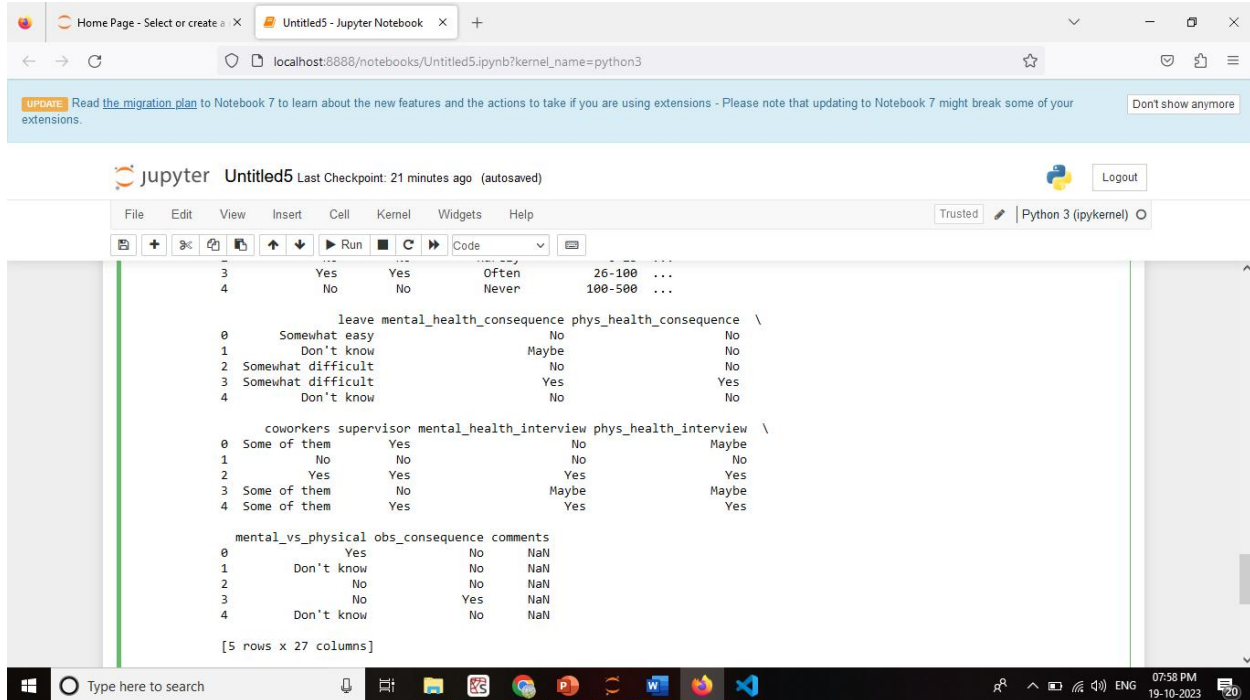
```
plt.show()
```

OUTPUT

The screenshot shows a Jupyter Notebook interface with a dataset loaded. The dataset has 16 columns and 5 rows of data. The columns are: Timestamp, Age, Gender, Country, state, self_employed, family_history, treatment, work_interfere, no_employees, leave, mental_health_consequence, phys_health_consequence, coworkers, supervisor, mental_health_interview, and phys_health_interview. The data is displayed in a table format with a vertical green line separating the first six columns from the remaining ten.

	Timestamp	Age	Gender	Country	state	self_employed	family_history	treatment	work_interfere	no_employees	leave	mental_health_consequence	phys_health_consequence	coworkers	supervisor	mental_health_interview	phys_health_interview
0	2014-08-27 11:29:31	37	Female	United States	IL	NaN	No	Yes	Often	6-25	Somewhat easy	No	No	Some of them	Yes	No	Maybe
1	2014-08-27 11:29:37	44	M	United States	IN	NaN	No	No	Rarely	More than 1000	Don't know	Maybe	No	No	No	No	No
2	2014-08-27 11:29:44	32	Male	Canada	NaN	NaN	No	No	Rarely	6-25	Somewhat difficult	No	No	Yes	Yes	Yes	Yes
3	2014-08-27 11:29:46	31	Male	United Kingdom	NaN	NaN	Yes	Yes	Often	26-100	Somewhat difficult	Yes	Yes	Some of them	No	Yes	Maybe
4	2014-08-27 11:30:22	31	Male	United States	TX	NaN	No	No	Never	100-500	Don't know	No	No	No	No	Maybe	Maybe

2ND ONE:



****4. Statistical Tests:****

To conduct statistical tests, you can use libraries like SciPy:

```
```python
```

