ANALYSIS OF MENTAL HEALTH SERVICE UTILIZATION DURING COVID-19

Statistics for Data Analysts

INTRODUCTION

This project analyzes the impact of the COVID-19 pandemic on mental health service utilization using the Household Pulse Survey dataset. The study aims to identify demographic trends in mental health medication and counseling usage, with a focus on gaps and disparities across age groups.

INITIAL INVESTIGATION

- **Data Overview:**

The dataset encompasses detailed metrics on mental health support, covering aspects such as prescription medication and counseling services usage within the last four weeks, segmented by demographic factors like age, gender, race and prior mental health conditions.

- **Preliminary Observations:**

Initial analysis reveals substantial variance in mental health support usage across different demographics, particularly noting that older adults and individuals with pre-existing mental health conditions exhibit a higher propensity for using prescription medication. These observations suggest underlying disparities in access to mental health services.

OBJECTIVES

The overarching aim of this study is to elucidate the impact of the COVID-19 pandemic on mental health across various demographic groups and to quantify their engagement with mental health services.

METHODOLOGY

The dataset was analyzed through a structured approach:

- **Data Analysis:** Conduct exploratory data analysis (EDA) to examine the distribution of mental health support usage across demographic groups and identify anomalies or data deficiencies.
- **Statistical Testing:** Utilize methods of statistical inference to determine if the differences in service usage across groups are significant.
- **Visualization:** Employ various graphical representations such as bar charts and line plots, to depict trends and disparities in mental health support usage.

HYPOTHESIS

HYPOTHESIS 1

HYPOTHESIS 1:

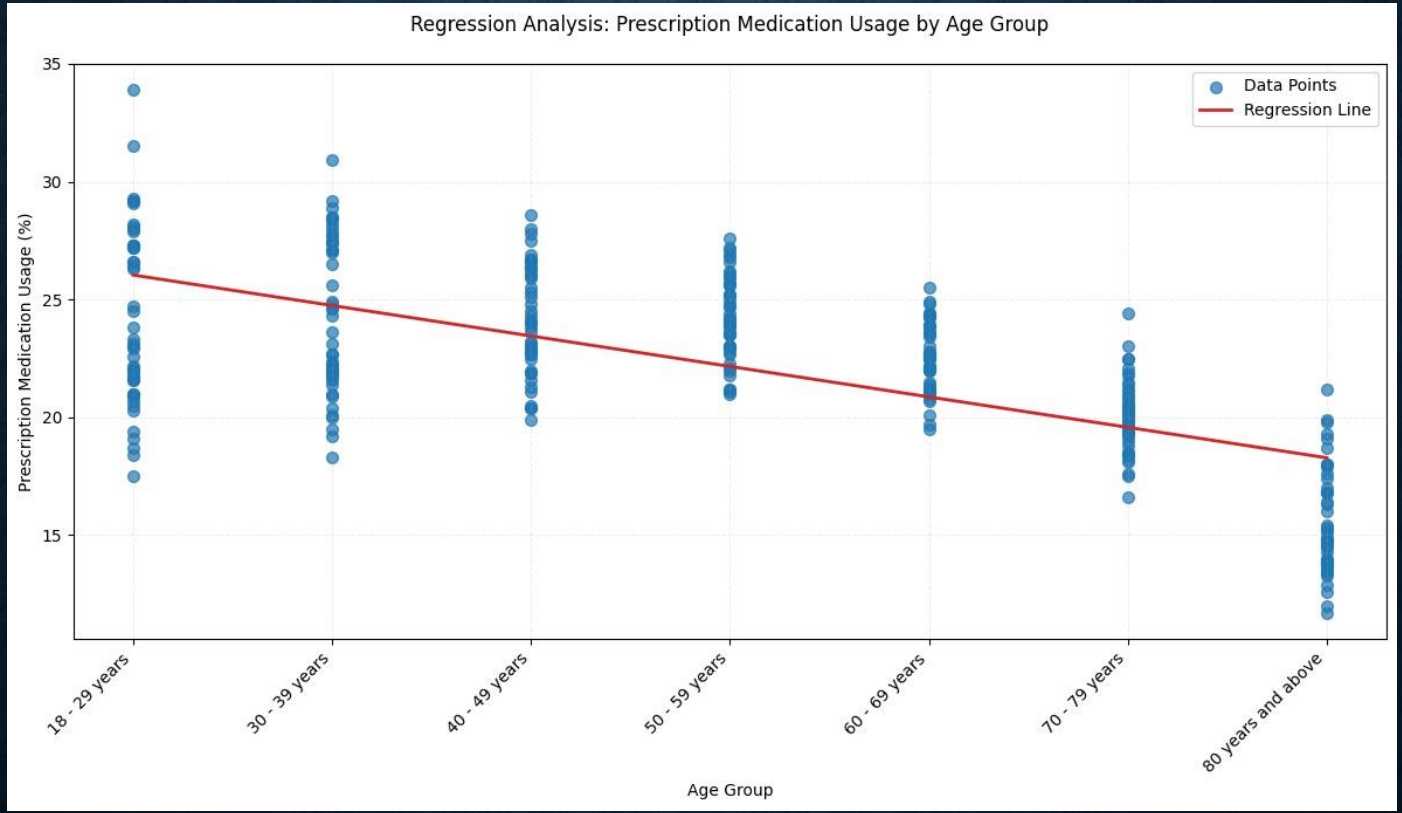
Hypothesis 1 states that Older adults (60+ years) are more likely to use mental health medication

