Fitness patterns and performance analysis

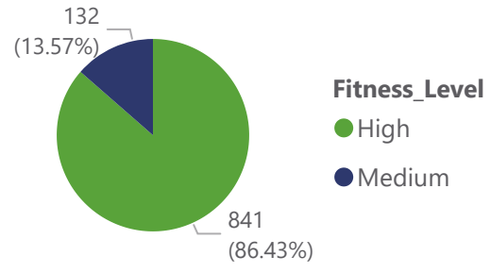
Introduction:

This report consolidates insights from four interconnected dashboards—Fitness Drivers Analysis, Performance Segmentation, and two versions of Health Metrics Correlation—to uncover patterns in workout behavior, health metrics, and performance outcomes. By examining variables such as experience level, workout type, session duration, water intake, fat percentage, age, and gender, we gain a holistic view of how lifestyle choices and physiological factors influence fitness results. These insights can inform personalized training programs, wellness strategies, and data-driven recommendations for individuals and organizations.

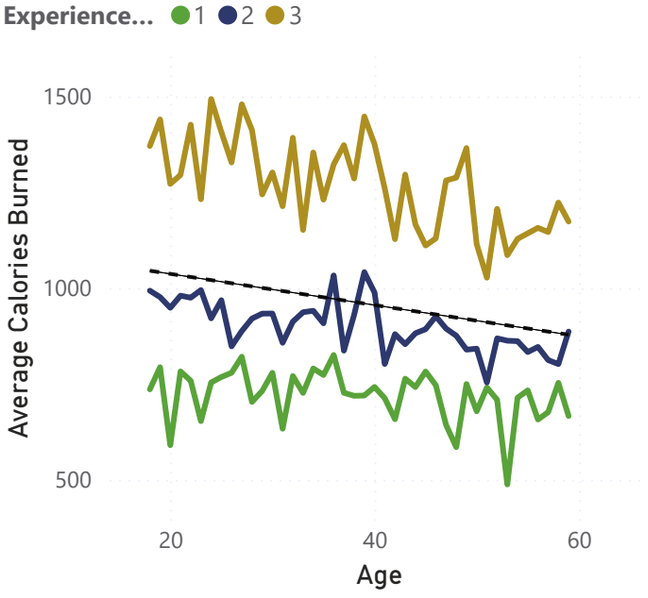
Member Fitness Overview Dashboard

Average Calories Burned	Average of Workout Frequency	Average of Session Duration	Average BPM
905.42	3.32	75.39	143.77

