Health Analysis

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Abstract

This report presents a comprehensive analysis of personal health data, focusing on key metrics such as physical activity, heart rate, sleep quality, and weight management. Various visualizations, including daily step trends, exercise type distribution, correlation analysis, and time series trends, are used to gain insights into health behaviors. The findings highlight important patterns in physical activity, hydration, and sleep quality, providing actionable recommendations for improved well-being over time.

Health Analysis Report

Introduction

This report provides an in-depth analysis of personal health data collected over a period of one year. The analysis focuses on key health metrics, such as daily step count, heart rate, sleep quality, calorie intake, water consumption, weight trend, exercise patterns, and blood pressure levels. The aim is to identify trends, correlations, and areas for potential improvement in overall health.

Data Description

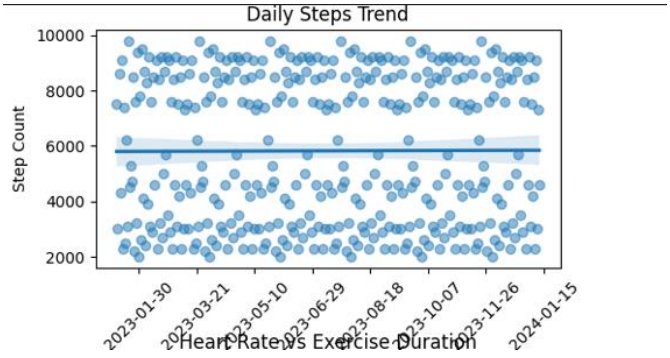
The dataset used in this analysis consists of 366 daily records with the following key attributes:

- **Date**: The specific day of the record.
- **Step Count**: The number of steps taken daily.
- **Heart Rate (avg bpm)**: Average heart rate in beats per minute.
- **Sleep Quality (%)**: Percentage representing the quality of sleep.
- **Calories (kcal)**: Total daily calorie intake.
- **Water Intake (L)**: Amount of water consumed in liters.
- **Weight (kg)**: Body weight in kilograms.
- **Exercise Type**: Type of exercise performed (e.g., Football, Pilates, Walking).
- **Exercise Duration (min)**: Duration of exercise in minutes.
- **Blood Pressure (mmHg)**: Systolic and diastolic blood pressure readings.

Analysis and Visualization

1. Daily Steps Trend

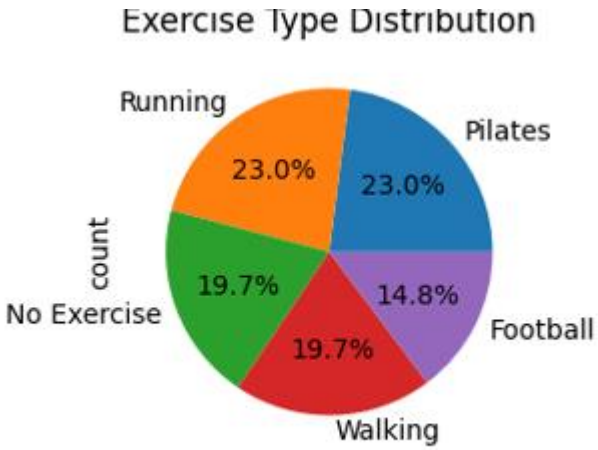
The daily step count fluctuates significantly throughout the year. There are noticeable peaks on certain days, which may correspond to specific events or activities. The overall trend suggests consistent physical activity with occasional high-step days.



2. Exercise Type Distribution

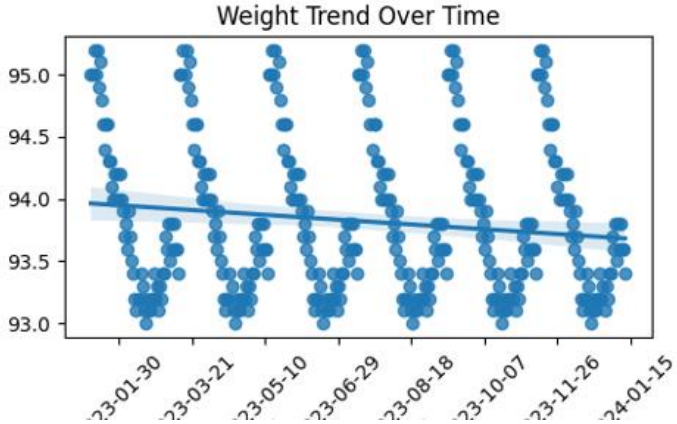
A pie chart shows the distribution of exercise types:

- **Pilates** and **Running** each account for 23% of total exercise activities.
- **Football** and **Walking** make up 14.8% and 19.7%, respectively.
- **No Exercise** days account for 19.7% of the total days recorded.



