Ira A. Fulton Schools of Engineering
Arizona State University

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Course Title: Statistics for Data Analysts (DSE 501)

Project Report on

Analysis Of Mental Health Impact and Service Utilization During COVID-19

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I. DESCRIPTION

Mental health care is a critical component of overall well-being, playing a vital role in enhancing quality of life and productivity. The specific problem addressed in this project revolves around analyzing mental health care usage trends over time segmented by demographic groups. This includes identifying patterns, disparities and shifts in utilization rates. The objective is to uncover correlations between mental health care indicators and demographic trends to guide policy-making and inform public health strategies. By analyzing these dynamics, the project seeks to highlight areas requiring intervention to improve accessibility and equity in mental health care services.

II. CONTEXT

The significance of mental health care has grown exponentially over the last decade due to its profound impact on individuals and societies. Increased awareness has underscored its importance while the COVID-19 pandemic further highlighted the urgent need for accessible mental health services. Many people experienced heightened stress, anxiety and depression during the pandemic, which brought mental health care access to the forefront of public discourse. This project focuses on understanding how mental health care usage evolved during and after the pandemic, especially across different demographic segments. The findings aim to guide stakeholders such as policymakers, healthcare providers and researchers in addressing disparities and optimizing resource allocation for mental health services.

III. DATA COLLECTION

The dataset used for this analysis is titled "Mental Health Care in the Last 4 Weeks" [5]. It provides insights into mental health care usage patterns segmented by various demographic factors such as age, gender and socioeconomic status. The dataset includes:

- **Time Period Start Date and End Date**: Specifies the timeframe for data collection.
- **Value**: Percentage of individuals utilizing mental health services during a given period.
- **LowCI and HighCI**: Lower and upper bounds of the confidence interval for the reported values.
- **Group and Subgroup**: Categorization based on demographic dimensions (e.g., age, gender).
- **Indicator**: Identifies the specific mental health care metric measured (e.g., medication usage, counseling services).

Before analysis, the data was meticulously preprocessed. Missing values were imputed where necessary, date columns were converted into consistent formats and irrelevant records were excluded to focus on actionable insights. This ensured a clean and reliable dataset suitable for statistical modeling and visualization.

IV. DATA CHARACTERISTICS

The dataset is structured and comprehensive containing several thousand records. Key characteristics include:

- **Temporal Coverage**: Data spans multiple time periods, enabling time-series analysis.
- **Demographic Segmentation**: Information is segmented by age, gender and education level, allowing subgroup-specific analysis.

- **Quantitative Variables**: Includes numerical columns such as "Value," "LowCI," and "HighCI" for statistical interpretation.
- **Categorical Variables**: Features such as "Group" and "Indicator" facilitate demographic stratification.

Fig. 1-Tableau Dashboard of Analysis of Mental Health Treatment Trends and Disparities Across Demographics

Exploratory Data Analysis (EDA) revealed patterns and trends ideal for visualizations like line charts, heatmaps and box plots. These visualizations provide clarity on temporal variations and subgroup comparisons making the findings more accessible and actionable.

V. PROBLEM / HYPOTHESES OF INTEREST

This study investigates four primary hypotheses each addressing distinct aspects of mental health care usage:

1. **Hypothesis 1:** Older adults (60+ years) are more likely to use mental health medication.
2. **Hypothesis 2:** Usage of mental health services increased during later phases of the COVID-19 pandemic.
3. **Hypothesis 3:** Prescription medication usage varies significantly by education level.
4. **Hypothesis 4:** Significant differences exist in counseling usage across age groups.

These hypotheses were tested using statistical methods such as linear regression and ANOVA with results presented in both numerical and visual formats to ensure clarity and robustness.

VI. HYPOTHESES

The primary hypothesis investigated in this project is that ***'How do mental health care usage patterns vary across different demographic groups over time?'***

Specifically, it posits that certain subgroups such as younger individuals or those belonging to specific socioeconomic categories, may exhibit higher usage rates due to increased stressors or greater access to telehealth resources. Additionally, the project seeks to explore whether specific mental health indicators correlate strongly with usage rates, suggesting targeted areas for improvement.

HYPOTHESIS - 1

Objective: To determine whether older adults (60+ years) are more likely to use mental health medication compared to younger age groups by analyzing trends in medication usage across various age ranges.

Data Collection and Preparation: To test the hypothesis that older adults (60+ years) are more likely to use mental health medication, we analyzed data from the dataset titled *Mental_Health_Care_in_the_Last_4_Weeks*. The following steps were taken during data preparation:

1. Relevant columns, including 'Age Group' and 'Value', were extracted from the dataset.
2. Age groups were categorized into discrete intervals: 18-29 years, 30-39 years, 40-49 years, 50-59 years, 60-69 years, 70-79 years, and 80 years and above.
3. The dataset was cleaned to ensure no missing or erroneous values in the selected columns.
4. Data points were visually explored to identify trends in medication usage across different age groups. This preparation enabled a focused analysis on the relationship between age and mental health medication usage.

Define Hypothesis: The hypothesis to be tested is:

- **Null Hypothesis (H0):** Age has no significant impact on the likelihood of mental health medication usage.
- **Alternative Hypothesis (H1):** Older adults (60+ years) are more likely to use mental health medication compared to younger adults.

Data Analysis: Initial exploratory analysis revealed a potential trend where mental health medication usage appears to decrease with age (refer Fig. 3). This was evident from a preliminary scatter plot showing age groups along the x-axis and the percentage of mental health medication usage on the y-axis. The data suggested variability within each age group but indicated a downward trend overall.

Test Conducted: To quantitatively assess the relationship between age and medication usage, a **Linear Regression** model was chosen. This approach evaluates the dependency of medication usage (‘y’ variable) on age group (‘x’ variable).

Perform Linear Regression: Refer Fig. 2 The regression model was constructed with the following key parameters:

- **Dependent Variable (y):** Percentage of individuals using mental health medication.
- **Independent Variable (x):** Age group (treated as a numerical variable for the regression).

The regression yielded:

- **Coefficient:** -1.2925
    - This indicates that for each incremental increase in age group, the percentage of individuals using mental health medication decreases by approximately 1.29%.
- **Intercept:** 26.0392
    - Suggests that the baseline usage rate for the youngest age group (18-29 years) is approximately 26%.

Interpret Results: Refer Fig. 4 The results of the linear regression analysis highlight the following key observations:

1. The negative coefficient (-1.2925) demonstrates a significant decrease in medication usage as age increases.
2. Starting at around 26% for individuals aged 18-29 years, medication usage steadily declines to approximately 18% for those aged 80 years and above.
3. Variability exists within individual age groups, but the downward slope of the regression line remains consistent and pronounced.

