ORGANIZATION VITATRACK WELLNESS

Here's the analysis based on the data:

1. Are users maintaining a balanced lifestyle in terms of daily steps, calories intake, and sleep?

From the histograms:

- **Daily Steps**: Most users take between **6,000 and 15,000 steps**, aligning with moderate to active lifestyles.
- **Calories Intake**: The distribution peaks between **1,700 and 2,800 kcal/day**, which is generally appropriate for adults.
- **Hours of Sleep**: Majority sleep between **5 to 9 hours**, though a subset falls below recommended 7 hours — indicating possible sleep imbalance.

🔲 **Conclusion**: While daily steps and calorie intake seem generally balanced, **sleep habits may be suboptimal** for some users.

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2. Identify how individuals are at risk of heart disease based on lifestyle habits.

We'll analyze relationships between **Heart Disease** and features like BMI, Smoking, Alcohol, Exercise, and Sleep.

It seems like I can't do more advanced data analysis right now. Please try again later.

However, I can still guide you through what the analysis would involve:

2. Identify Heart Disease Risk Based on Lifestyle Habits

You'd typically:

- Use **boxplots** to compare **BMI, alcohol intake, exercise hours, and sleep duration** between people **with vs. without heart disease**.
- Use a **count plot** for **smoking status** to observe if smokers are overrepresented among heart disease cases.

Look for patterns like:

- Higher average **BMI**
- Lower **exercise hours**
- Shorter **sleep**

- More **alcohol/smoking** among heart disease individuals

3. Is there any relationship between sleep and physical activity?

To explore this, we'll focus on two key variables:

- Hours_of_Sleep
- Exercise_Hours_per_Week (and potentially Daily_Steps as a secondary indicator of activity)

In Power BI or Excel, here's how you can analyze this:

✅ **Approach in Power BI**

Option A: Scatter Plot

- **X-axis**: Exercise_Hours_per_Week
- **Y-axis**: Hours_of_Sleep
- **Color/Legend**: Add Gender or Heart_Disease for deeper patterns
- Add a **Trend Line** to observe correlation

Option B: Correlation Chart or Table (optional with DAX or R plugin)

✅ **What to Look For**

- **Positive correlation**: If those who exercise more tend to sleep more, that indicates a healthy balance.
- **Negative or weak correlation**: May suggest that exercise doesn't necessarily align with rest — could indicate overtraining, stress, or poor time management.

Interpretation Example (Based on Hypothetical Patterns):

- People exercising **>7 hours/week** may also sleep **>7 hours/night**, suggesting **wellness-conscious behavior**.
- Those with <3 hours of exercise may also sleep less, potentially at **higher health risk**.

4. How BMI Varies Across Age Groups and Genders

This analysis reveals trends in body composition and potential health risks segmented by age and gender.

✅ **Steps for Power BI Visualization**

Step 1: Create Age Groups

In Power BI (or Excel), you can create bins or use a custom column with DAX:

DAX

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```
Age_Group =
SWITCH(
    TRUE(),
    [Age] <= 29, "18-29",
    [Age] <= 39, "30-39",
    [Age] <= 49, "40-49",
    [Age] <= 59, "50-59",
    [Age] <= 69, "60-69",
    "70+"
)
```

Step 2: Create a Clustered Column Chart or Boxplot

- **X-axis**: Age_Group
- **Legend**: Gender
- **Y-axis**: Average or distribution of BMI

Optional: Use a boxplot (via R visuals or custom visuals in Power BI) to show spread and outliers.

✅ **What to Look For**

- **Higher BMI in older age groups**: Could signal sedentary lifestyle or metabolic slowdown.
- **Gender comparison**:
    - Men may have **higher BMI** in middle-age groups due to muscle mass or weight gain.
    - Women may show BMI variation around **menopausal age** due to hormonal shifts.

Interpretation Example:

- Age 30–49 may show highest BMI on average for both genders.
- Female BMI may rise in older age groups due to decreased activity.
- Men may peak earlier but with slightly higher BMI overall.

5. What is the impact of smoking and alcohol on heart rate and blood pressure?

This question helps identify cardiovascular stress linked to lifestyle choices like **smoking** and **alcohol consumption**.

✅ **Approach in Power BI**

A. Smoking vs Heart Metrics

- Create **bar/box plots**:

- **X-axis**: Smoker (Yes/No)
- **Y-axis**:
  - Heart_Rate
  - Systolic_BP
  - Diastolic_BP

→ This shows how smokers differ in heart and blood pressure metrics.

B. Alcohol vs Heart Metrics

- Use **scatter plots** or **box plots**:
  - **X-axis**: Alcohol_Consumption_per_Week
  - **Y-axis**:
    - Heart_Rate
    - Systolic_BP
    - Diastolic_BP

→ Helps visualize **linear or nonlinear trends** between alcohol consumption and vital signs.

✅ **What to Look For**

- **Smokers** may show:
  - **Higher heart rate** (nicotine effect)
  - Slightly elevated **blood pressure**
- **Higher alcohol intake** (e.g., >5 drinks/week) may associate with:
  - Increased **heart rate**
  - Elevated **systolic blood pressure**

Interpretation Example:

- **Non-smokers** have an average heart rate of ~82 bpm vs **smokers** at ~90 bpm.
- Alcohol intake of **6–9/week** might push systolic BP from ~113 to ~120+ on average.

6. Segment People Based on Their Health Activity to Suggest Lifestyle Changes

This helps **group users with similar health behaviors** so that **personalized recommendations** can be made.

✅ **Approach in Power BI**

A. Clustering or Segmentation

Use **Power BI's K-Means Clustering (via Power Query or Python/R)** or manual segment logic based on:

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Key features to include:

- BMI
- Daily_Steps
- Exercise_Hours_per_Week
- Hours_of_Sleep
- Smoker
- Alcohol_Consumption_per_Week
- Heart_Rate
- Heart_Disease

✅ **Manual Segmentation Example (DAX logic or calculated columns)**

Example Lifestyle Segments:

Segment	**Criteria**
Active Healthy	BMI < 25, Steps > 8000, Sleep ≥ 7 hrs, Non-smoker, Low alcohol
At-Risk Lifestyle	BMI > 30, Steps < 5000, Sleep < 6 hrs, Smoker/Heavy Alcohol (>6/week)
Moderate	In-between values, occasional smoker or borderline BMI

You can define a column like this:

DAX

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```
Health_Segment =
SWITCH(
    TRUE(),
    [BMI] < 25 && [Daily_Steps] > 8000 && [Hours_of_Sleep] >= 7 && [Smoker] = "no" && [Alcohol_Consumption_per_Week] < 5, "Active Healthy",
    [BMI] > 30 && [Daily_Steps] < 5000 && [Hours_of_Sleep] < 6 && [Smoker] = "yes" && [Alcohol_Consumption_per_Week] > 6, "At-Risk Lifestyle",
    "Moderate"
)
```

✅ **Visualization Options**

- **Pie or bar chart**: Count of users per segment
- **Table/Matrix**: Segment vs average heart rate, BP, etc.
- **Slicer filters**: Allow exploration by age, gender, diabetic status

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□ Sample Recommendations by Segment:

Segment	Recommendation
Active Healthy	Maintain habits, monitor sleep consistency
At-Risk Lifestyle	Increase activity, reduce alcohol/smoking, improve sleep
Moderate	Focus on small improvements in diet, steps, or rest