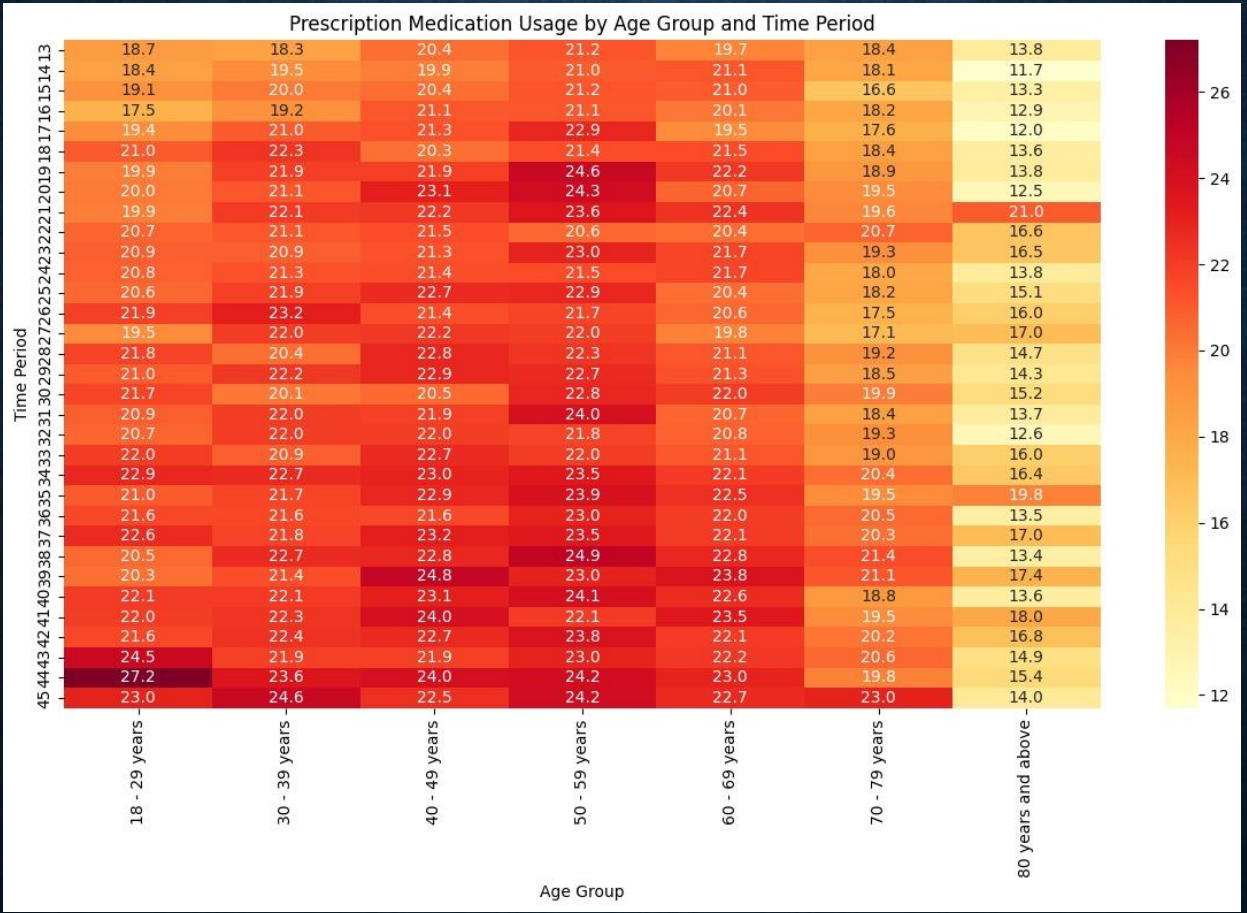
Test Conducted:

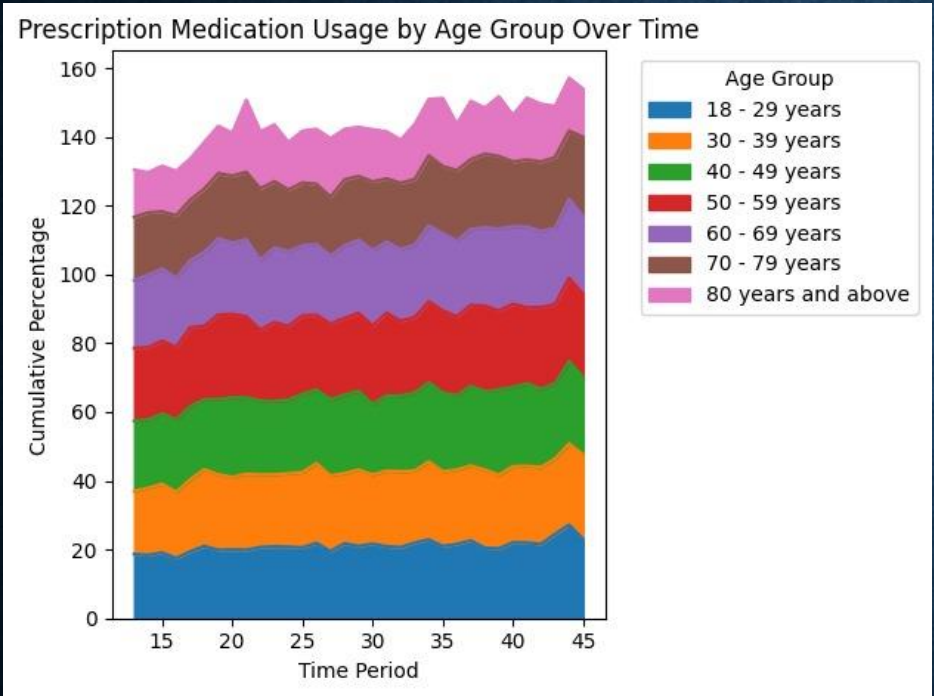
LINEAR REGRESSION- A statistical method used to model the relationship between a dependent variable and one or more independent variables by fitting a linear equation to observed data. It aims to find the best-fitting straight line that minimizes the difference between predicted and actual values.