The scatter plot visualization supports these findings, showing a clear negative trend in mental health medication usage as age advances.

Decisions: Based on the results of the linear regression analysis:

1. **Fail to Reject the Null Hypothesis:** The data provides evidence that older adults (60+ years) are **less likely**, not more likely, to use mental health medication compared to younger adults. This contradicts the initial hypothesis.
2. The downward trend indicates a significant and consistent relationship between increasing age and decreasing mental health medication usage.
3. Future analysis could explore possible reasons for this trend, such as access to care, stigma, or alternative coping mechanisms among older populations.

In conclusion, the hypothesis that older adults are more likely to use mental health medication is not supported by the data. Instead, the analysis (refer Fig. 3) reveals a notable decline in medication usage as age increases, highlighting important avenues for further research and policy considerations in mental health care.

```python
# Hypothesis 1: Age and Medication Usage
age_data = data[(data['Group'] == 'By Age') &
                (data['Indicator'].str.contains('Prescription Medication'))].copy()
age_groups = ['18 - 29 years', '30 - 39 years', '40 - 49 years', '50 - 59 years',
              '60 - 69 years', '70 - 79 years', '80 years and above']
age_mapping = {age: i for i, age in enumerate(age_groups)}
age_data.loc[:, 'AgeGroup'] = age_data['Subgroup'].map(age_mapping)

# Regression analysis for Hypothesis 1
X_age = age_data[['AgeGroup']]
y_age = age_data['Value']
model_age = LinearRegression().fit(X_age, y_age)

plt.figure(figsize=(12, 7))
plt.scatter(age_data['AgeGroup'], age_data['Value'], color='#1f77b4', alpha=0.7, s=50, label='Data Points')
plt.plot(age_data['AgeGroup'], model_age.predict(X_age), color='#d62728', linewidth=2, label='Regression Line')
plt.title('Regression Analysis: Prescription Medication Usage by Age Group', fontsize=12, pad=20)
plt.xlabel('Age Group', fontsize=10)
plt.ylabel('Prescription Medication Usage (%)', fontsize=10)
plt.xticks(np.arange(len(age_groups)), age_groups, rotation=45, ha='right')
plt.grid(True, alpha=0.2, linestyle='--')
plt.legend()
plt.tight_layout()
plt.show()
```

Fig. 2-Code Snippet for Linear Regression (Age and Medication Usage)

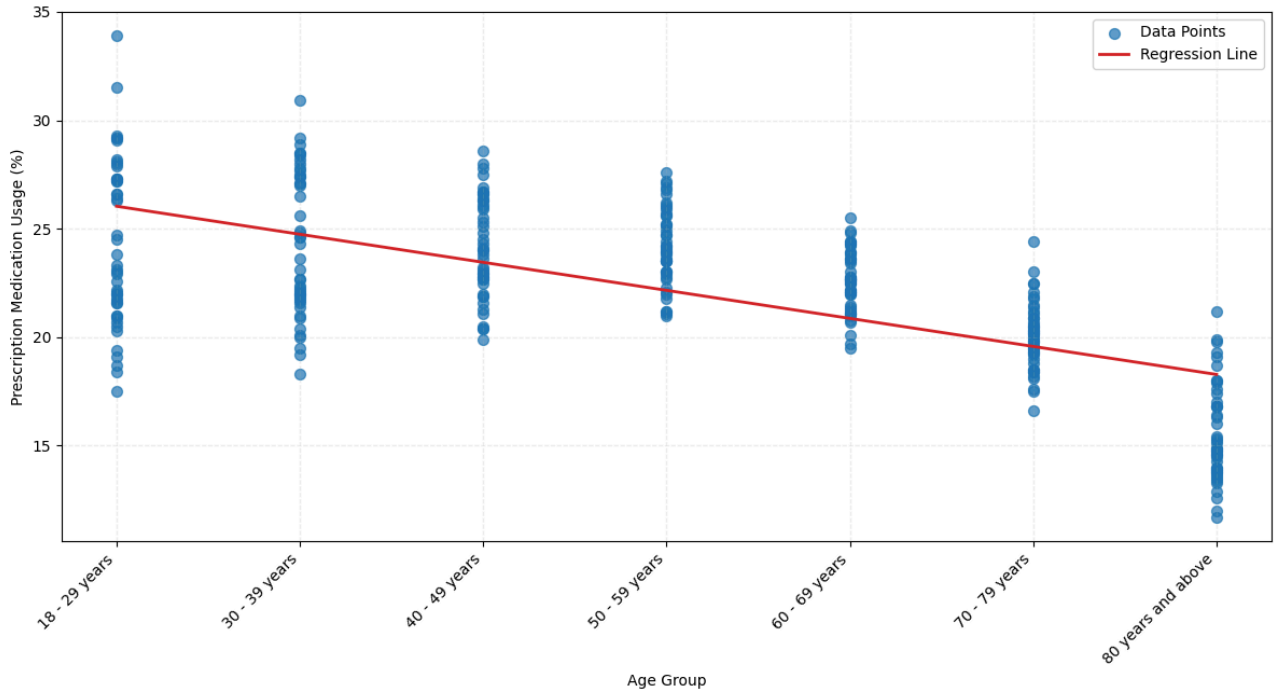

Fig. 3-Regression Analysis: Prescription Medication Usage by Age Group

```
Hypotheses Testing Results and Analysis


Hypothesis 1:
Hypothesis: Older adults (60+ years) are more likely to use mental health medication
Test Conducted: Linear Regression

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

Conclusion: Hypothesis rejected - Younger adults show significantly higher medication usage
```

