Introduction

Obesity is a major public health issue with serious consequences. According to the Centers for Disease Control and Prevention (CDC), “During August 2021–August 2023, the prevalence of obesity in adults was 40.3%.” Obesity has many negative effects on a person's health, it can lead to cardiovascular disease, type 2 diabetes, musculoskeletal disorders like osteoarthritis, some cancers (endometrial, breast and colon). Severe cases of obesity can lead to death. Beyond physical health, obesity can also negatively impact mental well being, leading to depression, anxiety, and low self esteem.

This project aims to examine key factors contributing to obesity among adults over 18, focusing on calorie intake, physical activity frequency, and family history of obesity. By identifying the strongest correlations between these factors and obesity, this research will help individuals make good lifestyle choices to live a healthy life.

Introduction to the Data

The dataset used in this analysis was sourced from Kaggle and contains various health-related attributes. The key columns include: Age (age of the individual), Gender, Height, Weight, Calorie Intake (CALC), Frequent Consumption of High-Calorie Food (FAVC), Frequency of Vegetable Consumption (FCVC), Number of Main Meals (NCP), Consumption of Sweet Drinks (SCC), Smoking Habits (SMOKE), Daily Water Intake (CH2O), Family History of Overweight, Physical Activity Frequency (FAF), Time Using Technology Devices (TUE), Consumption of Food Between Meals (CAEC), and Obesity Level (NObeyesdad).

Pre-processing

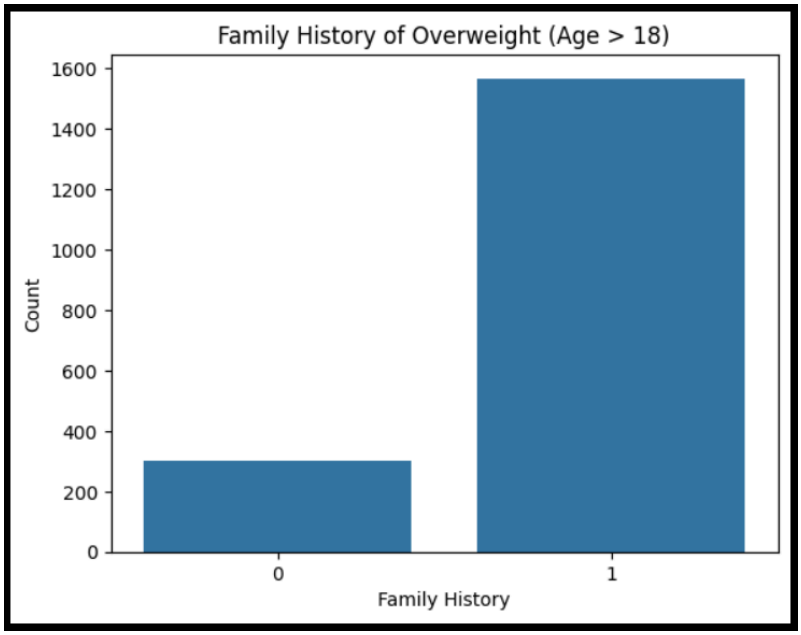
Before analyzing the dataset it had to be cleaned. I first handled missing values, removed duplicates. Then unnecessary columns such as MTRANS (Transportation Method), were