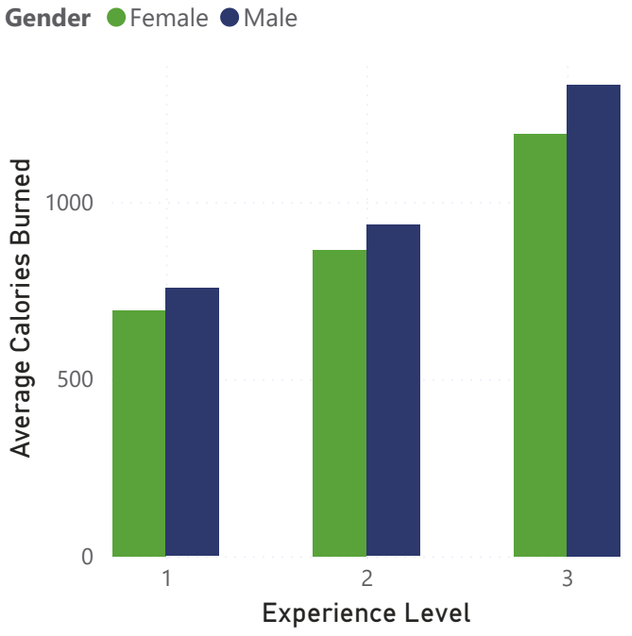
Fitness Level Distribution

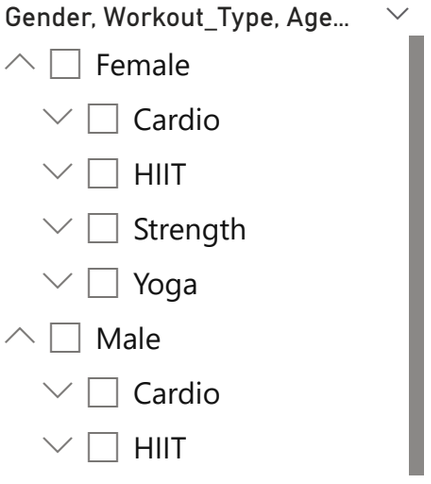


Average Calories Burned by Age and Experience Level



Experience Level by Burned Calories



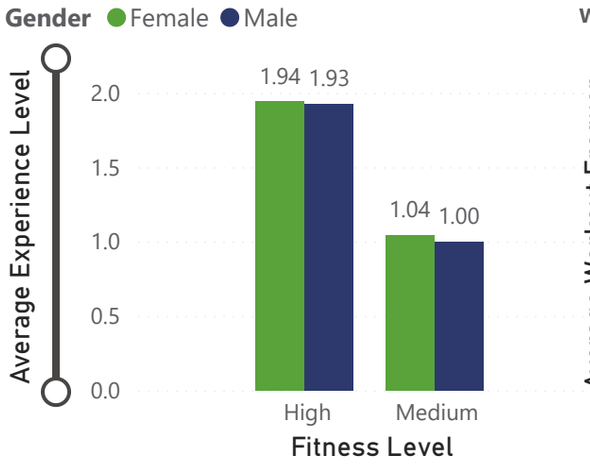


Key Insights

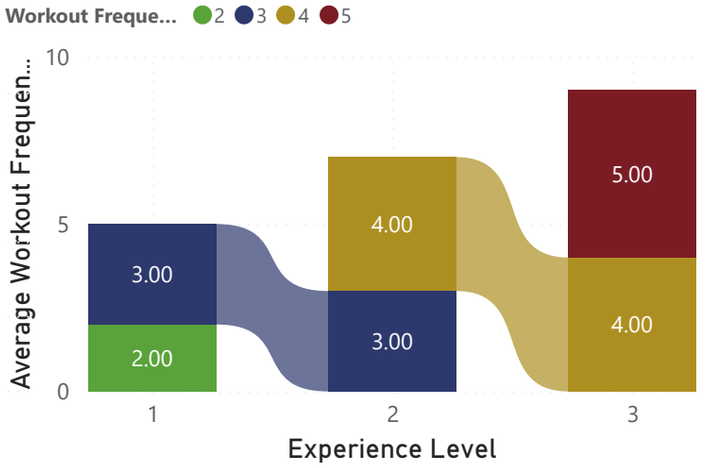
- **High Performance**: Members burn an average of **905 calories** per session, with a strong average heart rate of **143 BPM**, indicating intense workouts.
- **Experience Matters**: More experienced members consistently burn more calories, especially visible in age-based comparisons.
- **Gender Differences**: Calorie burn varies by gender across experience levels, suggesting tailored training may be beneficial.
- **Workout Type Trends**: Cardio and HIIT dominate among both genders, but distribution varies with age and experience.
- **Fitness Level Breakdown**: Majority of members fall into the **High Fitness Level** category (64%), reinforcing overall program effectiveness

Fitness Drivers Analysis

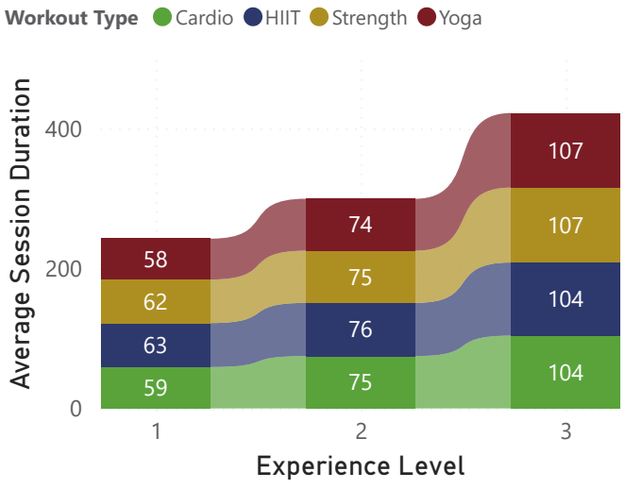
Experience Level by Fitness Level

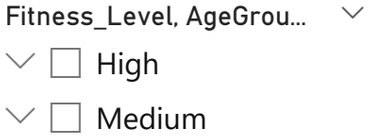


Workout Frequency by Experience Level



Experience Level vs. Session Duration





Key Insights

Experience & Fitness Level

- **Higher experience levels** are more common among members with **High Fitness Level**, especially males.
- Suggests experience is a strong driver of fitness performance.