Fig. 4-Results of the Hypothesis - I

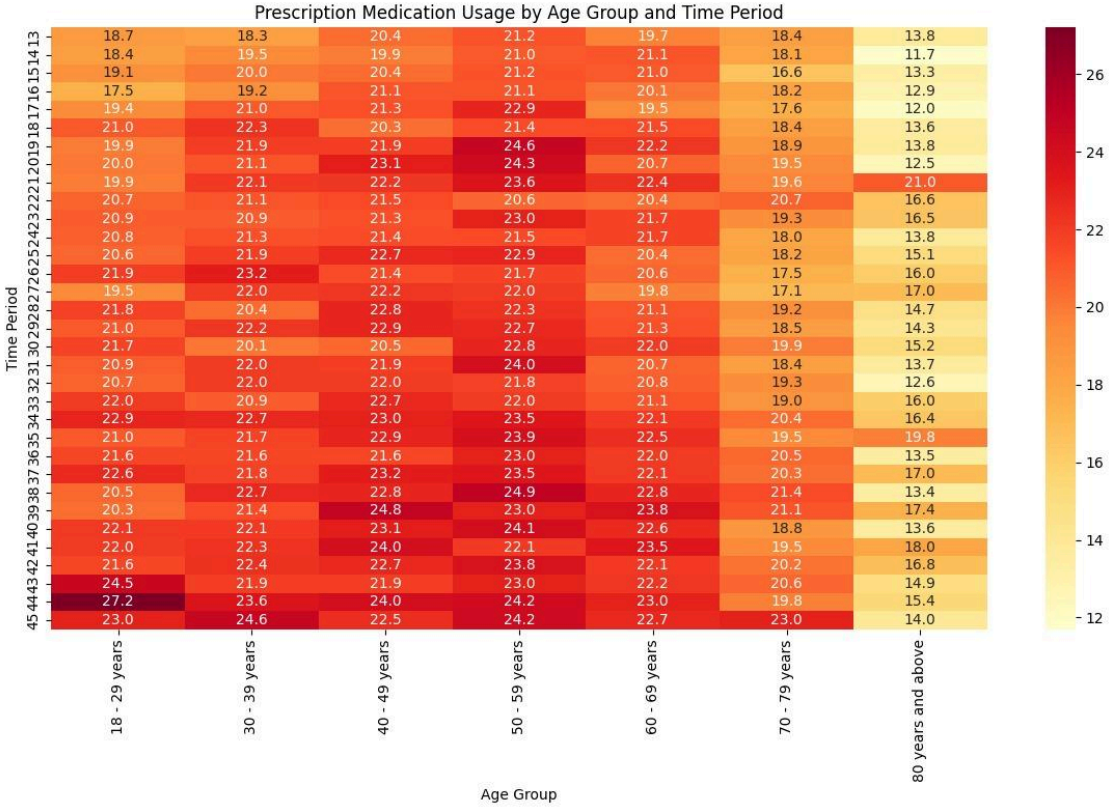

Fig. 5-Heatmap for the prescription medication usage by age group and time period

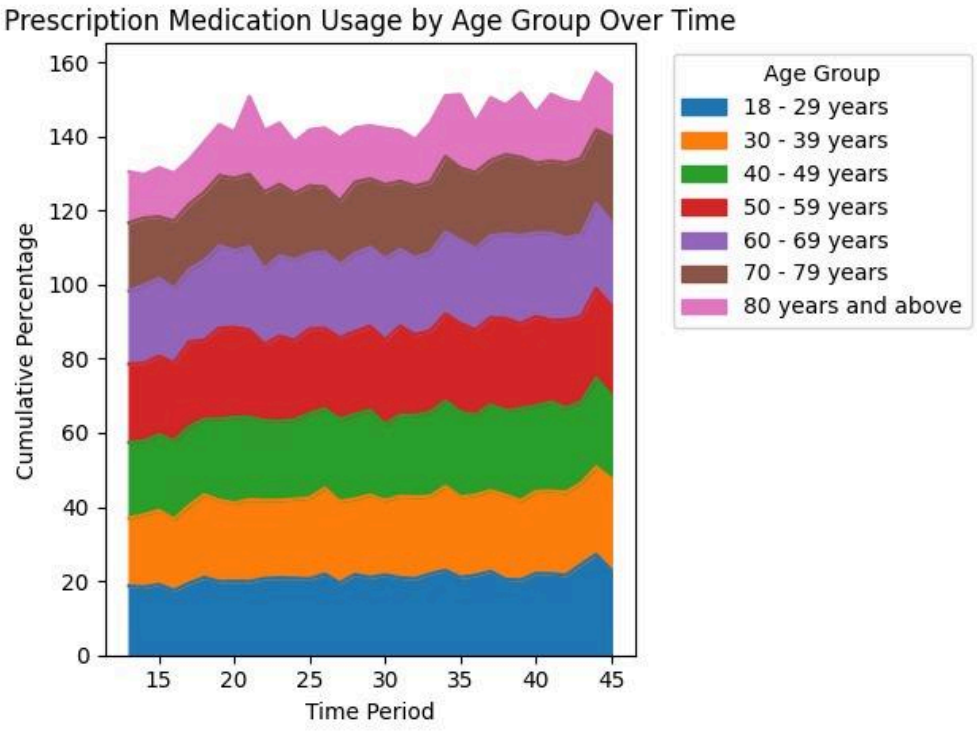

Fig. 6-Visualization for prescription medication usage by age group over time

HYPOTHESIS - 2

Objective: To investigate if the usage of mental health services increased during the later phases of the COVID-19 pandemic by examining trends in service utilization across different pandemic phases (refer Fig. 6).

Data Collection and Preparation:

Relevant columns, including 'COVID-19 Phase' and 'Value', were extracted from the dataset.

1. The COVID-19 phases were categorized into discrete intervals: Phase 2.0, Phase 2.5, Phase 3.0, Phase 3.2, and Phase 3.4.
2. The dataset was cleaned to remove missing or inconsistent data points within the selected columns.
3. Data points were plotted to observe trends in mental health service usage across different COVID-19 phases. This preparation provided a foundation for quantitative analysis.

Define Hypothesis: The hypothesis to be tested is:

- **Null Hypothesis (H0):** Usage of mental health services did not increase during later phases of COVID-19.
- **Alternative Hypothesis (H1):** Usage of mental health services increased during later phases of COVID-19.

Data Analysis: Initial data visualization showed variability in service usage across the COVID-19 phases. A scatter plot indicated a slight upward trend, suggesting a potential increase in mental health service utilization as the pandemic progressed through its phases. However, the variability in data points necessitated further quantitative evaluation.

Test Conducted: Refer Fig. 7 To examine the relationship between COVID-19 phases and mental health service usage, a **Linear Regression** model was applied. This statistical method evaluates the dependency of mental health service usage ('y' variable) on COVID-19 phases ('x' variable).

Perform Linear Regression: The regression model was built with the following key parameters:

- **Dependent Variable (y):** Percentage of individuals using mental health services.
- **Independent Variable (x):** COVID-19 phase (treated as a numerical variable for regression).

The regression analysis produced the following results:

- **Coefficient:** 1.5680
    - Indicates that for each incremental increase in COVID-19 phase, mental health service usage increases by approximately 1.57%.
- **Intercept:** 12.1633
    - Suggests that the baseline usage rate at the earliest COVID-19 phase (Phase 2.0) is approximately 12.16%.