3. Weight Trend Over Time

The line plot of weight over time shows periodic fluctuations, likely due to variations in diet and activity levels. Despite these fluctuations, there is a slight decreasing trend in weight over the recorded period.

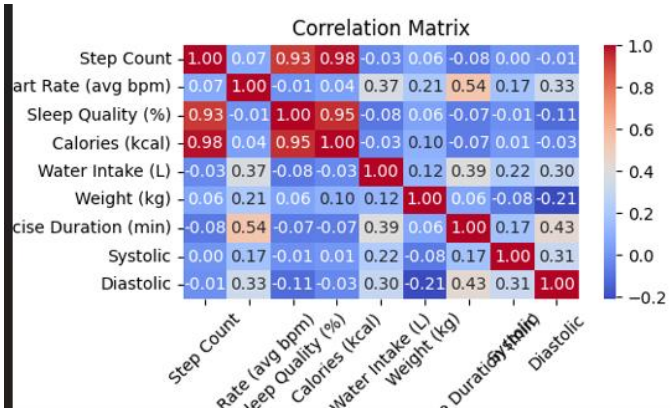


4. Correlation Matrix

A heatmap of the correlation matrix highlights key relationships between various metrics:

- **Step Count** has a strong positive correlation (0.98) with **Calories (kcal)**, indicating that increased physical activity leads to higher calorie burn.

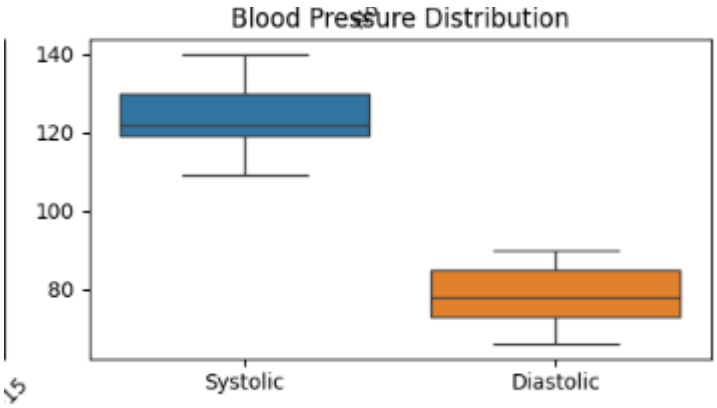
- **Sleep Quality (%)** shows a moderate negative correlation with **Heart Rate (avg bpm)** (-0.54), suggesting that better sleep quality may be associated with a lower average heart rate.
- **Water Intake (L)** has a weak correlation with most other metrics, implying limited direct influence on other health factors.



5. Blood Pressure Distribution

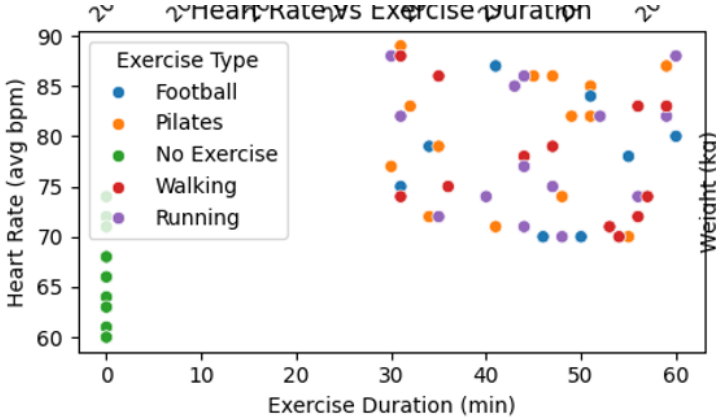
A boxplot of systolic and diastolic blood pressure readings shows:

- Systolic values range between 110 and 140 mmHg, with a median around 120 mmHg.
- Diastolic values range between 70 and 90 mmHg, with a median around 80 mmHg.



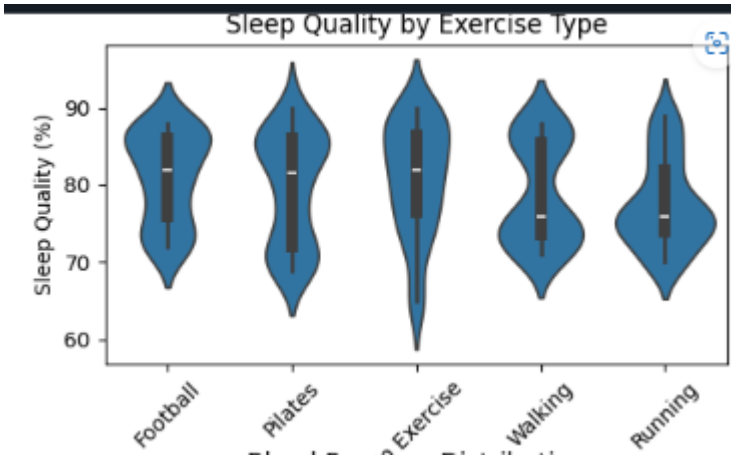
6. Calories vs. Exercise Duration

A scatter plot depicting the relationship between calories burned and exercise duration shows that higher exercise duration generally leads to increased calorie burn. Different exercise types are represented with distinct colors, indicating variation in calorie expenditure based on the type of exercise.



