REPORT AND ANALYSIS

From Calories to Composition: Linking Intake, Activity, and Body Metrics

Nutritional Dietary data

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Introduction

This dataset captures nutritional and physical activity information from patients, including variables such as BMI, body fat percentage, muscle mass, physical activity hours per week, daily caloric intake, and water consumption. These metrics are essential for assessing the interrelationship between diet, physical health, and fitness behaviors.

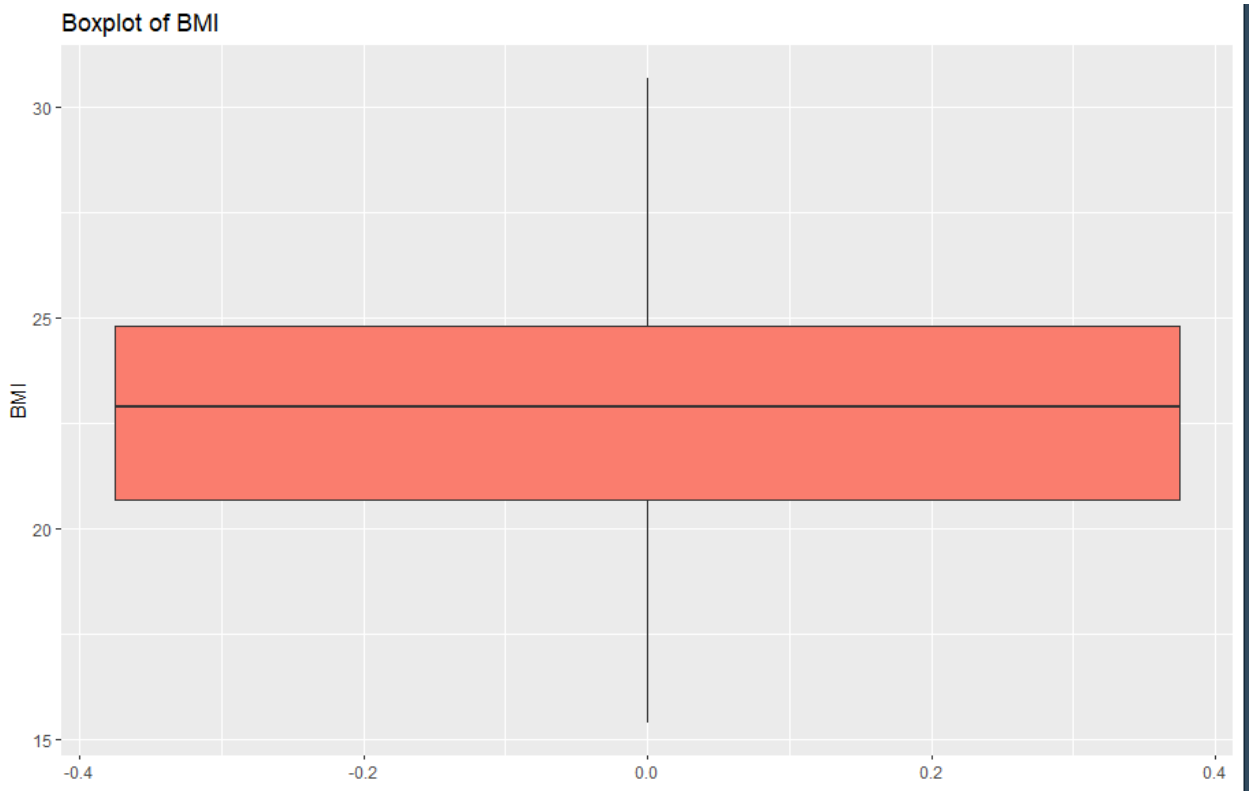
Methods Used for Analysis

- Data Cleaning: Missing values in numeric columns were imputed using the column mean.
- Descriptive Statistics: Summary statistics were generated using describe() from the psych package.
- Visualizations:
    - Boxplot of BMI to detect spread and outliers.
    - Scatter plot of physical activity vs. daily caloric intake with linear regression.
    - Bar plot showing distribution of water intake using grouped bins.
- Correlation Matrix: Examined Pearson correlations between body composition metrics and lifestyle indicators.