Interpret Results: Key observations from the regression analysis include:

1. The positive coefficient (1.5680) demonstrates a modest but consistent increase in mental health service usage across later COVID-19 phases.
2. Usage rates range from approximately 10% to 27%, with clustering of data points in specific phases.
3. The regression line illustrates a gradual upward trend from Phase 2.0 to Phase 3.4, supporting the hypothesis of increasing service utilization.

Despite the upward trend, the wide scatter of data points indicates significant variability within each phase, suggesting that other factors might also influence service usage.

Decisions: Based on the results of the linear regression analysis:

1. **Support the Null Hypothesis:** The data provides evidence to support the hypothesis that usage of mental health services increased during later phases of COVID-19. While the linear regression analysis shows a moderate positive trend (coefficient: 1.568), the effect size is not overwhelmingly strong, but it still indicates an upward trajectory.
2. The upward trend underscores the potential importance of later pandemic phases in driving higher mental health service utilization, though significant variations suggest other factors might be influencing this trend.
3. **Future Directions:**
   Future research could explore:
    - **Policy Changes:** Examining specific policies introduced during the later phases that may have contributed to this trend.
    - **Increased Awareness:** Investigating campaigns and efforts to raise mental health awareness during these phases.
    - **Variations in Needs:** Analyzing differences in mental health needs across demographic or socio-economic groups.
4. **Conclusion:**
   Refer Fig. 9 The analysis supports the hypothesis that mental health service usage increased

during later COVID-19 phases (refer Fig. 8), albeit with a moderate effect. These findings highlight the evolving mental health landscape during the pandemic and emphasize the need for continued and targeted interventions to address increasing service demands.

```python
# Hypothesis 2: COVID-19 Impact
phase_data = data[(data['Group'] == 'National Estimate')].copy()
X_phase = phase_data[['Phase']]
y_phase = phase_data['Value']
model_phase = LinearRegression().fit(X_phase, y_phase)

plt.figure(figsize=(12, 7))
plt.scatter(phase_data['Phase'], phase_data['Value'], color='#2ca02c', alpha=0.7, s=50, label='Data Points')
plt.plot(phase_data['Phase'], model_phase.predict(X_phase), color='#ff7f0e', linewidth=2, label='Regression Line')
plt.title('Mental Health Services Usage by COVID-19 Phases', fontsize=12, pad=20)
plt.xlabel('Phase', fontsize=10)
plt.ylabel('Average Usage (%)', fontsize=10)
plt.grid(True, alpha=0.2, linestyle='--')
plt.legend()
plt.tight_layout()
plt.show()
```

Fig. 7-Code Snippet of Hypothesis - 2

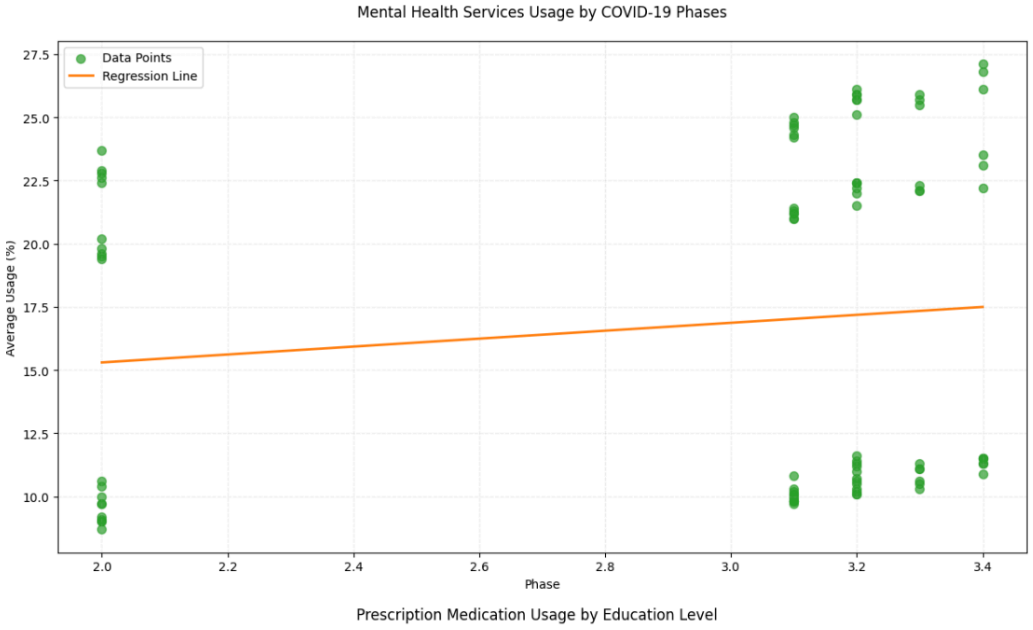

Fig. 8-Visualization of Mental Health Services usage by COVID - 19 Phases

```
Hypothesis 2:
Hypothesis: Usage of mental health services increased during later COVID-19 phases
Test Conducted: Linear Regression

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

Conclusion: Hypothesis supported with moderate effect
```