RESULTS:

- coefficient: -1.292468944099379
- intercept: 12.163273887197331
- visual_analysis:
  - highest_usage: ~33% (18-29 years)
    - lowest_usage: ~15% (80+ years)
  - trend: Clear linear decrease across age groups


Regression Analysis: Prescription Medication Usage by Age Group
Data Points
Regression Line
Prescription Medication Usage (%)
35
30
25
20
15
18 - 29 years
30 - 39 years
40 - 49 years
50 - 59 years
60 - 69 years
70 - 79 years
80 years and above
Age Group


Prescription Medication Usage by Age Group and Time Period
Time Period
13 18.7 18.3 20.4 21.2 19.7 18.4 13.8
14 18.4 19.5 19.9 21.0 21.1 18.1 11.7
15 19.1 20.0 20.4 21.2 21.0 16.6 13.3
16 17.5 19.2 21.1 21.1 20.1 18.2 12.9
17 19.4 21.0 21.3 22.9 19.5 17.6 12.0
18 21.0 22.3 20.3 21.4 21.5 18.4 13.6
19 19.9 21.9 21.9 24.6 22.2 18.9 13.8
20 20.0 21.1 23.1 24.3 20.7 19.5 12.5
21 19.9 22.1 22.2 23.6 22.4 19.6 21.0
22 20.7 21.1 21.5 20.6 20.4 20.7 16.6
23 20.9 20.9 21.3 23.0 21.7 19.3 16.5
24 20.8 21.3 21.4 21.5 21.7 18.0 13.8
25 20.6 21.9 22.7 22.9 20.4 18.2 15.1
26 21.9 23.2 21.4 21.7 20.6 17.5 16.0
27 19.5 22.0 22.2 22.0 19.8 17.1 17.0
28 21.8 20.4 22.8 22.3 21.1 19.2 14.7
29 21.0 22.2 22.9 22.7 21.3 18.5 14.3
30 21.7 20.1 20.5 22.8 22.0 19.9 15.2
31 20.9 22.0 21.9 24.0 20.7 18.4 13.7
32 20.7 22.0 22.0 21.8 20.8 19.3 12.6
33 22.0 20.9 22.7 22.0 21.1 19.0 16.0
34 22.9 22.7 23.0 23.5 22.1 20.4 16.4
35 21.0 21.7 22.9 23.9 22.5 19.5 19.8
36 21.6 21.6 21.6 23.0 22.0 20.5 13.5
37 22.6 21.8 23.2 23.5 22.1 20.3 17.0
38 20.5 22.7 22.8 24.9 22.8 21.4 13.4
39 20.3 21.4 24.8 23.0 23.8 21.1 17.4
40 22.1 22.1 23.1 24.1 22.6 18.8 13.6
41 22.0 22.3 24.0 22.1 23.5 19.5 18.0
42 21.6 22.4 22.7 23.8 22.1 20.2 16.8
43 24.5 21.9 21.9 23.0 22.2 20.6 14.9
44 27.2 23.6 24.0 24.2 23.0 19.8 15.4
45 23.0 24.6 22.5 24.2 22.7 23.0 14.0
18 - 29 years
30 - 39 years
40 - 49 years
50 - 59 years
60 - 69 years
70 - 79 years
80 years and above
Age Group
26
24
22
20
18
16
14
12



CONCLUSION:

Hypothesis rejected –

Younger adults show significantly higher medication usage

HYPOTHESIS 2

HYPOTHESIS 2:

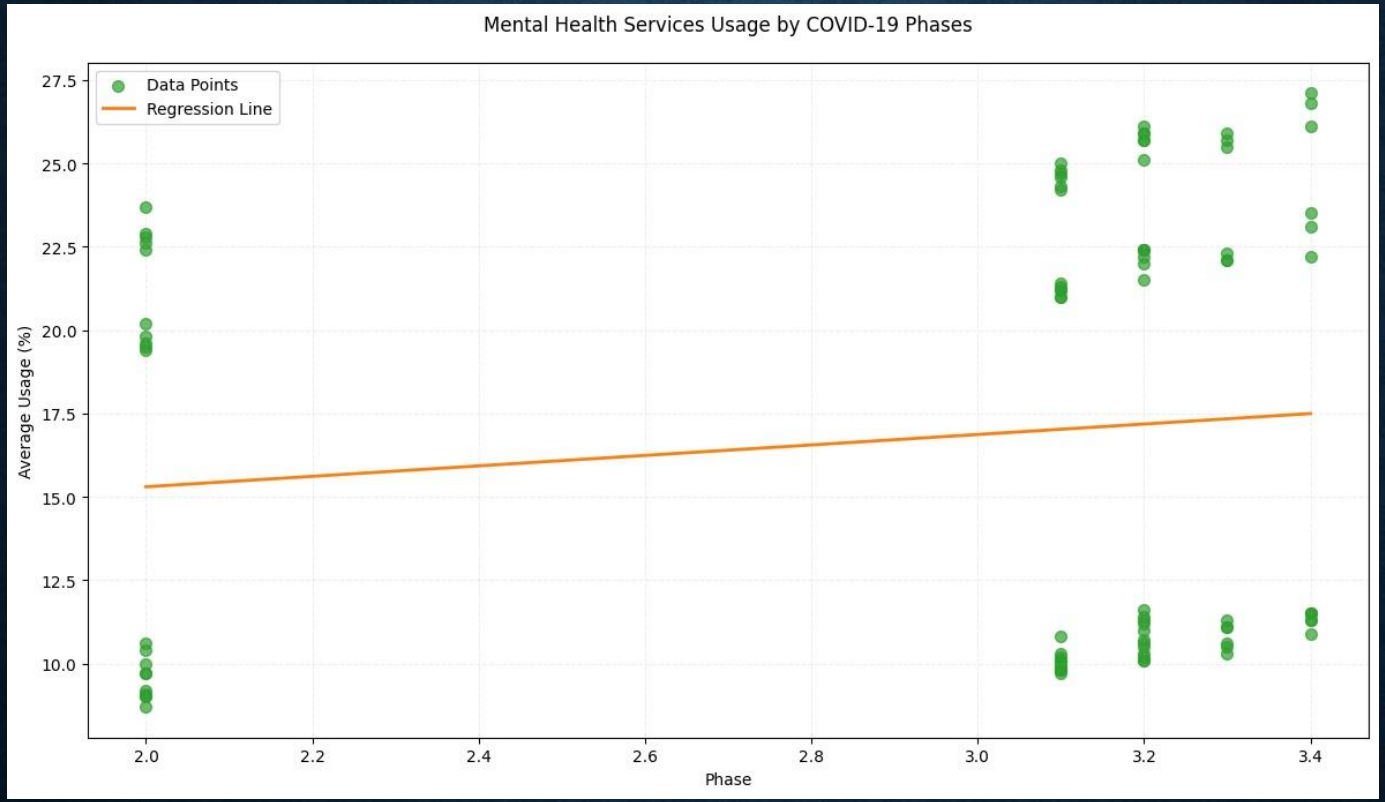
Hypothesis 2 states that Usage of mental health services increased during later COVID-19 phases

