REPORT AND ANALYSIS

# A Time Series Correlation Analysis Among Patients

**Time Series Monitoring data**


## Prepared By

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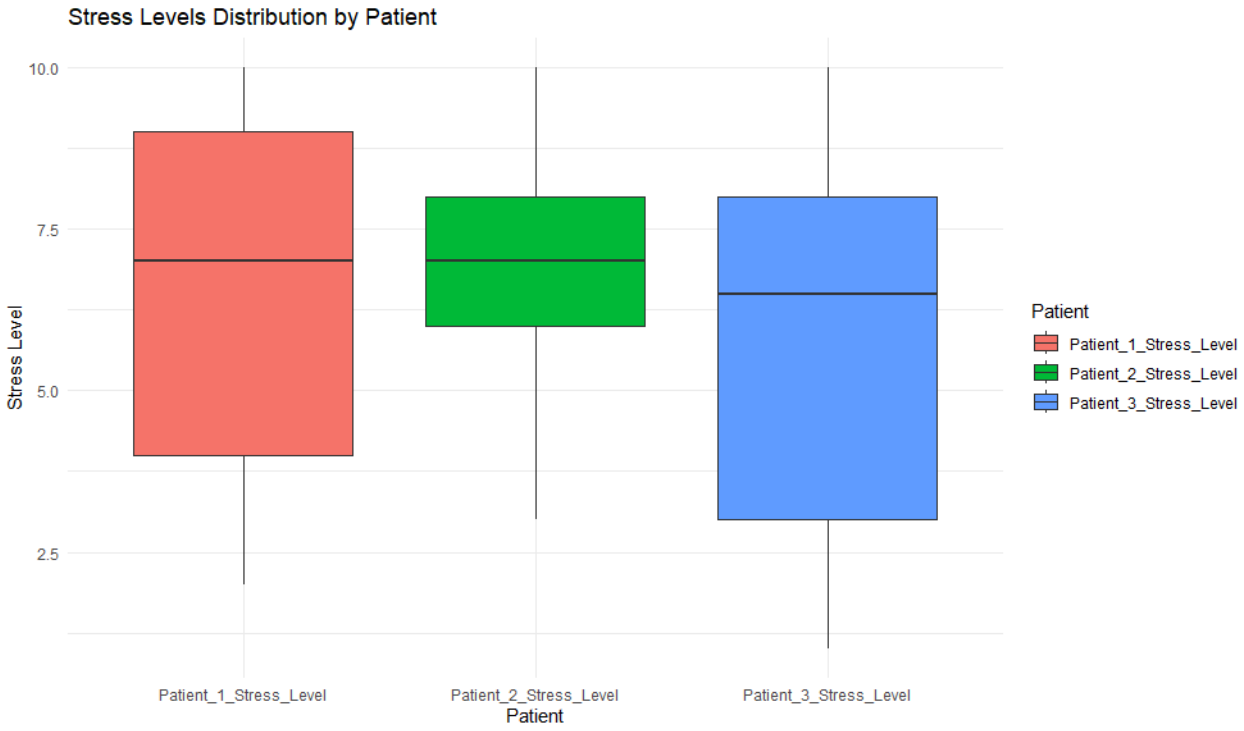
## Introduction

The dataset titled *"Time Series Monitoring Data – Group 005"* contains monthly records of physical activity (measured in average daily step counts), self-reported stress levels, and BMI for three individual patients over a series of months. The objective is to understand patterns in their health behaviors, assess correlations between physical activity, stress, and BMI, and explore how these factors change over time.

## Methods Used for Analysis

- Software & Libraries: R with tidyverse, ggpubr, and psych.
- Data Cleaning: Columns related to steps, stress, and BMI were converted to numeric to ensure consistency.
- Descriptive Statistics: Mean, median, and standard deviation were computed for all numeric variables per patient.
- Visualization




A boxplot was used to visualize the distribution of stress levels across patients.

- Correlation Matrix: Pearson correlation coefficients were computed between all numeric variables to examine the strength and direction of relationships among steps, stress, and BMI.

**Key Results and Figures**

| Variable | Mean | Median | Standard Deviation |
|---|---|---|---|
| Patient 1 - Steps | 3648.74 | 3530 | 2214.48 |
| Patient 2 - Steps | 2916.10 | 2783.5 | 1578.09 |
| Patient 3 - Steps | 4081.62 | 3623 | 2849.03 |
| Patient 1 - Stress | 6.48 | 7 | 2.54 |
| Patient 2 - Stress | 7.17 | 7 | 1.70 |
| Patient 3 - Stress | 5.76 | 6.5 | 2.87 |
| Patient 1 - BMI | 24.24 | 24 | 0.96 |
| Patient 2 - BMI | 24.42 | 24.35 | 0.29 |
| Patient 3 - BMI | 24.92 | 25.15 | 0.96 |

**Correlation Insights:**

- A strong negative correlation exists between step count and stress level (e.g., -0.95 for Patient 1), indicating that higher physical activity is associated with lower stress.

- Steps and BMI are moderately negatively correlated in Patients 1 and 3, suggesting increased steps may be linked to lower BMI.

- Stress and BMI show a positive correlation, particularly in Patient 1, indicating that higher stress may slightly raise BMI.

**Conclusion**

This analysis reveals a consistent pattern where increased physical activity (as measured by steps) is linked to reduced stress and healthier BMI values. Patients with higher average steps, like Patient 3, tend to have lower stress scores and healthier BMI. Conversely, low activity levels appear to coincide with increased stress and slight upward trends in BMI. These trends support the commonly accepted view that regular physical activity contributes positively to both mental well-being and physical health.