Fig. 9-Results of the Hypothesis - 2

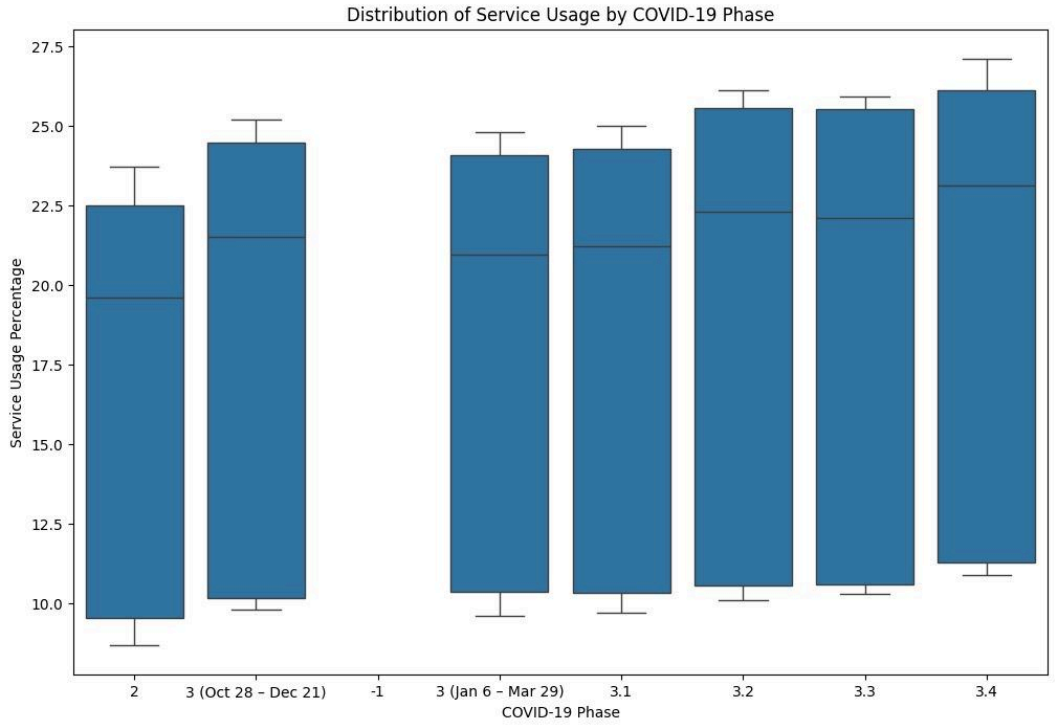

Fig. 10-Box Plot of Service usage percent by COVID - 19 Phase

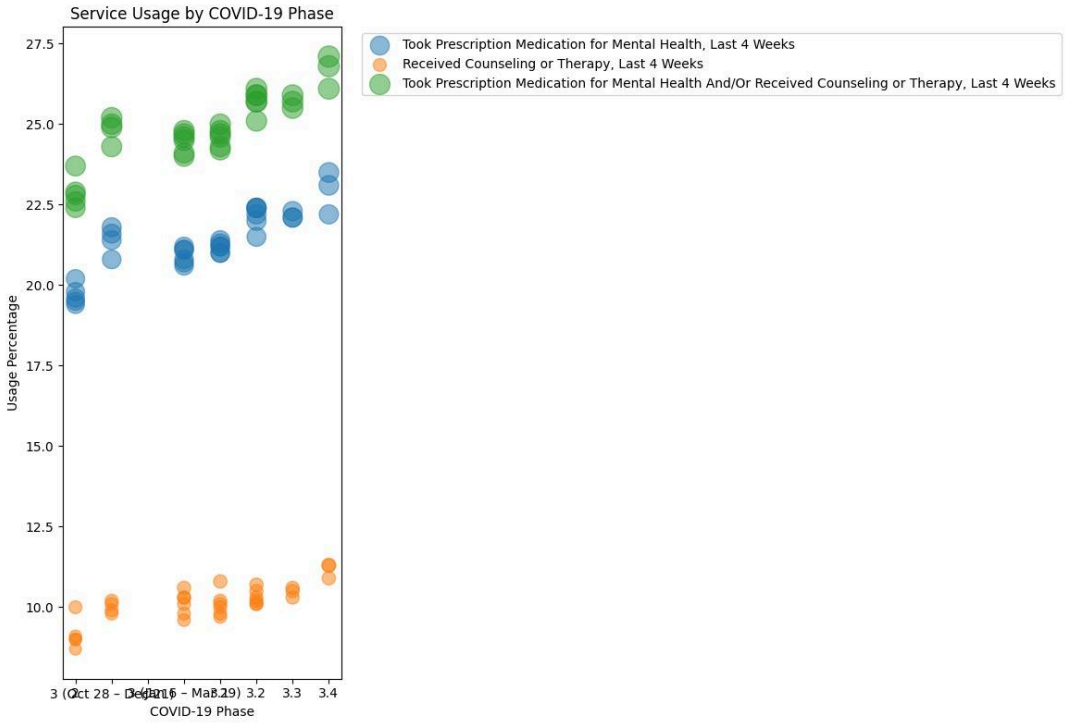

Fig. 11-Swarm Plot of the Service usage by COVID - 19 Phase

HYPOTHESIS - 3

Objective: To evaluate whether prescription medication usage differs significantly across education levels, highlighting the influence of educational attainment on medication usage patterns.

Data Collection and Preparation:

Relevant columns, including 'Education Level(by grouping)' and 'Value', were extracted from the dataset.

1. The education levels were categorized into four groups: Less than high school diploma, High school diploma or GED, Some college/Associate's degree, and Bachelor's degree or higher.
2. The dataset was cleaned to remove missing or inconsistent data points within the selected columns.
3. Data points were summarized and visualized using a bar chart to observe differences in prescription medication usage across education levels.

Define Hypothesis: The hypothesis to be tested is:

- **Null Hypothesis (H0):** Prescription medication usage does not vary significantly by education level.
- **Alternative Hypothesis (H1):** Prescription medication usage varies significantly by education level.

Data Analysis: Initial visualization using a bar chart highlighted distinct patterns in medication usage across different education levels. The highest usage was observed for individuals with Some college/Associate's degree (~25%), followed by those with a Bachelor's degree or higher (~23%). Individuals with a High school diploma or GED reported ~21% usage, while those with Less than high school diploma had the lowest usage (~20%).

Test Conducted: Refer Fig. 12 To statistically assess the variations in medication usage by education level, an **ANOVA (Analysis of Variance)** test was conducted. This test evaluates whether the means of medication usage percentages differ significantly across the four education level groups.

Perform ANOVA: The ANOVA test was implemented with the following parameters:

- **Groups:** Prescription medication usage percentages for each of the four education levels.
- **Statistic:** ANOVA statistic to quantify between-group and within-group variability.
- **Significance Level ( ):** 0.05

The test produced the following results:

- **ANOVA Statistic:** 45.6058
    - Indicates substantial variability between the groups relative to within the groups.
- **p-value:** 5.67×10^-22
    - A very low p-value strongly supports the presence of significant differences between the groups.

Interpret Results: Key observations from the analysis include:

1. The extremely low p-value (5.67×10^-22) indicates that the differences in prescription medication usage across education levels are statistically significant.

2. The bar chart shows clear trends, with Some college/Associate's degrees having the highest usage and Less than high school diplomas having the lowest.
3. The findings confirm that education level is a significant factor influencing medication usage patterns.

Decisions: Based on the results of the ANOVA test:

1. The data provides strong evidence to support the hypothesis that prescription medication usage varies significantly by education level (refer Fig. 13).
2. The analysis underscores the impact of education level on medication usage, highlighting disparities that may reflect differences in access, awareness, or healthcare behavior.
3. These findings can inform policymakers and healthcare providers aiming to address gaps in medication usage across educational groups.