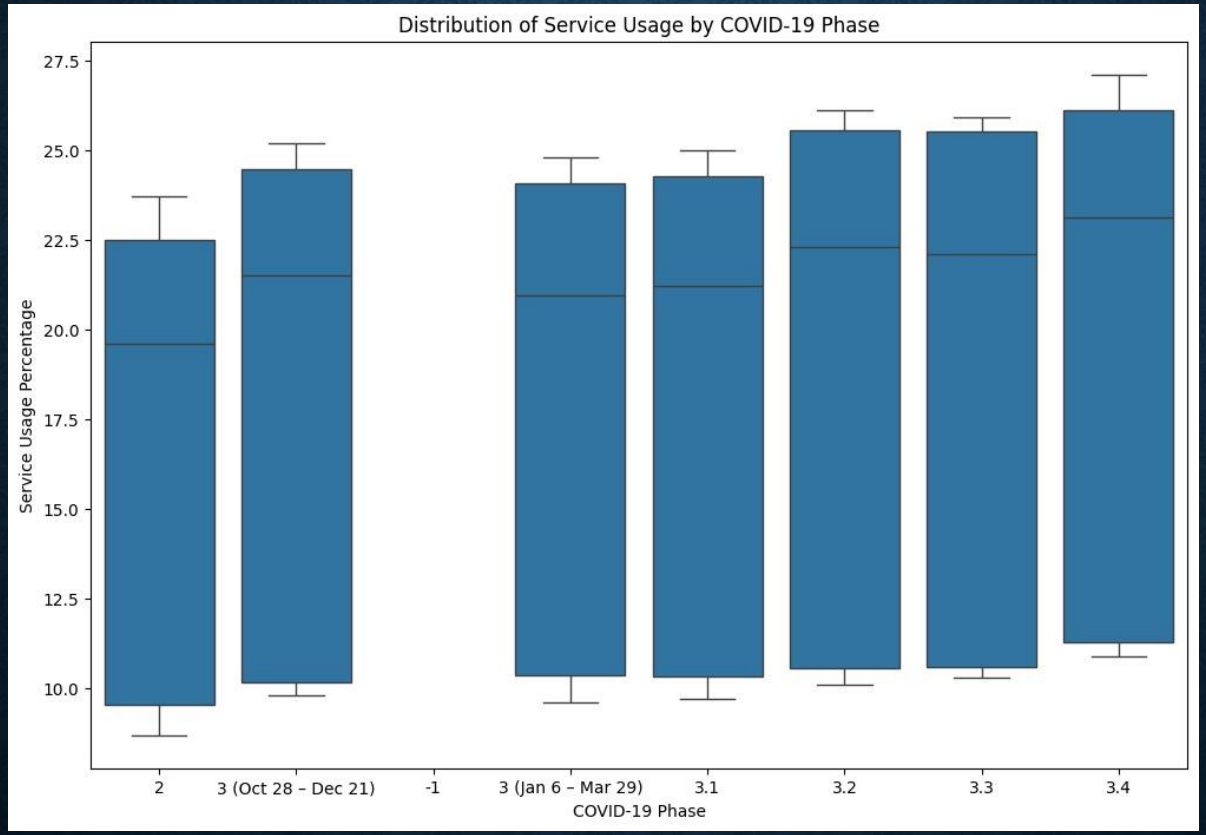
Test Conducted:

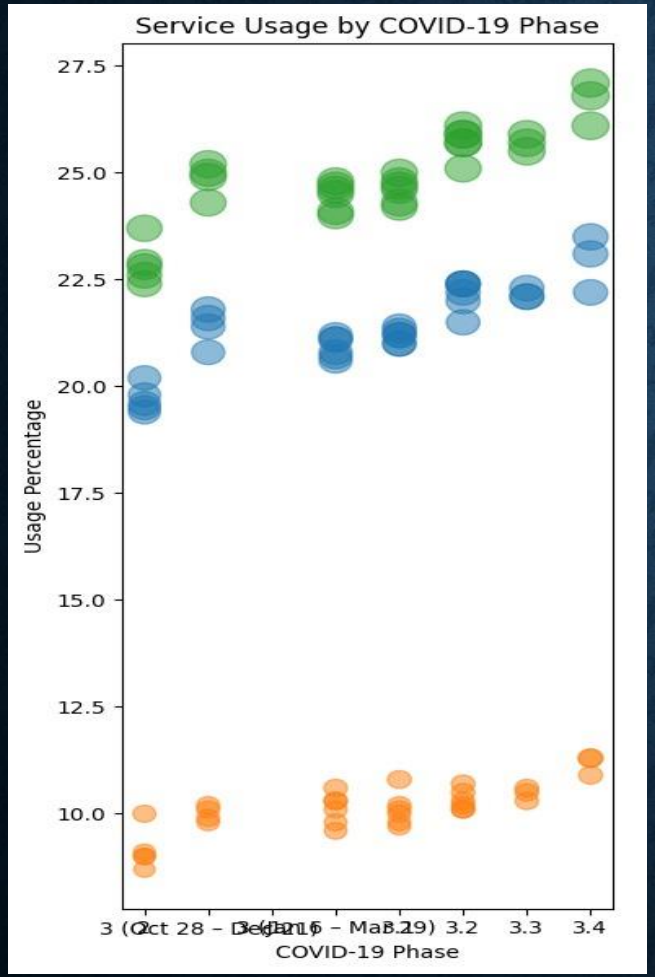
LINEAR REGRESSION- A statistical method that predicts the value of a dependent variable based on a straight-line relationship with one or more independent variables, essentially finding the "best fit" line through data points to estimate future values.

