Report: Effect of Shamiri Intervention on Adolescent Mental Health

1. Brief Background

This report examines the impact of the Shamiri Intervention on adolescent mental health, focusing on depressive symptoms as measured by the Patient Health Questionnaire-8 (PHQ-8). The PHQ-8 is a widely used, validated tool for assessing depression severity. This analysis aims to determine if the Shamiri Intervention leads to a significant change in PHQ-8 scores compared to a control condition. The dataset includes baseline and endpoint PHQ-8 scores, along with demographic information, allowing for a comparison of changes in depressive symptoms over time between the intervention and control groups.

2. Data Analysis Methods

The analysis was conducted using R. The following steps were performed:

1. Data Cleaning:
    - The data was loaded from an Excel file.
    - Columns were renamed for clarity.
    - Text responses for PHQ and GAD questions were converted to numerical scores (0-3).
    - Data types were adjusted (e.g., Time and Condition to factors, Age to numeric).
    - Missing values were imputed using the median for each column.
    - Duplicate rows were removed.
    - Total PHQ-8 and GAD-7 scores were calculated for each participant.
2. Data Preparation for Analysis:
    - The data was reshaped from long to wide format, with baseline and endpoint PHQ-8 scores in separate columns.
    - A change score was calculated by subtracting the baseline PHQ-8 score from the endpoint PHQ-8 score (Endpoint - Baseline).
3. Statistical Analysis:
    - Descriptive statistics (mean and standard deviation) of the change scores were calculated for both the intervention and control conditions.
    - An independent samples t-test was performed to compare the mean change scores between the two conditions.
    - A boxplot was generated to visualize the distribution of change scores for each condition.

3. Findings

Descriptive Statistics

Condition	Mean Change	SD Change
Control	0.1698113	6.17917
Intervention	-2.0800000	6.33049

This table shows that the mean change in PHQ-8 scores for the control group is approximately 0.17, indicating a slight increase in depressive symptoms, while the intervention group shows a mean decrease of approximately 2.08 in their PHQ-8 scores, suggesting an improvement in mental health.

Independent Samples t-test

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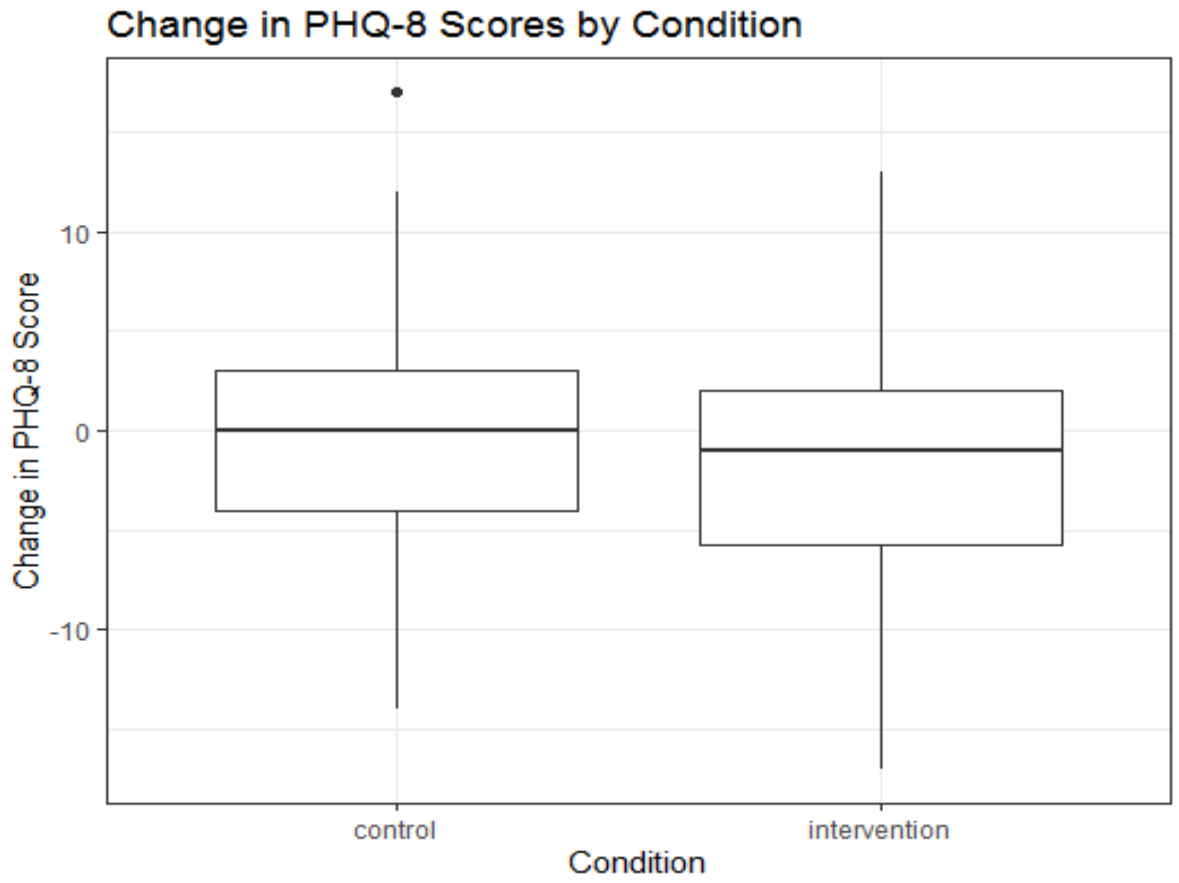
                Welch Two Sample t-test