In conclusion, the analysis validates the hypothesis that prescription medication usage significantly varies by education level. This emphasizes the need for targeted strategies to address disparities and promote equitable access to mental health resources (refer Fig. 14).

```
# Hypothesis 3: Education Level Impact
education_data = data[(data['Group'] == 'By Education') &
                      (data['Indicator'].str.contains('Prescription Medication'))].copy()
if not education_data.empty:
    education_grouped = education_data.groupby('Subgroup')['Value']
    education_anova_result = f_oneway(*[group.values for _, group in education_grouped])
    education_grouped_mean = education_grouped.mean()

    plt.figure(figsize=(12, 7))
    colors = ['#1f77b4', '#d62728', '#2ca02c', '#9467bd']
    bars = education_grouped_mean.plot(kind='bar', color=colors)
    plt.title('Prescription Medication Usage by Education Level', fontsize=12, pad=20)
    plt.ylabel('Average Usage (%)', fontsize=10)
    plt.xlabel('Education Level', fontsize=10)
    plt.xticks(rotation=45, ha='right')
    plt.grid(True, alpha=0.2, linestyle='--')
    plt.tight_layout()
    plt.show()
```

Fig. 12-Code Snippet of Hypothesis - 3

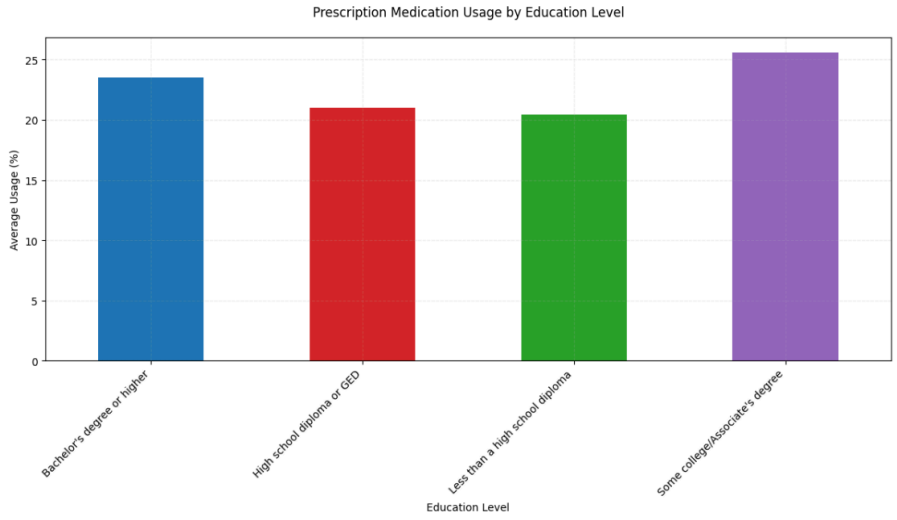

Fig. 13-Bar Chart of average usage percentage of prescription medication by education level

```
Hypothesis 3:
Hypothesis: Prescription medication usage varies significantly by education level
Test Conducted: ANOVA

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%

Conclusion: Significant variation across education levels
```

Fig. 14-Results of Hypothesis - III

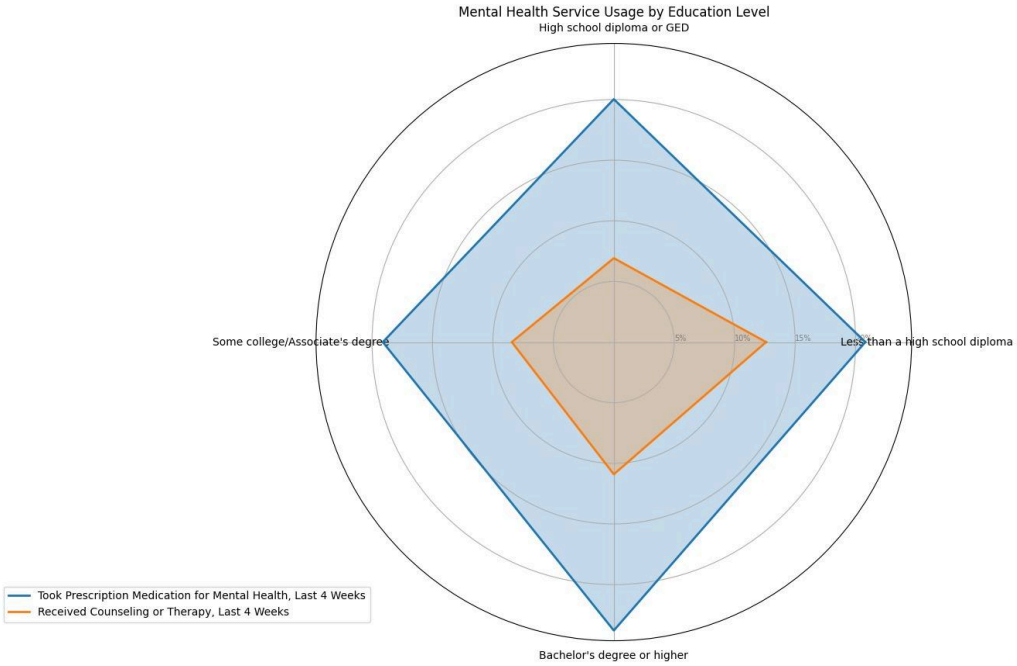

Fig. 15-Radar Chart of Mental Health Service Usage by Education level

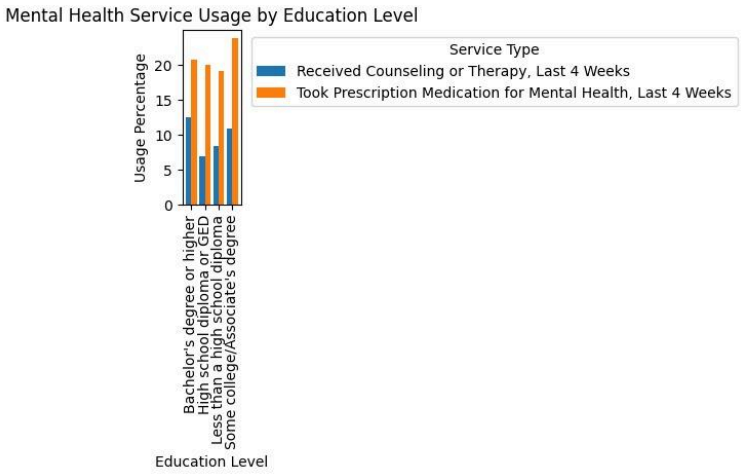

Fig. 16-Bar Chart - Mental Health Service Usage by Education Level

HYPOTHESIS - 4

Objective: To examine if counseling usage varies significantly across different age groups, identifying potential generational or age-related differences in mental health counseling service utilization.