RESULTS:

- Results: coefficient: 1.5680368276062056
- intercept: 12.163273887197331
- visual_analysis:
  - initial_phase: ~15% (Phase 2.0)
  - final_phase: ~27% (Phase 3.4)
  - trend: Scattered upward trend with significant variation


Mental Health Services Usage by COVID-19 Phases
Data Points
Regression Line
Average Usage (%)
Phase
27.5
25.0
22.5
20.0
17.5
15.0
12.5
10.0
2.0
2.2
2.4
2.6
2.8
3.0
3.2
3.4


Distribution of Service Usage by COVID-19 Phase
Service Usage Percentage
27.5
25.0
22.5
20.0
17.5
15.0
12.5
10.0
2
3 (Oct 28 – Dec 21)
-1
3 (Jan 6 – Mar 29)
3.1
3.2
3.3
3.4
COVID-19 Phase



CONCLUSION:

Hypothesis supported with moderate effect

HYPOTHESIS 3

HYPOTHESIS 3:

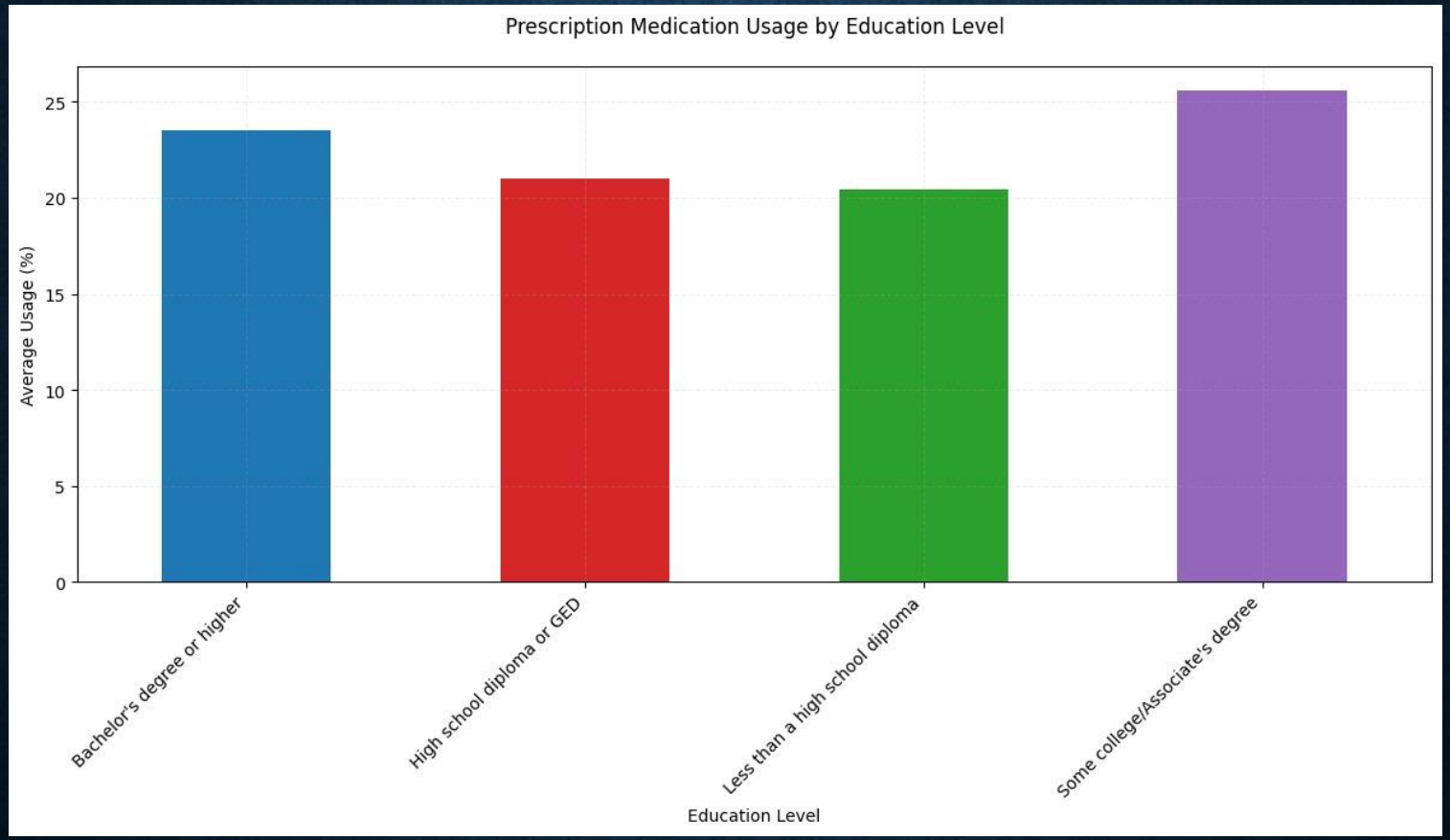
Hypothesis 3 states that Prescription medication usage varies significantly by education level