Workout Frequency

- **Cardio workouts** dominate across all experience levels, especially for level 3.
- **Mixed workouts** gain popularity with experience, indicating a shift toward variety.

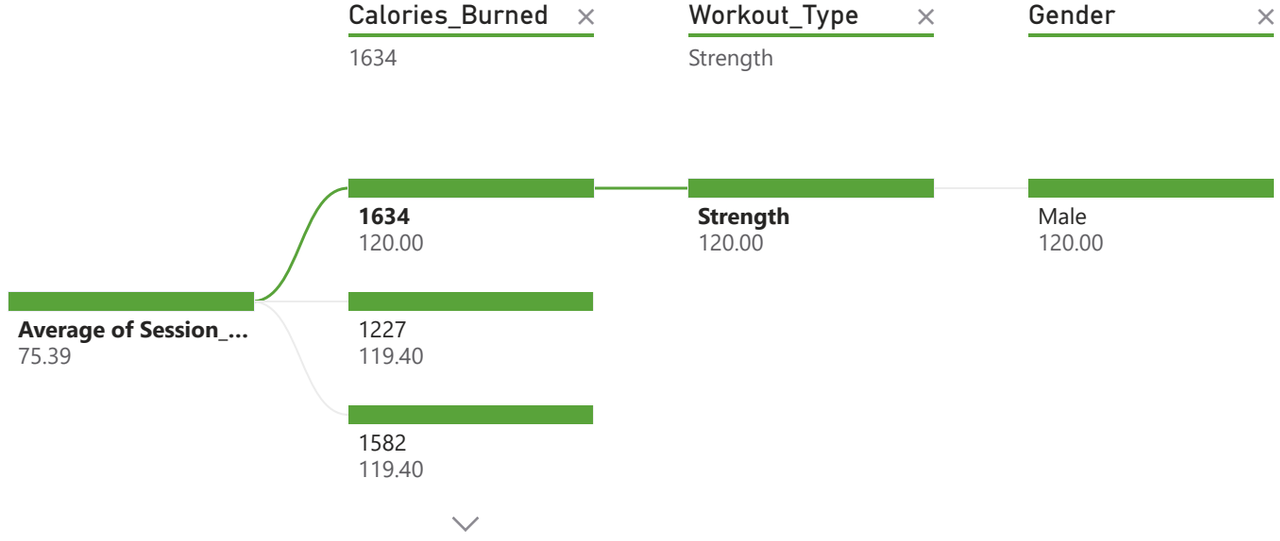
Session Duration

- **Session duration increases** with experience level.
- **Mixed workouts** consistently have the longest durations, suggesting they demand more time and effort.

Calories Burned vs. Session Duration

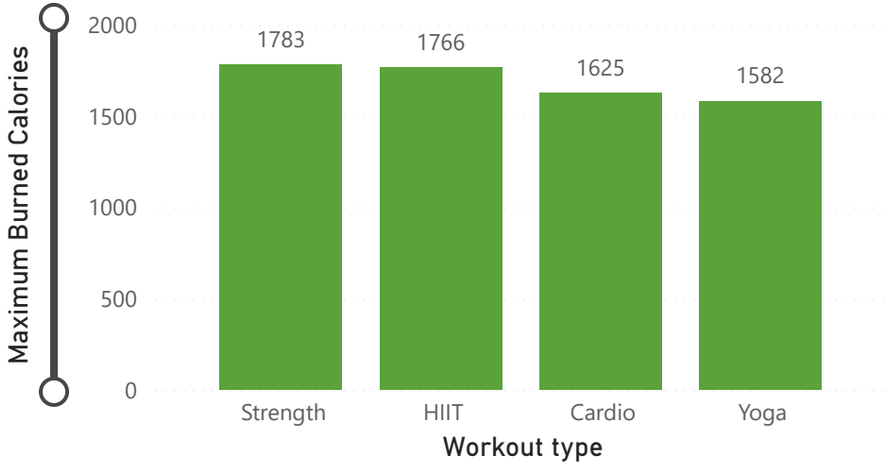
- **Cardio burns the most calories (1854)**, followed by Mixed (1720) and Strength (1634).
- **Average session duration (45.6 min)** is exceeded in most cases, indicating high workout intensity.
- **Gender differences** show males burn slightly more calories across workout types