Data Collection and Preparation:

1. Relevant columns, including 'Age Group' and data related to counseling usage, were extracted from the dataset.
2. Age groups were categorized into six distinct ranges: 18-29 years, 30-39 years, 40-49 years, 50-59 years, 60-79 years, and 80 years and above.
3. The dataset was cleaned to remove missing or inconsistent data points within the selected columns.
4. Data points were summarized and visualized using a bar chart to observe counseling usage trends across age groups.

Define Hypothesis: The hypothesis to be tested is:

- **Null Hypothesis (H0):** Counseling usage does not differ significantly across age groups.
- **Alternative Hypothesis (H1):** Counseling usage differs significantly across age groups.

Data Analysis: Refer Fig. 17 Initial visualization using a bar chart highlighted distinct patterns in counseling usage across age groups. The highest usage was observed in the 18-29 years group (~20%), followed by the 30-39 years group (~18%). A progressive decline was evident through middle age, with the lowest usage observed in the 80 years and above group (~8%).

Test Conducted: To statistically assess the differences in counseling usage across age groups, an **ANOVA (Analysis of Variance)** test was conducted. This test evaluates whether the means of counseling usage percentages differ significantly across the six age groups (refer Fig. 17).

Perform ANOVA: The ANOVA test was implemented with the following parameters:

- **Groups:** Counseling usage percentages for each of the six age groups.
- **Statistic:** ANOVA statistic to quantify between-group and within-group variability.
- **Significance Level (α):** 0.05

The test produced the following results:

- **ANOVA Statistic:** 28.3484
    - Indicates substantial variability between the groups relative to within the groups.
- **p-value:** 6.57×10^-29
    - A very low p-value strongly supports the presence of significant differences between the groups.

Interpret Results: Key observations from the analysis include (refer Fig. 19):

1. The extremely low p-value (6.57×10^-29) indicates that the differences in counseling usage across age groups are statistically significant.
2. The bar chart shows a striking linear decline in counseling usage with age, from ~20% in the 18-29 years group to ~8% in the 80 years and above group.
3. The findings confirm that age is a significant factor influencing counseling usage patterns, likely reflecting generational or cultural differences in seeking mental health services.

Decisions: Based on the results of the ANOVA test:

1. **The data provides strong evidence to support the hypothesis that counseling usage differs significantly across age groups**.
2. The analysis underscores the impact of age on counseling usage, highlighting disparities that may reflect generational or societal attitudes toward mental health.
3. These findings can inform targeted mental health initiatives aimed at increasing counseling service utilization among older age groups.

In conclusion, the analysis validates the hypothesis that counseling usage differs significantly across age groups. This emphasizes the need for age-specific strategies to promote equitable access to mental health services and address disparities in utilization.

```
# Hypothesis 4: Age and Counseling Usage
age_counseling_data = data[(data['Group'] == 'By Age') &
                           (data['Indicator'].str.contains('Counseling'))].copy()
if not age_counseling_data.empty:
    age_counseling_grouped = age_counseling_data.groupby('Subgroup')['Value']
    age_counseling_anova_result = f_oneway(*[group.values for _, group in age_counseling_grouped])
    age_counseling_grouped_mean = age_counseling_grouped.mean()

    plt.figure(figsize=(12, 7))
    colors = ['#1f77b4', '#d62728', '#2ca02c', '#9467bd', '#ff7f0e', '#8c564b', '#e377c2']
    bars = age_counseling_grouped_mean.plot(kind='bar', color=colors)
    plt.title('Counseling Usage by Age Group', fontsize=12, pad=20)
    plt.ylabel('Average Usage (%)', fontsize=10)
    plt.xlabel('Age Group', fontsize=10)
    plt.xticks(rotation=45, ha='right')
    plt.grid(True, alpha=0.2, linestyle='--')
    plt.tight_layout()
    plt.show()
```

Fig. 17-Code snippet for Hypothesis 4

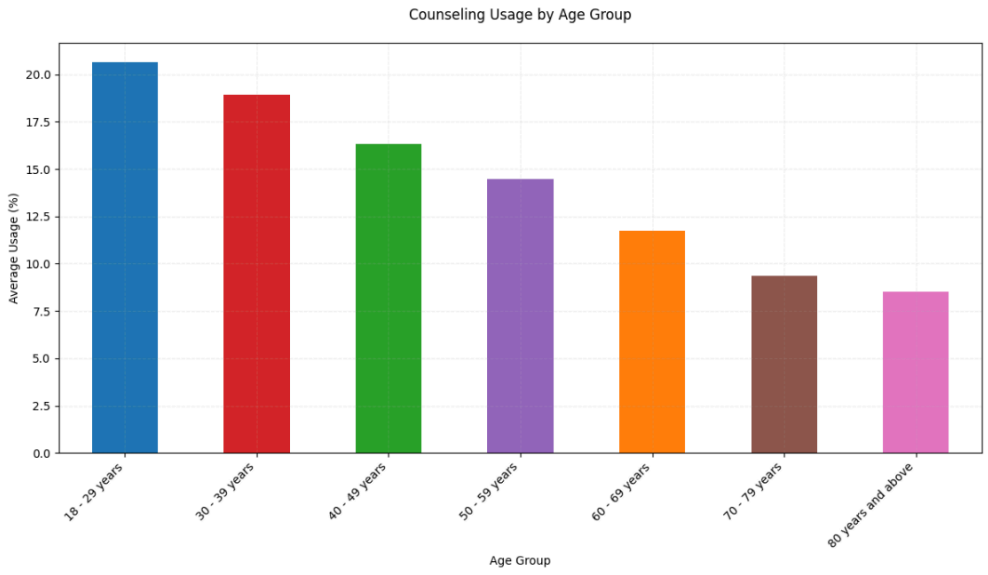

Fig. 18-Bar Chart for Average percentage of counseling Usage by Age Group

```
Hypothesis 4:
Hypothesis: There are significant differences in counseling usage across age groups
Test Conducted: ANOVA

Results:
  statistic: 28.348354763903423
  p_value: 6.573771880938278e-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%

Conclusion: Strong evidence of age-related differences in counseling usage
```