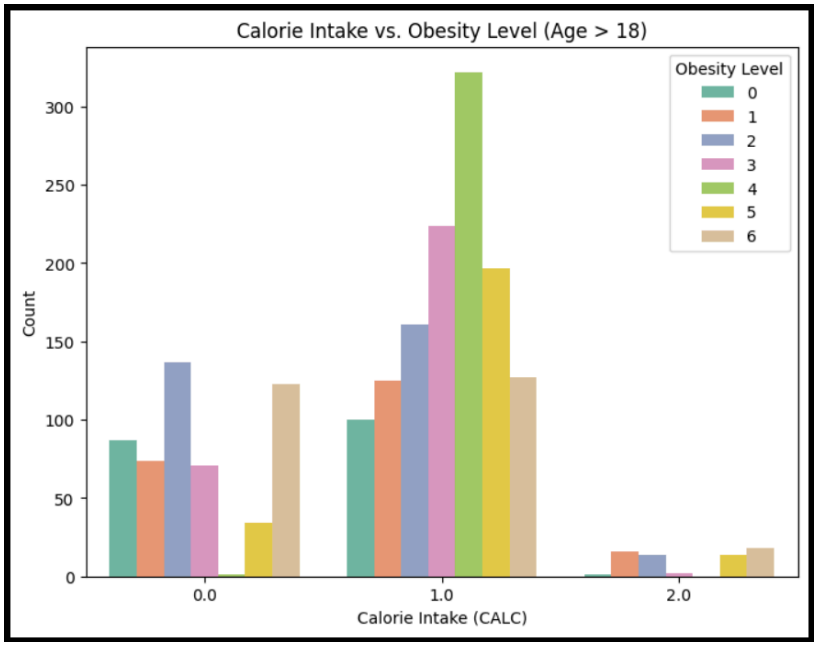
dropped as they were not relevant to the research question. Additionally, categorical variables were converted into numerical values for easier analysis.

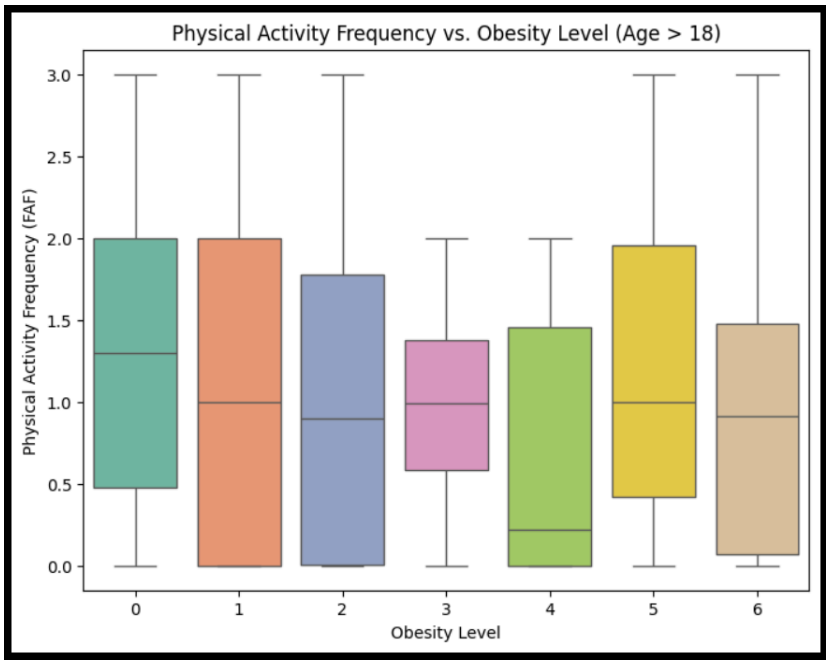
Binary categorical columns:

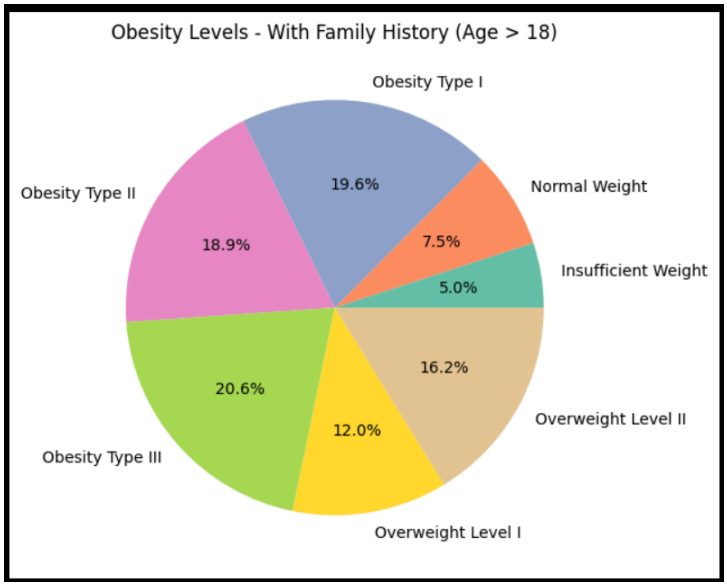
- Gender:
    - Male = 1
    - Female = 0
- FAVC, SCC, SMOKE, and Family History of Overweight:
    - Yes = 1
    - No = 0
- CAEC (Consumption of Food Between Meals):
    - No = 0
    - Sometimes = 1
    - Frequently = 2
    - Always = 3
- CALC (Calorie Intake):
    - No = 0
    - Sometimes = 1
    - Frequently = 2
- NObeyesdad (Obesity Level):
    - Insufficient Weight = 0
    - Normal Weight = 1
    - Overweight Level I = 2
    - Overweight Level II = 3