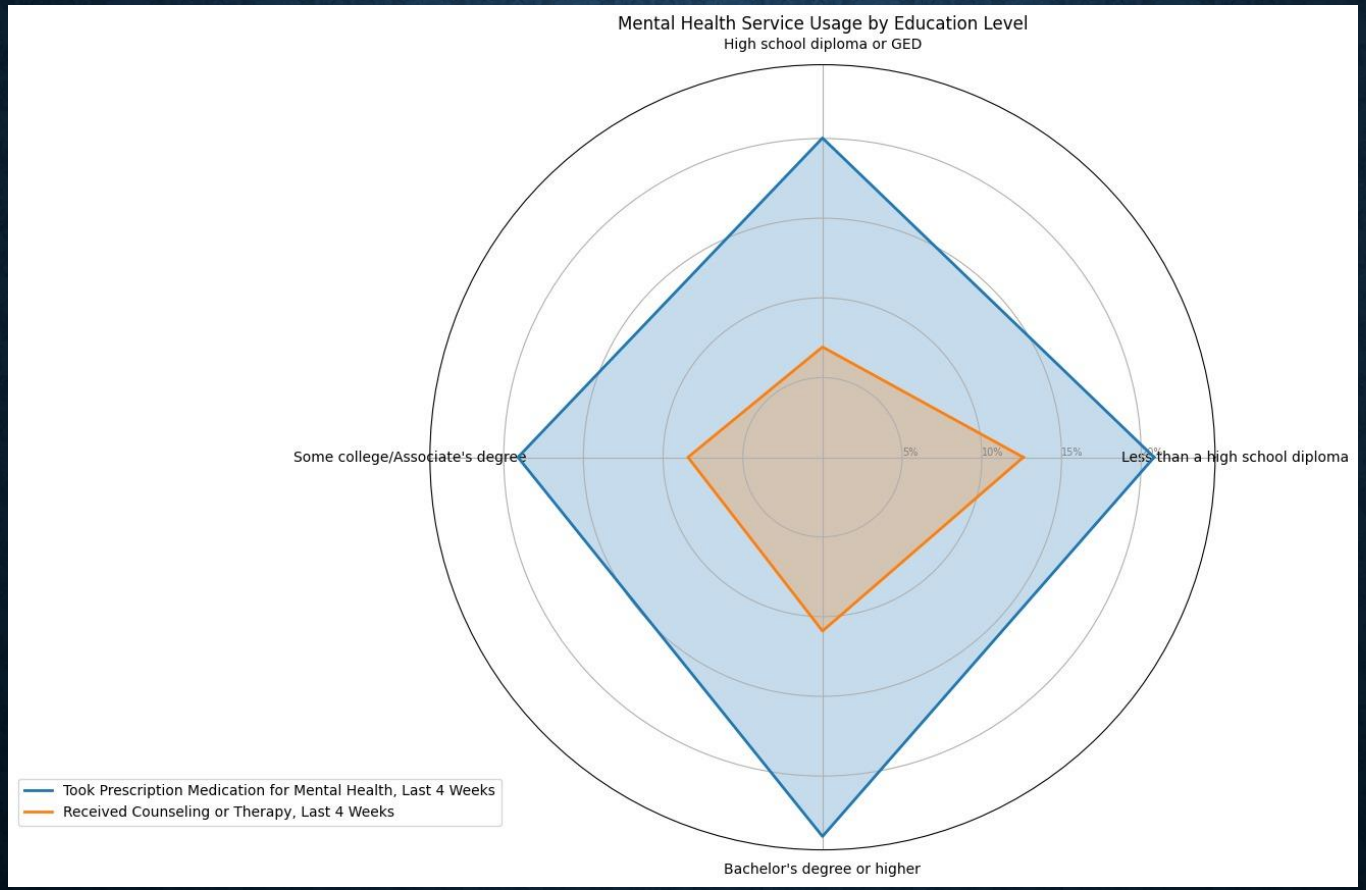
Test Conducted:

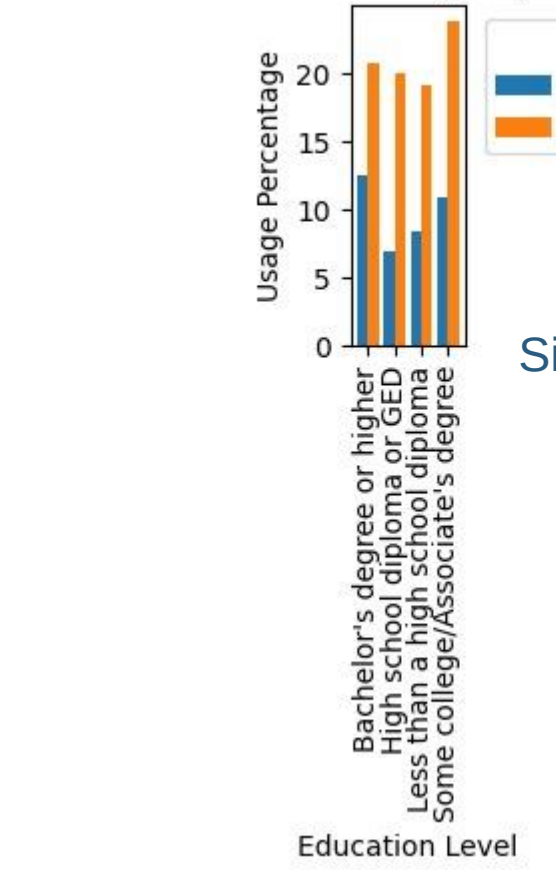
ANOVA- A statistical test used to compare the means of multiple groups to determine if there are significant differences between them, essentially analyzing the variance across different groups to identify potential variations in the data.

RESULTS:

- statistic: 45.605836555989
- p_value: 5.673503657819562e-22
- visual_analysis:
  - Some college/Associate's degree: ~25%
  - Bachelor's degree or higher: ~23%
  - High school diploma/GED: ~21%
  - Less than high school: ~20%


Prescription Medication Usage by Education Level
Average Usage (%)
0
5
10
15
20
25
Bachelor's degree or higher
High school diploma or GED
Less than a high school diploma
Some college/Associate's degree
Education Level


Mental Health Service Usage by Education Level
High school diploma or GED
Some college/Associate's degree
Less than a high school diploma
Bachelor's degree or higher
5%
10%
15%
Took Prescription Medication for Mental Health, Last 4 Weeks
Received Counseling or Therapy, Last 4 Weeks



Conclusion:

Significant variation across education levels

HYPOTHESIS 4

HYPOTHESIS 4:

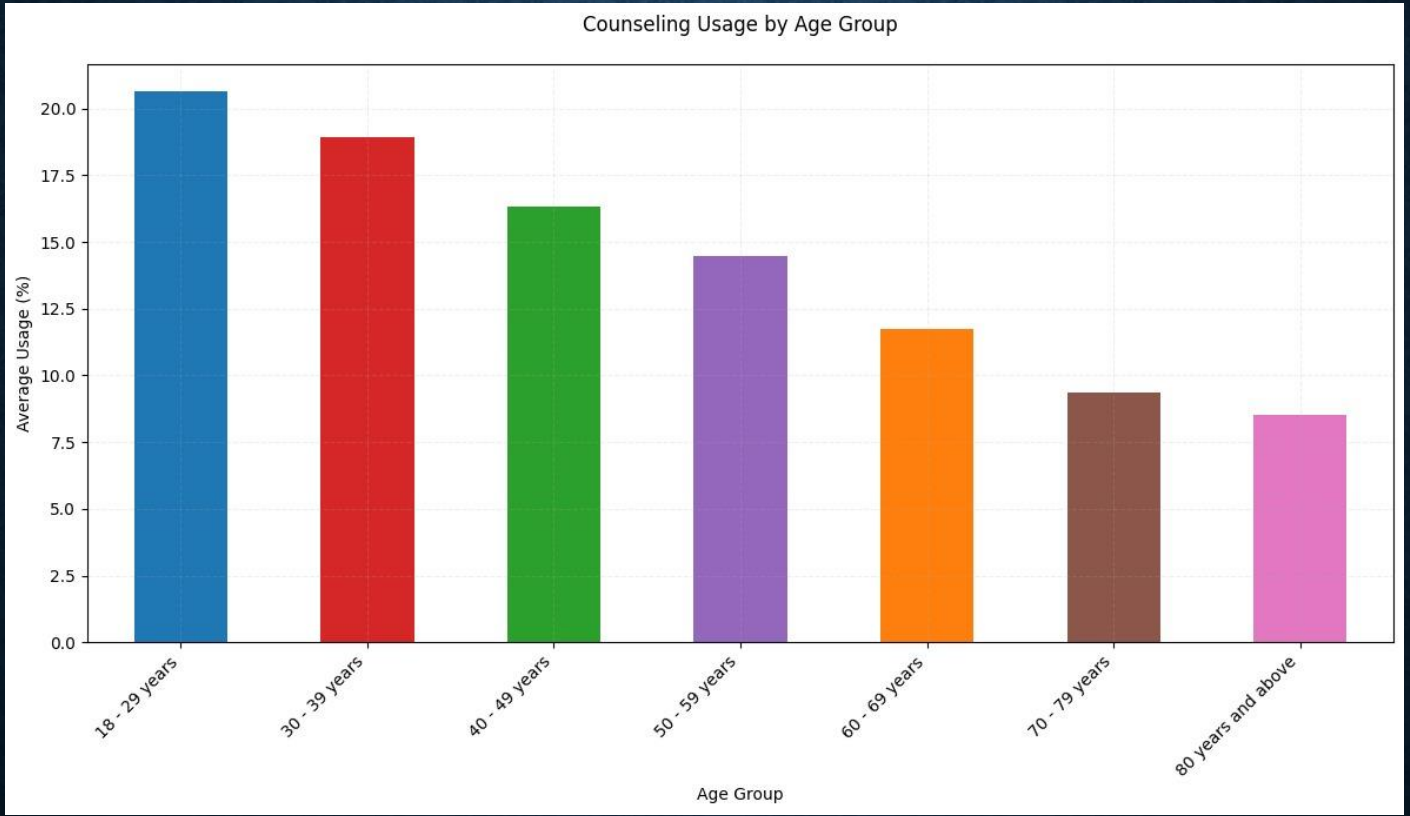
Hypothesis 4 states that There are significant differences in counseling usage across age groups

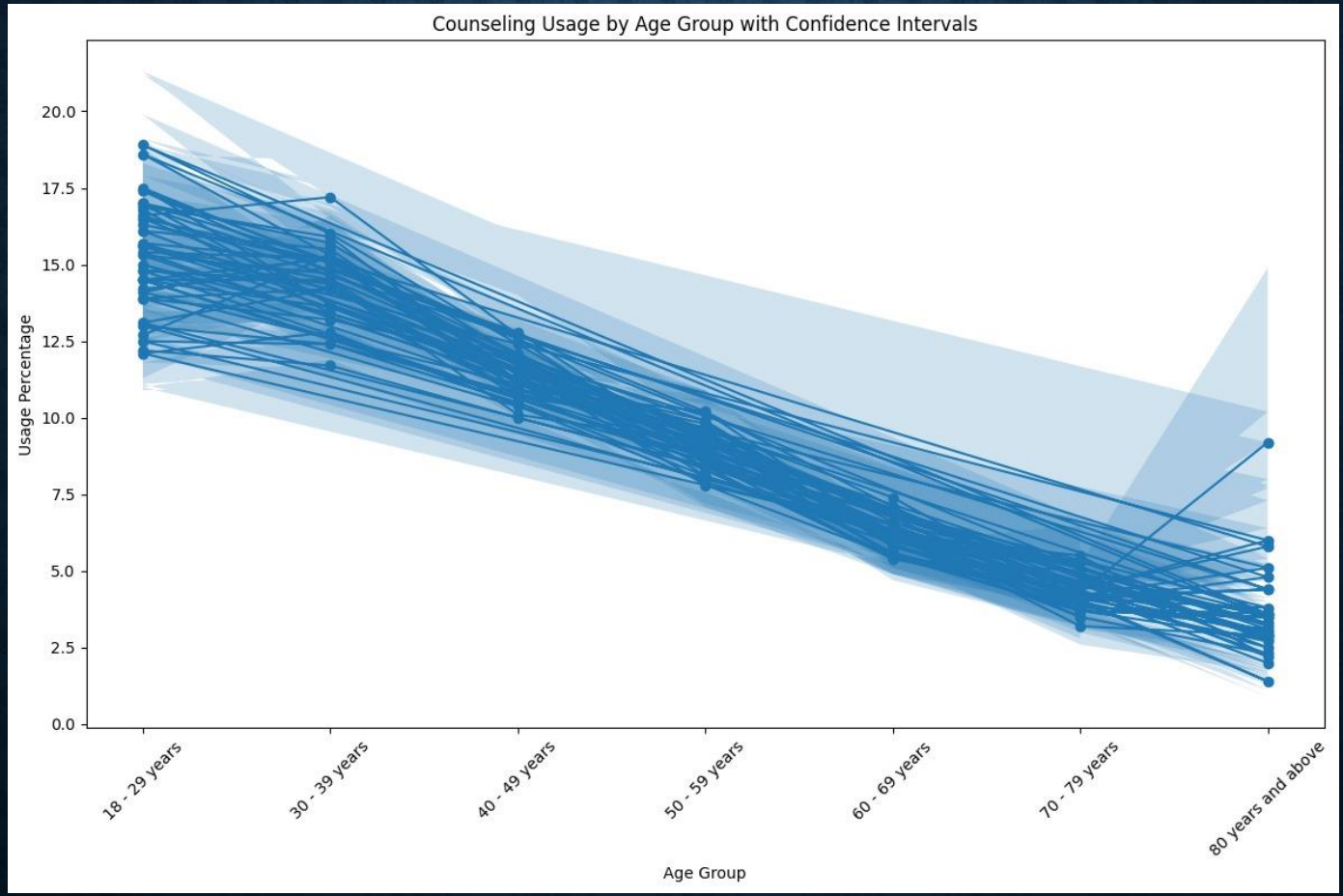
Test Conducted:

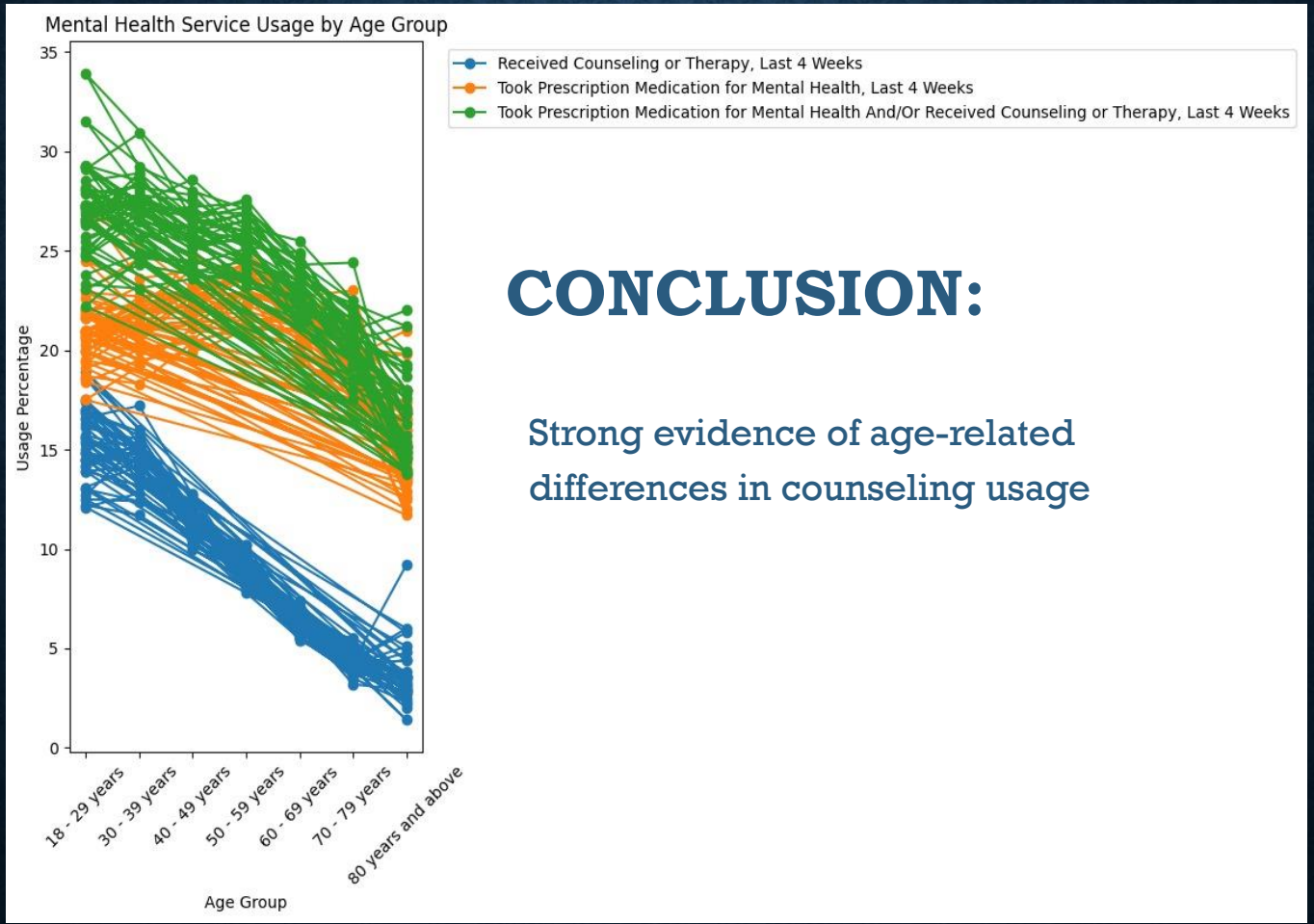
ANOVA- A statistical technique used to analyze the differences among group means in a dataset. It tests whether there is a significant difference between the means of three or more groups, based on the variability within and between the groups.

RESULTS:

- statistic: 28.348354763903423
- p_value: 6.5737718809382 78e-29
- visual_analysis:
  - 18-29 years: ~20%
  - 30-39 years: ~18%
  - 40-49 years: ~16%
  - 50-59 years: ~14%
  - 60-69 years: ~12%
  - 70-79 years: ~9%
  - 80+ years: ~8%


Counseling Usage by Age Group
Average Usage (%)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
18 - 29 years
30 - 39 years
40 - 49 years
50 - 59 years
60 - 69 years
70 - 79 years
80 years and above
Age Group


Counseling Usage by Age Group with Confidence Intervals
Usage Percentage
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
18 - 29 years
30 - 39 years
40 - 49 years
50 - 59 years
60 - 69 years
70 - 79 years
80 years and above
Age Group



CONCLUSION:

Strong evidence of age-related differences in counseling usage

KEY FINDINGS AND HYPOTHESES

1. Prescription medication usage is highest among younger adults (18-29 years).

2. Counseling usage shows a clear decline across increasing age groups.

3. Significant variation exists in service usage across education levels.

4. COVID-19 phases influenced mental health service demand, with an overall upward trend.

CONCLUSION

The analysis reveals critical gaps in mental health service accessibility, particularly among older adults and lower-educated groups. These insights can guide public health policies to target vulnerable populations more effectively.