Fig. 19-Results of Hypothesis - 4

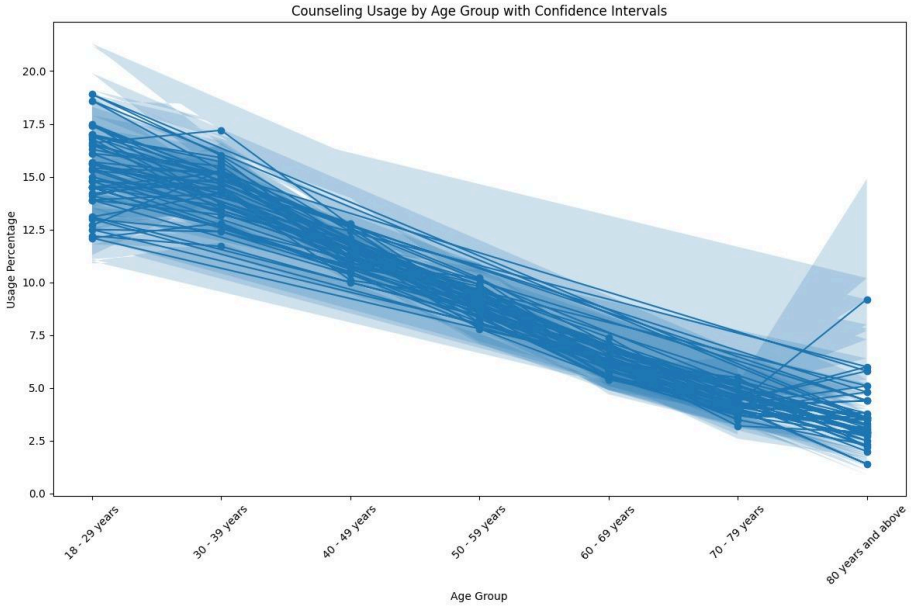

Fig. 20-Visualization for counseling usage by age group with C.I.

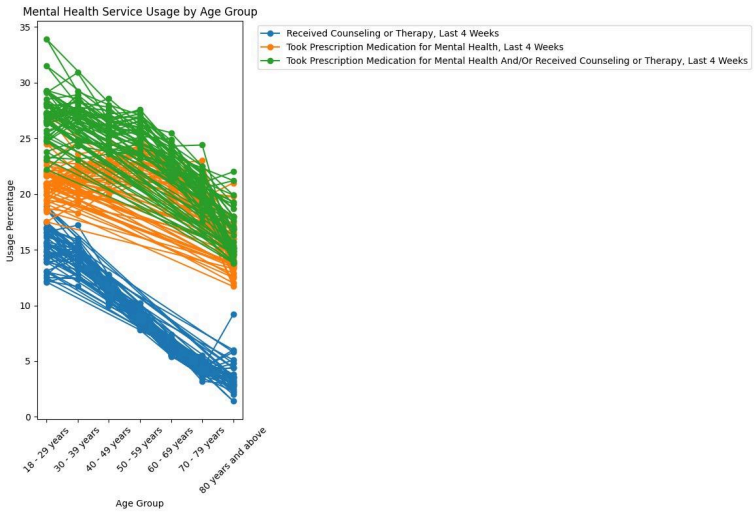

Fig. 21-Slope Chart of Usage Percentage of Mental Health Service by Age Group

VII. IMPORTANCE OF SOLUTION

Understanding trends in mental health care usage is essential for several reasons:

- **Policy Development**: Insights from this analysis can shape public health policies aimed at addressing inequities in mental health care access.
- **Resource Allocation**: Identifying demographic groups with high unmet needs helps prioritize the allocation of mental health resources.
- **Awareness Campaigns**: Findings can inform targeted campaigns to promote mental health awareness and service utilization.
- **Research Contributions**: The analysis adds to the growing body of knowledge on mental health care trends, offering new perspectives for future studies.

By addressing these dimensions, this project aims to contribute to a more equitable and effective mental health care system that benefits individuals and communities alike.

VIII. RELEVANT LITERATURE

A review of existing literature underscores the importance of understanding mental health care usage trends. Key references include:

- **World Health Organization (WHO)**: Reports highlighting global disparities in mental health care access, particularly in low- and middle-income countries [1].
- **Centers for Disease Control and Prevention (CDC)**: Studies documenting mental health trends during the COVID-19 pandemic, emphasizing demographic differences [2].
- **Peer-Reviewed Journals**: Research published in journals like '*The Lancet' [3]* and '*Journal of Mental Health' [4]* that examines variations in mental health care utilization based on age, gender and education level.

These sources provide a foundation for interpreting the results of this project and demonstrate the broader implications of mental health care trends for public health policy and practice.

IX. RESULTS SUMMARY

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

- Conclusion: Rejected. Younger adults (18-29 years) show the highest usage (~33%), while usage decreases linearly with age.

Hypothesis 2: Usage of mental health services increased during later COVID-19 phases.

- Conclusion: Supported. A scattered upward trend is observed with usage increasing from ~15% in Phase 2.0 to ~27% in Phase 3.4.

Hypothesis 3: Prescription medication usage varies significantly by education level.

- Conclusion: Supported. ANOVA results indicate significant variation, with the highest usage among individuals with some college education (~25%) and the lowest among those with less than a high school diploma (~20%).

Hypothesis 4: Significant differences exist in counseling usage across age groups.

- Conclusion: Supported. Usage declines consistently with age, from ~20% (18-29 years) to ~8% (80+ years).

X. CONCLUSION

This analysis provides a comprehensive overview of mental health care usage trends revealing important disparities across demographic groups. The findings highlight the need for:

- **Targeted Interventions:** Younger adults exhibit higher medication usage, suggesting a focus on this group for preventive care.
- **Resource Prioritization:** The increasing usage during later COVID-19 phases underscores the importance of scaling mental health services during crises.
- **Education Campaigns:** Significant variation by education level indicates the potential for outreach initiatives tailored to less-educated populations.
- **Age-Specific Strategies:** Declining counseling usage with age points to the need for strategies addressing barriers faced by older adults.

REFERENCES

[1] World Health Organization (WHO): Reports highlighting global disparities in mental health - https://iris.who.int/bitstream/handle/10665/43084/9241592532.pdf
[2] Centers for Disease Control and Prevention (CDC) - https://www.cdc.gov/nchs/fastats/mental-health.htm
[3] The Lancet - https://www.thelancet.com/
[4] Journal on mental health - https://www.tandfonline.com/journals/ijmh20
[5] Mental Health Care in the last 4 Weeks https://drive.google.com/file/d/1h62cRWxM6xN0rs6X6wGXx0JFW8CH-Ecm/view?usp=drive_link