

MENTAL HEALTH TREND ANALYSIS USING R FOR A UNIVERSITY COUNSELING PROGRAM

1. Background

A large U.S. university in the Midwest conducted a semesterly mental health survey among undergraduate and graduate students to assess wellness, stress levels, and accessibility of support services. Participation had grown steadily, but insights remained limited to surface-level reporting.

The university's Counseling & Psychological Services (CAPS) department hired us to conduct a thorough statistical analysis using R. The goal was to extract actionable findings from three semesters of data and support service planning, particularly in light of post-pandemic mental health shifts.

2. Objective

- To summarize and visualize patterns in student-reported mental health indicators using R
- To test hypotheses regarding gender, academic year, and housing type effects on reported stress and depression levels
- To provide recommendations based on statistically validated results for service allocation, outreach, and telehealth prioritization

3. Data Used

Source: Institutional Research Office, anonymized student surveys (Spring 2022, Fall 2022, Spring 2023)

Dataset Details:

- 6,248 valid responses
- Key variables: Stress_Score, Depression_Score, Sleep_Quality, Use_of_Services, Academic_Year, Gender, Housing_Status, International_Status

4. Methodology

4.1 Data Preparation

- Imported and cleaned data using tidyverse

- Handled missing values using listwise deletion for inferential analysis
- Combined and standardized survey items for Stress_Score and Depression_Score composites (Cronbach's alpha > 0.81)

4.2 Descriptive Analysis

- Calculated means, standard deviations, and frequency distributions
- Visualized trends using ggplot2 (e.g., boxplots, density plots)

4.3 Inferential Analysis

- **T-tests** to compare mental health scores by gender
- **One-way ANOVA** to compare scores across academic years
- **Chi-square tests** for service use vs. housing type
- **Pearson correlation** between depression and sleep quality

5. Statistical Results

Test Type	Result Summary
T-Test (Gender)	Female students had significantly higher mean stress ($p < 0.01$)
ANOVA (Academic Year)	Freshmen reported highest depression scores ($p < 0.05$)
Chi-Square (Services × Housing)	Off-campus students used counseling services less frequently ($p < 0.001$)
Correlation	Depression and poor sleep quality had strong negative correlation ($r = -0.66$)

6. Interpretation and Action

- **Freshmen and female students** emerged as priority groups for targeted support
- Recommended **outreach campaigns for off-campus students** who underutilize services despite similar symptom scores
- Proposed scaling up **tele-counseling slots** during midterms and finals when spikes in stress were detected
- Suggested workshops addressing sleep hygiene based on strong statistical linkage to mental health outcomes

7. Reporting Output

- **R Markdown Report (PDF, 21 pages):**
 - Executive summary, assumptions, test outputs, visualizations, and interpretation
 - Appendices with R code for replication
- **Excel Summary Sheet:**
 - Tabulated statistics, segment-level findings, and recommendations by subgroup
- **Slides (Optional Deliverable):**
 - Condensed visual deck for CAPS leadership team and internal staff briefings

8. Institutional Impact

- Report findings adopted into CAPS **2023–24 strategic plan**
- Led to the creation of two new online counseling slots and three new support groups targeting high-risk cohorts
- Engagement rates with mental health services increased by **17% in one semester**
- Project cited in the university's annual report as part of student wellbeing initiatives