- Obesity Type I = 4
- Obesity Type II = 5
- Obesity Type III = 6




Calorie Intake vs. Obesity Level (Age > 18)
Obesity Level
0
1
2
3
4
5
6
Count
300
250
200
150
100
50
0
0.0
1.0
2.0
Calorie Intake (CALC)


Physical Activity Frequency vs. Obesity Level (Age > 18)
Physical Activity Frequency (FAF)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
1
2
3
4
5
6
Obesity Level



Storytelling

Obesity is a cause of both genetics and environmental factors. One indicator of obesity risk is whether an individual has a family history of being overweight. This research shows how having a family history of obesity correlates with an individual's weight.

The bar chart "Family History of Overweight (age > 18)" clearly shows that individuals with a family history are likely to have obesity compared to individuals who don't have a family history of obesity. This shows that learned eating habits from family members play a role in obesity as well as genetics.

Calorie intake is a strong factor that can contribute to obesity. The "Calorie Intake vs. Obesity Level (Age > 18)" bar chart shows the relationship between calorie intake and obesity levels. Most individuals with Obesity Type I, II, and III tend to have a higher calorie intake. Compared to individuals with normal weight or underweight are in lower calorie intake categories. This suggests a positive relationship between increased calorie consumption and higher obesity levels. This shows that increased calorie intake contributes to obesity.

Another factor contributing to obesity is physical activity frequency. The box plot Physical Activity Frequency vs. Obesity Level (Age > 18) shows the relationship between physical activity frequency and obesity level. There is not a big difference in physical activity frequency and obesity but it can be seen that individuals with higher obesity levels generally have lower physical activity levels. Obesity Type I, II, and III categories tend to have less frequent physical activity compared to normal weight and underweight individuals.

The pie chart "Obesity Levels - With Family History (age > 18)" provides a detailed breakdown of obesity levels among individuals with a family history of obesity. The chart shows 7.5% of individuals have a normal weight, and an even smaller 5.0% are classified as insufficient weight. The remaining individuals fall into overweight or obese categories: 16.2% are classified as Overweight Level II, 12.0% as Overweight Level I, while the largest portions fall into the three obesity categories: 19.6% as Obesity Type I, 18.9% as Obesity Type II, and 20.6% as Obesity Type III.

Impact

These findings suggest how factors such as calorie intake, physical activity frequency, and family history of obesity can lead to obesity. There are other factors that can also contribute to obesity that were not discussed in this research which include genetics, metabolism, and dietary habits. These factors should also be considered when discussing obesity because obesity is caused by both genetics and lifestyle choices. This project discussed some contributors to obesity, but may have oversimplified the issue by not considering genetics, metabolism, and dietary habits.

References

Rahman, Abdel. “Obesity Levels.” *Kaggle*, 21 June 2024, www.kaggle.com/datasets/abdelrahman16/obesity-dataset.

Earhart, Sarah. “Obesity - the Link between Your Weight and Your Family.” *Obesity Action Coalition*, 12 Aug. 2021, www.obesityaction.org/resources/obesity-the-link-between-your-weight-and-your-family.

Emmerich, Samuel D, et al. “NCHS Data Brief, Number 508, September 2024.” *National Center for Health Statistics*, www.cdc.gov/nchs/data/databriefs/db508.pdf. Accessed 7 Feb. 2025.

“Obesity: Health Consequences of Being Overweight.” *World Health Organization*, World Health Organization, www.who.int/news-room/questions-and-answers/item/obesity-health-consequences-of-being-overweight. Accessed 6 Feb. 2025.