data:  Change by Condition
t = 1.82, df = 100.31, p-value = 0.0712
alternative: true difference in means is not equal to 0
95 percent confidence interval:
 -0.198  4.697
sample estimates:
mean in group Control mean in group Intervention
0.1698113               -2.0800000
```

The t-test results indicate that there is no statistically significant difference in the change in PHQ-8 scores between the intervention and control groups (p = 0.0712).

Although the intervention group experienced a greater reduction in depressive symptoms, this difference did not reach conventional levels of statistical significance ($p < 0.05$). The confidence interval ranges from approximately -0.198 to 4.697, which includes zero, further suggesting that we cannot conclude a significant effect of the intervention based on this analysis.

Boxplot



The boxplot displays the distribution of the change in PHQ-8 scores for both the control and intervention conditions. Visually, the boxplot shows:

- The median change score for the intervention group appears to be lower (more negative) than the control group, aligning with the descriptive statistics.
- The spread (interquartile range) of the change scores seems relatively similar between the two groups.
- An outlier is present in the control group, indicating a participant with a particularly high positive change in PHQ-8 score.
- The whiskers of the boxplots extend to different lengths, suggesting variations in the range of change scores within each group.

4. Conclusions and Recommendations

The findings suggest that while the Shamiri Intervention demonstrates a trend toward improvement in depressive symptoms among adolescents compared to the control group, this difference is not statistically significant at conventional levels ($p = 0.0712$). The observed trend warrants further investigation.

Recommendations:

- Conduct studies with larger sample sizes to increase statistical power and the likelihood of detecting a significant effect if one exists.
- Explore potential reasons for the lack of statistical significance, such as high variability within the groups or unmeasured confounding variables.
- Investigate the characteristics of individuals who respond most favorably to the intervention to identify potential moderators of treatment effects.
- Consider measuring additional outcomes beyond PHQ-8 scores to gain a more comprehensive understanding of the intervention's impact on adolescent mental health.
- Given the presence of an outlier in the control group, consider sensitivity analyses to assess whether the outlier unduly influences the overall results.

Attachments:

- Initial Data: ***task.xlsx***
- Cleaned Data: ***cleaned_task_data.csv***
- Analysis Code: ***Shamiri Intervention.R***
- Boxplot: ***change_score_boxplot.png***