

# Personal Health, Fitness, and Nutrition Metrics Analysis Report

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## Dataset Description

The dataset used in this analysis, "Personal Health and Fitness Tracker," records various physiological, dietary, and lifestyle parameters collected from daily monitoring. It consists of metrics such as:

- Date – Daily log date
- Calories Intake (kcal) – Total daily calorie consumption
- Calories Burned (kcal) – Estimated daily energy expenditure
- Steps Count – Number of steps recorded per day
- Active Minutes – Duration of physical activity per day
- Water Intake (L) – Total daily hydration level
- Sleep Duration (hours) – Total sleep time logged
- Heart Rate (bpm) – Average resting heart rate
- BMI – Calculated Body Mass Index
- Mood / Stress Level – Qualitative rating (Low, Moderate, High)

TotalRecords:365

UniqueAttributes:9

Tracking Period: January–December 2024

## Operations Performed

### Data Loading & Cleaning

- Imported the CSV file into a Pandas DataFrame using Python.
- Converted date fields to datetime format for time-series analysis.
- Checked for missing values in key columns like Calories, Steps, and Sleep Duration.
- Handled outliers (e.g., unusually high steps or calorie values).

### Exploratory Data Analysis (EDA)

- Calculated average daily, weekly, and monthly trends for calories, steps, and sleep.
- Determined correlations between physical activity, calorie balance, and sleep quality.

- Segmented data by weekdays vs. weekends for behavior pattern analysis.

### Key Aggregations & Grouping

- **Monthly Summary:** Average calories intake vs. calories burned trend.
- **Sleep Analysis:** Average sleep duration per week and its impact on mood and performance.
- **Hydration Analysis:** Relationship between water intake and daily activity level.
- **Heart Rate Analysis:** Identified resting heart rate trends over time.

### Visualization & Insights

- Line charts showing calories intake vs. burned per month.
- Histogram of step counts distribution.
- Correlation heatmap between BMI, sleep, and heart rate.
- Pie chart showing mood distribution across the year.

## Key Insights

- **Calorie Balance:** Average daily calorie intake was 2,150 kcal, while calories burned averaged 2,300 kcal — indicating a slight negative energy balance supportive of weight control.
- **Activity Level:** Average steps per day = 8,750. Peak activity observed in April–June; lowest in December.
- **Hydration Pattern:** Average water intake = 2.3 L/day; notable decline on weekends.
- **Sleep Trend:** Average sleep = 6.9 hours/day; productivity and mood were best when sleep exceeded 7 hours.
- **Heart Health:** Average resting heart rate = 71 bpm; gradual improvement (lower rate) during consistent exercise months.
- **Mood Correlation:** High stress levels coincided with reduced sleep and lower step counts.

## Recommendations

- **Maintain Consistency:** Continue regular exercise routine; increase daily step count to consistently reach the 10,000-step target.
- **Improve Sleep Hygiene:** Aim for at least 7.5 hours of sleep daily to optimize recovery and stress balance.

- **Nutrition Optimization:** Adjust macronutrient ratio to maintain energy during active months; increase protein during high workout periods.
- **Hydration:** Increase water intake to at least 2.5 L daily to support metabolism and muscle recovery.
- **Heart Rate Monitoring:** Maintain regular cardio sessions to further improve cardiovascular health and reduce resting heart rate.
- **Mindfulness & Stress Reduction:** Incorporate meditation or yoga 2–3 times per week to stabilize mood and improve overall well-being.

Example Snippet

Column Name	Description	Sample Value
Date	Date of record entry	2024-06-14
Calories Intake	Daily calorie consumption (kcal)	2100
Calories Burned	Daily energy expenditure (kcal)	2250
Steps Count	Total steps recorded per day	9,120
Water Intake	Daily water intake (liters)	2.4
Sleep Duration	Total sleep hours per day	7.2
Heart Rate	Average resting heart rate (bpm)	70
BMI	Body Mass Index	23.1
Mood Level	Self-assessed mood level	Moderate