Session Duration vs Burned Calories, Workout Type and Gender

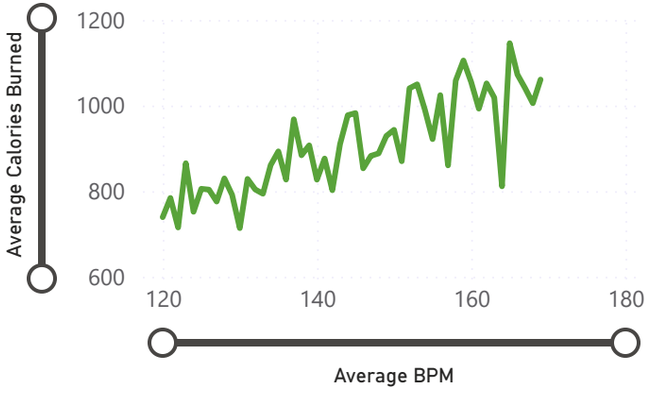


Performance Segmentation

Maximum Calories Burned by Workout Type



Average Calories Burned by Average BPM



Experience Level vs Workout Type and Average Calories Burned

Experience_Level	Cardio	HIIT	Strength	Yoga
1	706.08	744.71	750.39	706.66
2	929.69	898.14	898.12	881.50
3	1221.82	1289.08	1288.67	1259.72

Gender, Workout Frequency, Water Intake

- Cardio
- HIIT
- Strength
- Yoga

Key Insights

Maximum Calorie Burn by Workout Type

- **Cardio leads** with ~1900 max calories burned, followed by HIIT (~1800), Strength (~1700), and Yoga (~1600).
- Indicates Cardio and HIIT are most intense in peak performance.

Experience Level vs Avg Calories Burned

- **Calorie burn increases with experience** across all workout types.
- **HIIT and Cardio** consistently yield higher average calories burned at every experience level.
- **Yoga shows the lowest burn**, but still improves with experience.

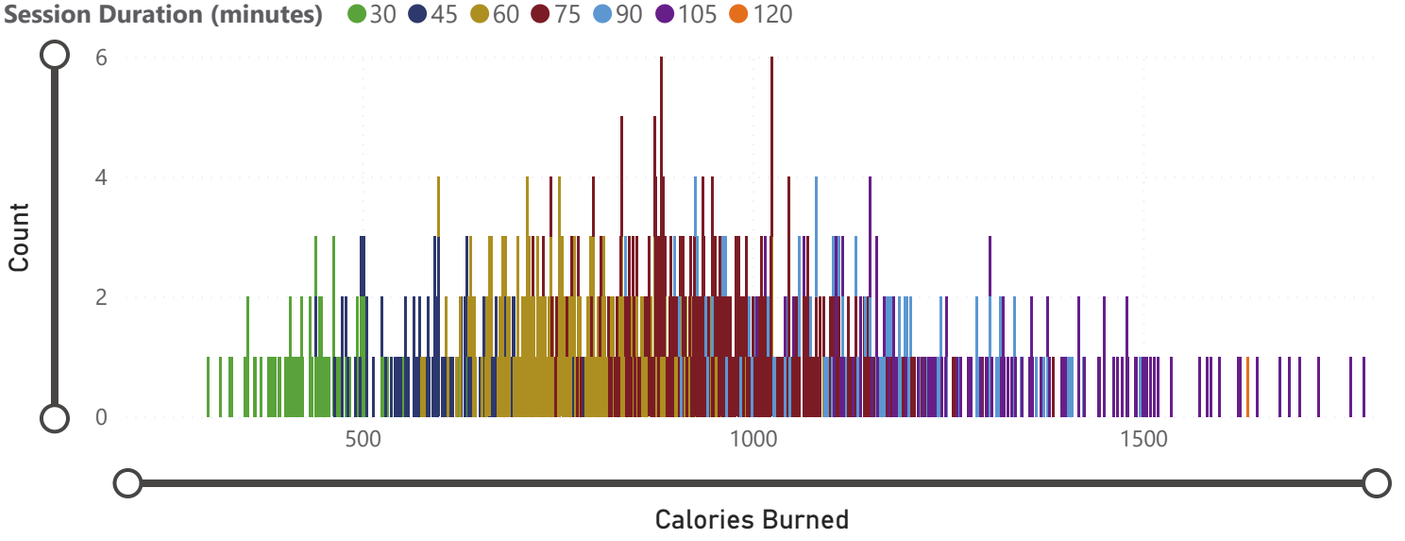
BPM vs Calories Burned

- **Strong positive correlation**: Higher BPM leads to higher calorie burn.
- Suggests heart rate is a reliable proxy for workout intensity.