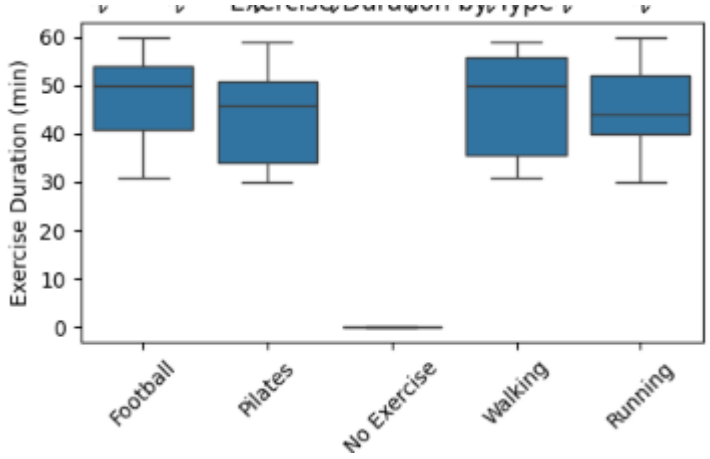
7. Sleep Quality by Exercise Type

A violin plot shows the distribution of sleep quality percentages across different exercise types. It provides insights into how various exercise routines may influence sleep quality.



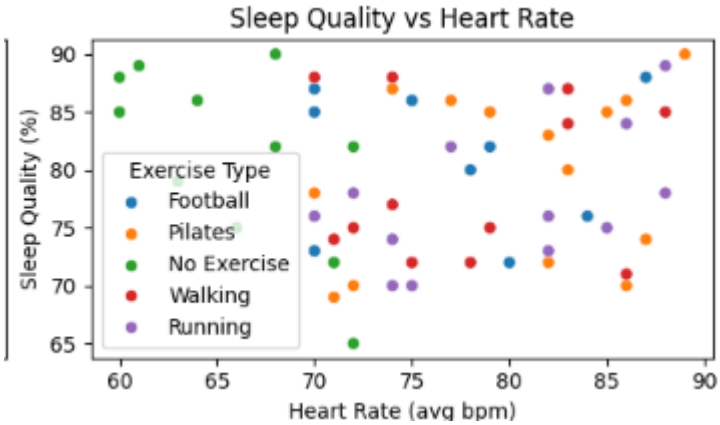
8. Exercise Duration by Type

A boxplot compares the duration of exercises by type, highlighting differences in typical exercise times for various activities.



9. Sleep Quality vs. Heart Rate

A scatter plot illustrates the relationship between sleep quality and heart rate, with different exercise types represented by different colors.



Key Findings

1. **Physical Activity**: The subject maintains a consistent level of physical activity, with regular exercise contributing significantly to daily calorie burn.
2. **Sleep Quality**: There is a noticeable link between sleep quality and heart rate, suggesting that better sleep may contribute to improved cardiovascular health.
3. **Weight Management**: Despite fluctuations, there is a slight overall decrease in weight, indicating positive progress toward weight management goals.
4. **Hydration**: Water intake remains consistent but shows minimal correlation with other health metrics, implying that hydration levels are maintained independently.
5. **Blood Pressure**: Blood pressure readings are within a healthy range, with minor variations across the recorded period.

Recommendations

1. **Maintain Regular Exercise**: Continue engaging in a variety of exercises, particularly those that contribute to higher calorie burn.
2. **Focus on Sleep Quality**: Improving sleep hygiene could further enhance overall health and reduce heart rate.
3. **Monitor Weight Trends**: Keep tracking weight to ensure continued progress toward health goals.
4. **Consistent Hydration**: Maintain or increase water intake, especially on high-activity days.
5. **Blood Pressure Checks**: Regular monitoring of blood pressure can help ensure that it remains within a healthy range.

Conclusion

This analysis provides valuable insights into the subject's health patterns and highlights areas of strength and improvement. By maintaining regular exercise, focusing on sleep quality, and ensuring proper hydration, the subject can continue to make positive strides in their overall health and well-being.