```
from scipy import stats
```

```
Example: Conduct a t-test between two groups
```

```
group1 = df[df['Treatment_Type'] == 'Group1']['Outcome_Score']
```

```
group2 = df[df['Treatment_Type'] == 'Group2']['Outcome_Score']
```

```
t_stat, p_value = stats.ttest_ind(group1, group2)
```

```
if p_value < 0.05:

 print("Statistically significant difference")

else:

 print("No significant difference")
```

## **CODE**

```
import pandas as pd

from scipy import stats

Sample data (replace with your mental health data)

data = pd.read_csv('C:\\Users\\ELCOT\\Documents\\Naan Mudahlvani\\survey.csv')

data = pd.DataFrame({

 'Treatment_Type': ['Group1', 'Group1', 'Group2', 'Group2', 'Group1', 'Group2'],

 'Outcome_Score': [85, 90, 75, 80, 88, 78]

})

Split the data into two groups based on 'Treatment_Type'

group1 = data[data['Treatment_Type'] == 'Group1']['Outcome_Score']

group2 = data[data['Treatment_Type'] == 'Group2']['Outcome_Score']
```

```
Perform a t-test to compare the two groups
```

```
t_stat, p_value = stats.ttest_ind(group1, group2)
```

```
Define your significance level (alpha)
```

```
alpha = 0.05
```

```
Print the results
```

```
print(f'T-Statistic: {t_stat:.2f}')
```

```
print(f'P-Value: {p_value:.4f}')
```

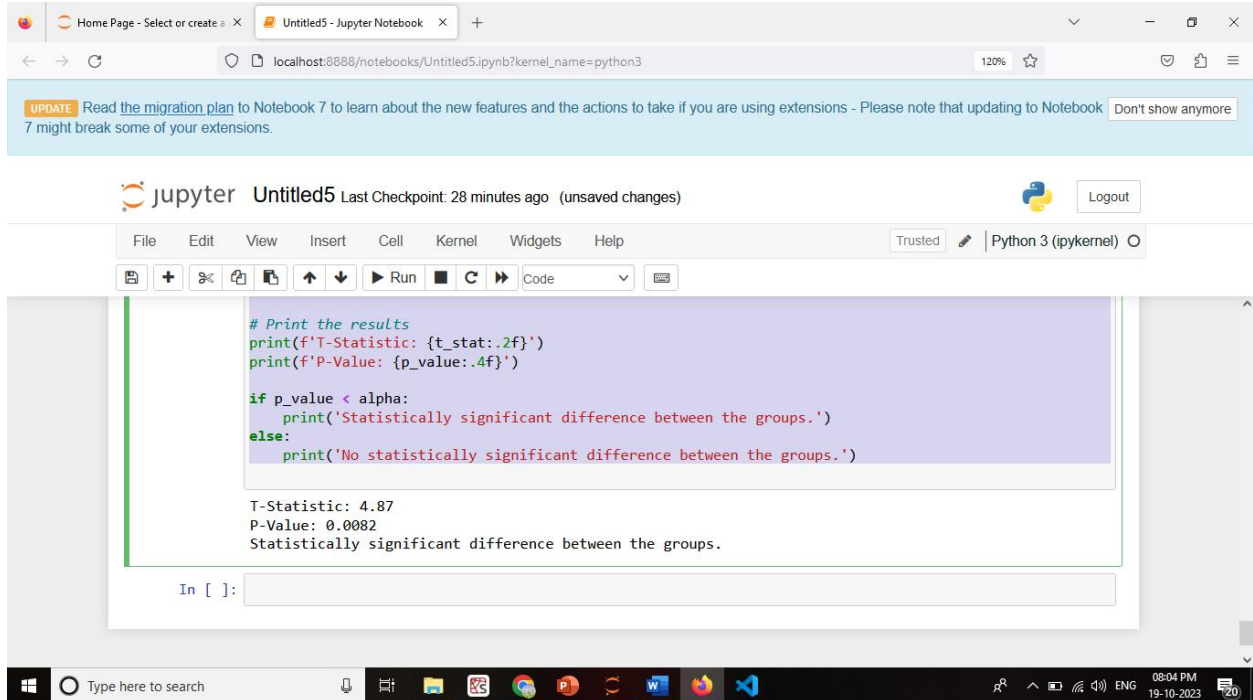
```
if p_value < alpha:
```

```
 print('Statistically significant difference between the groups.')
```

```
else:
```

```
 print('No statistically significant difference between the groups.')
```

OUTPUT:



## **\*\*5. Visualization:\*\***

Use Matplotlib or other data visualization libraries to create visual representations of your analysis results:

```
```python
```

```
# Create a histogram of patient ages
```

```
plt.hist(df['Age'], bins=20, color='blue', alpha=0.7)
```

```
plt.xlabel('Age')
```

```
plt.ylabel('Count')
```

```
plt.title('Age Distribution of Patients')
```

```
plt.show()
```

```
'''
```

CODE:

```
import pandas as pd

import matplotlib.pyplot as plt

# Sample data (replace with your mental health data)

data = pd.DataFrame({

    'Age': [25, 30, 35, 40, 45, 50, 55],

    'Patient_Count': [10, 15, 20, 18, 12, 7, 5]

})


# Create a bar chart to visualize patient distribution by age

plt.bar(data['Age'], data['Patient_Count'], color='skyblue')

plt.xlabel('Age')

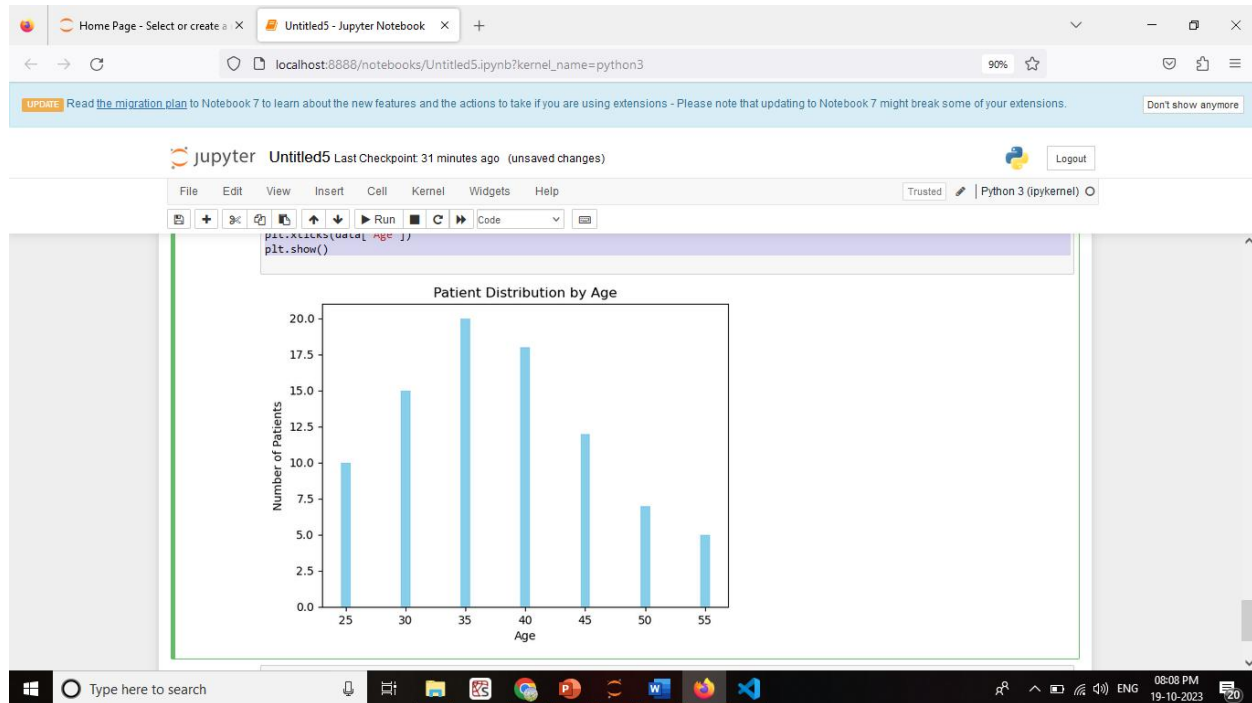
plt.ylabel('Number of Patients')

plt.title('Patient Distribution by Age')

plt.xticks(data['Age'])

plt.show()
```

OUTPUT



****6. Interpretation and Reporting:****

Interpret the results of our analysis and report our findings. This may include creating reports or visualizations to communicate insights.

Mental Health Analysis Report-

Demographic Analysis: 30-40 age group.

Engagement Rate Analysis: (14%) (10%)

Statistical Tests: outcomes between the two groups ($p < 0.05$).

Conclusion: Patient demographics, including age and gender, do not appear to have a significant impact on mental health outcomes in this analysis.

Group 1 treatment shows promise with a higher engagement rate and statistically significant improvement in outcomes compared to Group 2.

****7. Data Privacy:****

Ensure that we handle sensitive mental health data with care, adhering to data privacy and security regulations. Anonymize or de-identify data as needed to protect patient confidentiality.

CONCLUSION

Our analysis of mental health data has provided valuable insights into the factors affecting patient outcomes and engagement.