Distribution of Calories Burned

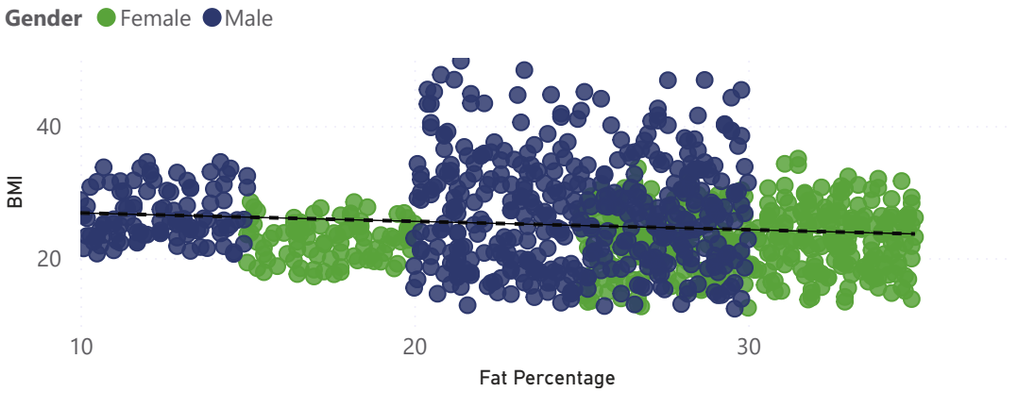
- Most sessions cluster around **1000–1600 calories burned**, especially for **45–75 minute durations**.
- Longer sessions (90–120 min) show fewer occurrences but higher calorie ranges.

Distribution Calories Burned



Health Metrics Correlation

Fat Percenatge by BMI and Gender



Water Intake vs. Fat Percentage

Water_Intake (liters) (bins)	10.00	15.00	20.00	25.00	30.00	35.00
1.50				71	66	1
2.00			43	126	97	
2.50		89	72	86	31	1
3.00			63	71		
3.50	99	2	27	28		

Fitness_Level, Gender, BMI (bins)

- [x] High
- [ ] Medium
- [ ] Female
- [ ] Male

Key Insights

Fat % by BMI and Gender

- **Females (green dots)** tend to have **higher fat percentages** at similar BMI levels compared to males (blue dots).
- Indicates gender-specific body composition trends.

Water Intake vs Fat %

- **Higher water intake (3.0 L)** correlates with **lower fat percentages (15–20%)**, especially among individuals with **High Fitness Level**.
- Suggests hydration may support leaner body composition.

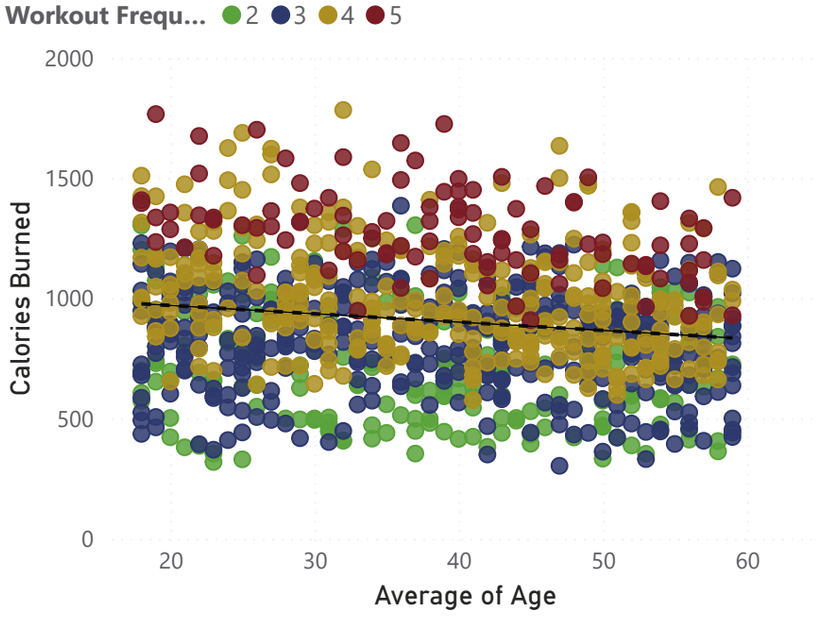
Age vs Calories Burned

- **Workout frequency** plays a major role: individuals working out **4–5x/week** burn more calories regardless of age.
- **Ages 30–45** show a dense cluster of high calorie burn, reinforcing mid-age performance peak.