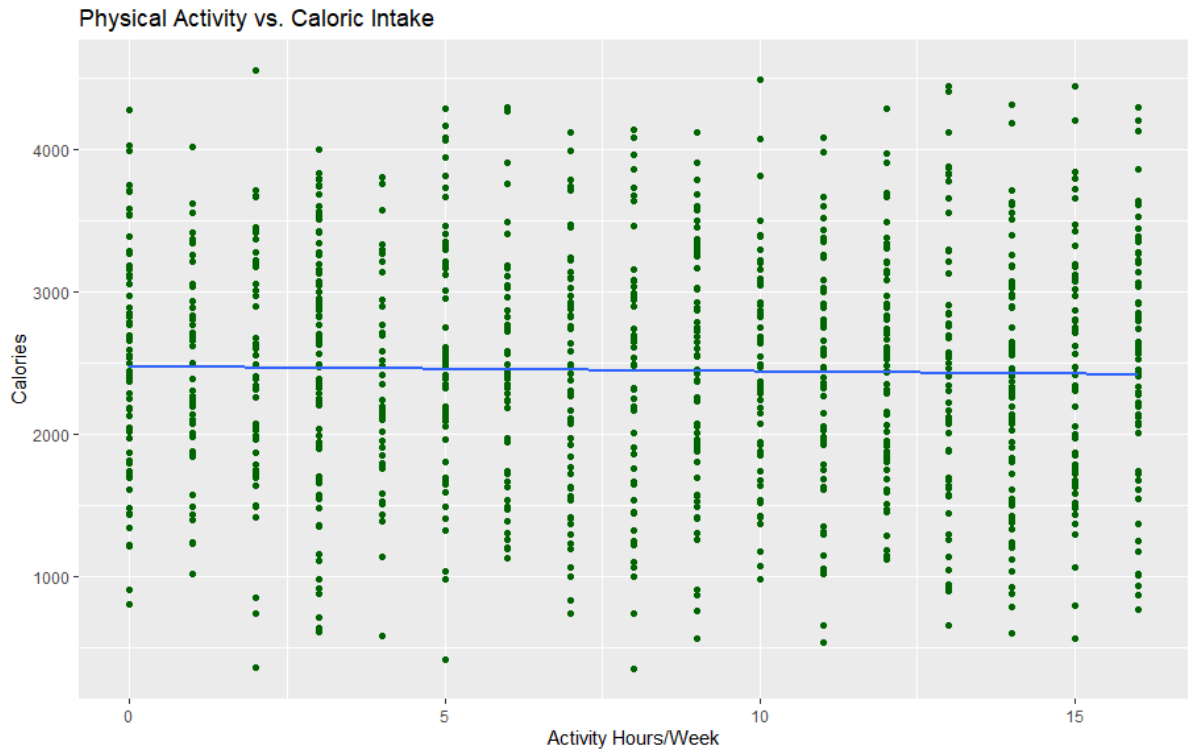
Key Results and Figures

Variable	Strong Correlations Observed
BMI	Positively correlated with Body Fat % (r = 0.90)
Body Fat %	Positively correlated with Calories (r = 0.73)
BMI & Activity Hours	Negative correlation (r = -0.70)
Muscle Mass & Activity Hours	Positive correlation (r = 0.47)
Calories & Muscle Mass	Moderate positive correlation (r = 0.52)

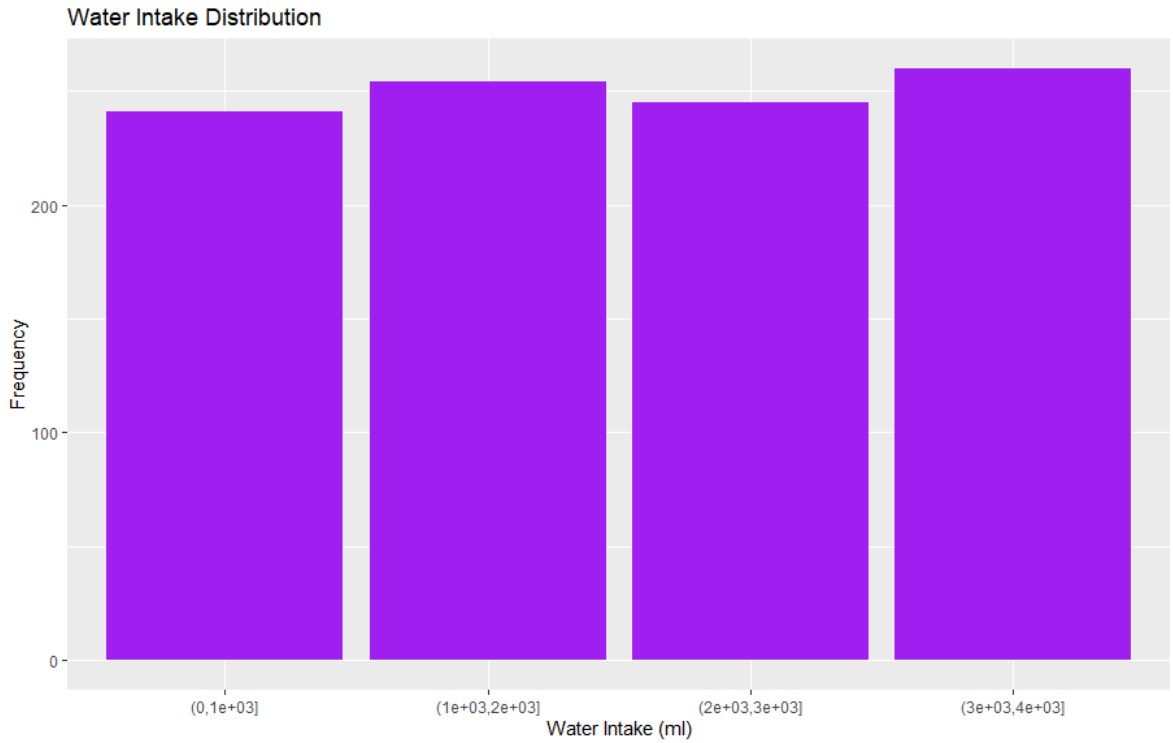
Figures:



Boxplot: Visualized BMI distribution (see boxplot_bmi.png)



Scatter plot: Physical activity vs. caloric intake (see scatter_activity_calories.png)



Bar plot: Water intake bins (see barplot_water_intake.png)

Conclusion

This analysis shows strong interrelationships between body composition and lifestyle behavior. Higher BMI is closely linked to body fat percentage and caloric intake, while increased physical activity correlates with higher muscle mass and lower BMI. Interestingly, physical activity has a near-zero correlation with caloric intake, suggesting varied dietary habits regardless of exercise levels.

These insights emphasize the importance of balanced nutrition and consistent physical activity in managing body composition and overall health.