**1. Data Exploration:**

* The initial step involves examining the available data to understand how to effectively utilize it to achieve the desired results.

**2. Data Grouping and Aggregation:**

* Given that Average Income Data and obesity rates are available for each city, I found it more convenient to categorize the Income Data into four ranges:
  + Low Income Range (<5000)
  + Medium Income Range (5000-8000)
  + High Income Range (8000-100000)
  + Very High Income Range (>100000)
* I created three new data frames for each income category and calculated the mean, minimum, and maximum obesity rates for each category. This summary table reveals the correlation between Obesity and Income.

**3. Plotting and Data Visualization:**

* The four Data Frames facilitated the creation of plots for each income category and a comprehensive one encompassing all categories. This approach ensures accuracy in the final results.
* Scatter Plots were generated, displaying the Linear Regression Line to illustrate the correlation between Income and Obesity Rate.

**4. Statistical Testing:**

* Utilizing the main Data Frame and binning the income data into categories such as:
  + **income\_bins = [0, 50000, 80000,100000, 1500000]**
  + **labels = ["Low (<50000)", "Medium (50000-80000)", "High (80000-100000)", "Very High (>100000)"]**
* This categorization yielded another table presenting Obesity rates for the four income categories, providing accurate insights.

**5. Visualization on Maps:**

* Employing labels for categorization facilitated the creation of a map, showcasing all categories in distinct colors. Each map popup displays information such as city name, latitude, longitude, income data, and obesity rate. The map supports zooming in and out for enhanced exploration.

These refined steps outline a systematic approach to your project, emphasizing clarity and coherence in both the analytical and visual aspects.

**Income and Obesity Analysis:**

The analysis consistently reveals a noteworthy pattern: higher income levels exhibit an association with lower obesity rates. Recognizing this relationship is pivotal for developing targeted public health strategies and policies aimed at reducing obesity and fostering overall well-being.

Factors Influencing the Correlation:

1. **Income Disparities:**
   * Studies consistently demonstrate an inverse relationship between income and obesity, indicating that lower income levels correlate with higher rates of obesity.
2. **Food Access and Availability:**
   * Low-income individuals often reside in areas with limited access to grocery stores or markets offering fresh and affordable produce. This limitation can result in a dependence on more economical but less nutritious food options.
3. **Education and Awareness:**
   * Higher income is frequently linked to better educational opportunities. This connection can lead to increased health awareness and knowledge regarding nutrition and healthy lifestyles.
4. **Work and Lifestyle:**
   * Lower-income jobs may involve extended work hours, heightened stress levels, and restricted opportunities for physical activity. Sedentary occupations and a lack of time for exercise contribute to weight gain.
5. **Cultural and Social Factors:**
   * Cultural norms and social influences play a role in dietary choices. In certain communities, traditional or culturally significant foods may not always align with optimal nutritional guidelines.
6. **Healthcare Access:**
   * Limited access to healthcare services, including preventive care and weight management programs, acts as a barrier for lower-income individuals seeking guidance on healthy living.

**Recommendations for Further Research:**

While the analysis provides valuable insights, further research incorporating a broader range of factors and regional considerations can enhance our understanding of the intricate dynamics between income and obesity. This comprehensive approach will contribute to more informed public health interventions and policies.

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