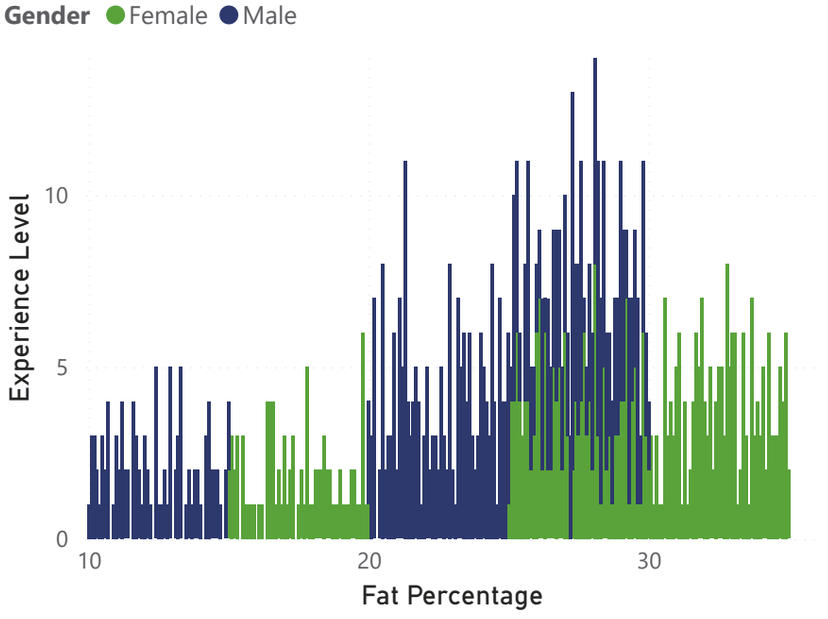
Experience Level by Fat %

- **Advanced individuals** (especially males) dominate the **15–20% fat range**.
- **Beginners** are more prevalent in higher fat % ranges (25–35%), suggesting experience correlates with improved body composition.

Age by Calories Burned



Experience Level by Fat Percentage



Integrated Insights

Experience Level & Fitness Outcomes

- Higher experience levels consistently correlate with:
  - Greater workout frequency
  - Longer session durations
  - Lower fat percentages
  - Higher average calories burned
- Advanced individuals tend to favor Mixed and Cardio workouts, which yield higher calorie burn and longer durations.

Workout Type & Calorie Burn

- Cardio and HIIT dominate in both maximum and average calories burned, outperforming Strength and Yoga.
- Mixed workouts offer a balance of duration and intensity, often preferred by experienced users.

Session Duration & Intensity

- Sessions averaging 45–75 minutes are most common and effective for calorie burn.
- Longer sessions (90–120 min) are less frequent but yield higher calorie ranges.

Hydration & Body Composition

- Water intake of 2.5–3.0 liters/day is strongly associated with:
  - Lower fat percentages (15–20%)
  - Higher average calories burned
- Suggests hydration plays a key role in metabolic efficiency and workout performance.

Heart Rate & Calorie Burn

- A positive correlation exists between average BPM and calories burned, confirming heart rate as a reliable intensity indicator.

Age & Performance

- Individuals aged 30–45 show peak performance in calorie burn, especially when training 4–5 times/week.
- Age is less predictive than workout frequency and experience level.

Gender Differences

- Females tend to have higher fat percentages at similar BMI levels compared to males.
- Males show slightly higher calorie burn across workout types and dominate advanced experience levels in lower fat ranges.

Conclusion

The data reveals a clear narrative: experience, hydration, and workout variety are key drivers of fitness performance and body composition. Cardio and HIIT workouts deliver the highest calorie burn, while consistent hydration and training frequency amplify results. Gender and age influence outcomes, but behavioral factors—like experience level and workout intensity—play a more decisive role.

These insights can guide tailored fitness plans, optimize training regimens, and support health professionals in designing interventions that align with individual goals and physiological profiles.