Understanding Metabolic Syndrome

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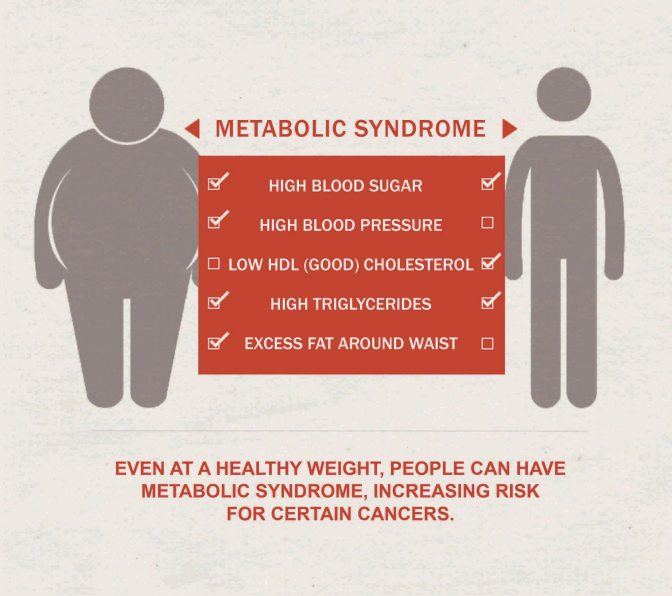


National Center for Health Statistics

Analyzing data to better understand the underlying health risks that can cause a myriad of metabolic diseases like hypertension, diabetes, heart disease.

By better understanding some common markers better, actions can be made to prevent misdiagnosis in patients to rule out other possible health risks.

The Data

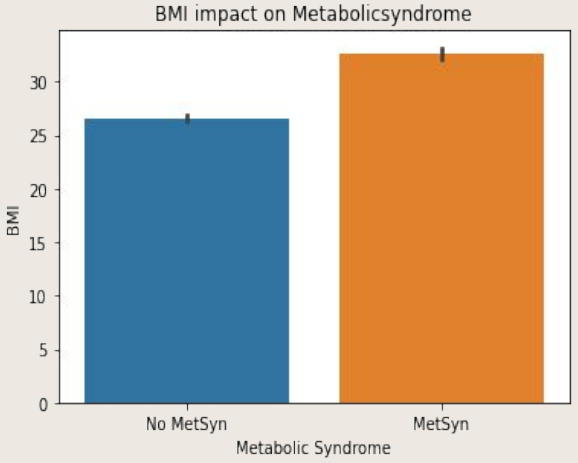
The data is a collection of 2,401 individuals various health markers including waist circumference, age, body mass index (bmi) and blood glucose levels.

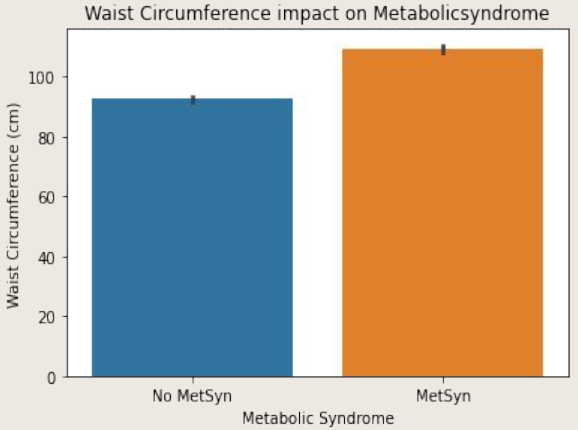
These markers combined with the rest contribute to a fuller understanding of the individual's overall health and if that have developed a metabolic disease.

The simple goal of the dataset is to predict if an individual has a metabolic disease in a 'yes' or 'no' based on common markers and trends in the dataset.

BMI and Waist Circumference

- BMI - Body Mass Index is a dated metric to evaluate an individual's body fat composition based on height and weight. While dated it is a quick generalized way to gather a snapshot of an individuals health.
- Waist Circumference - The circumference of an individual is a more discernible measurement that can lead a medical professional to determine if someone's habits could contribute to a metabolic disease.
- In the charts it is clear that individuals with higher BMI and Waist Circumference are at a greater risk.





Strengths of the Tuned XGBoost Model

- The False Positive rate is .055 leading to the conclusion that not many individuals would be at risk of a false diagnosis and have to put through various tests.

- The models prediction accuracy is 90% which leads to confidence in the findings presented.

- With further entries of the dataset the metrics would increase based on the trends presented.

Limitations of the Model

- Relatively small pool of individuals to make a prediction off of in comparison to the individuals that have a metabolic disease.
    - In the United States there are about 1 in 3 adults have metabolic syndrome.

- With a 90% accuracy there is room for improvement that would be rectified with more data. Either by gathering more individuals into the study or combine resources with another dataset to gather a deeper understanding.

Recommendations

- I would recommend that the stakeholder use the XGBoost model to make predictions based on the data on hand but suggest another survey or collection of more entries.
    - Use with confidence that the currents metrics will have a much lower chance of wrongfully diagnosing an individual

- Possibly include a blood oxygen level feature to get an idea on the effectiveness of an individual's heart.