Heart Disease Diagnostic Analysis

Project Report

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Project Detail

Project Title :   Heart Disease Diagnostic Analysis

Technologies :   Data Analytics

Domain :   Healthcare

Programming Language :   Python

Tools :   Jupyter Notebook, Excel, Power BI

Objective of the Project

The main aim of this project is to carefully study the things that can tell us if someone might have a heart problem. We'll look at lots of information about different patients to find important clues. By doing this, we hope to learn useful things that can help us understand what makes someone more likely to have heart issues. Our goal is to find helpful information in the data, like things that could warn us about possible heart problems in the future. By doing this, we want to add to what we know about how to keep our hearts healthy.

Problem Statement

Health is real wealth in the pandemic time we all realized the brute effects of covid-19 on all irrespective of any status. Required to analyze this health and medical data for better future preparation.

Information of Dataset

1. age= The person's age in years

2. sex= The Gender of Person (1 = male, 0 = female)

3. cp= chest pain type (4 values) Value 0: asymptomatic; Value 1: atypical angina; Value 2: non-anginal pain; Value 3: typical angina

4. trestbps= resting blood pressure

5. chol= serum cholesterol in mg/dl

6. fbs= fasting blood sugar > 120 mg/dl

7. restecg= resting electrocardiographic results (values 0,1,2) 0 = normal; 1 = ST-T wave abnormality; 2 = left ventricular hypertrophy by the criteria of Estes

8. thalach= maximum heart rate achieved

9. exang= exercise-induced angina

10. oldpeak= ST depression induced by exercise relative to rest

11. slope= The slope of the peak exercise ST segment

12. ca= number of major vessels (0-3) colored by fluoroscopy

13. thal= 0 = normal; 1 = fixed defect; 2 = normal blood flow ;3 = reversible defect

14. target= Heart disease (1 = no, 0= yes)

Insights

In our dataset of 1025 people, we found that 499 (48.7%) individuals have heart disease, while 526 (51.3%) do not. This information helps us understand the prevalence of heart disease within our sample population, which is important for our analysis.
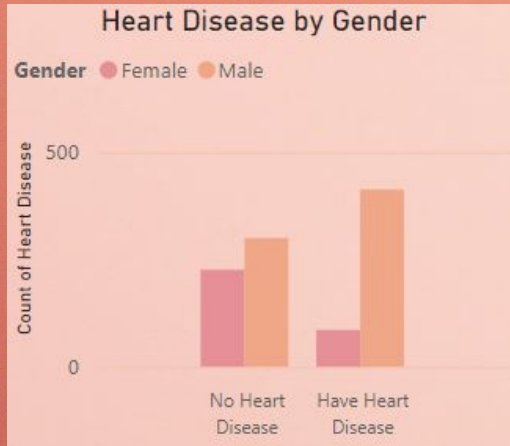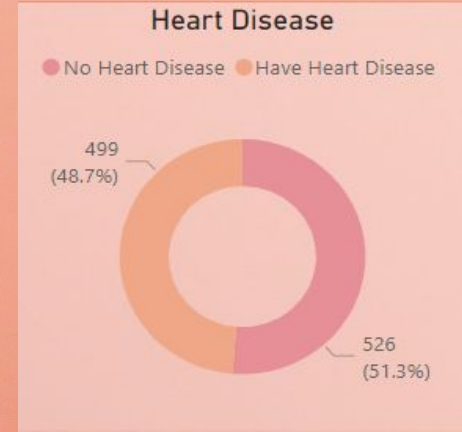

In our dataset, we observed that males have a higher prevalence of heart disease compared to females. This finding suggests that gender may play a role in the likelihood of developing heart disease within our sample population.

Age by Gender

Gender ● Female ● Male
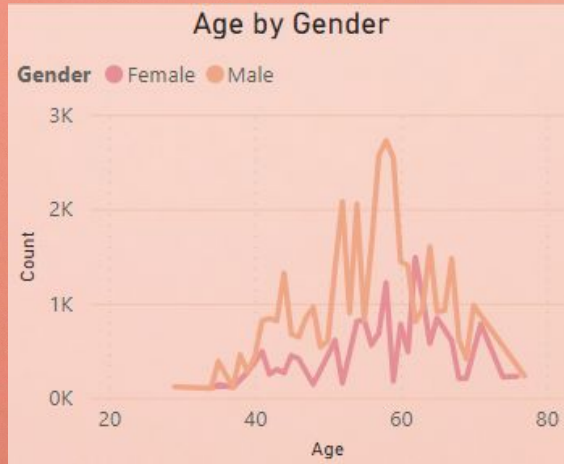
In our dataset, we noticed that more <u>men belong to the age category over 50</u>, while more <u>women are in the category over 55</u>. This indicates that there's a difference in the age distribution between genders. It's important to consider these age variations as they might influence the prevalence and characteristics of heart disease in men and women. Understanding these differences can help tailor healthcare strategies to address the specific needs of different age and gender groups.

People over 40 have a greater chance of getting heart disease. This shows how age is a big factor in getting heart problems. Understanding this helps us take better care of people in their middle years.

Heart Disease With Age Category

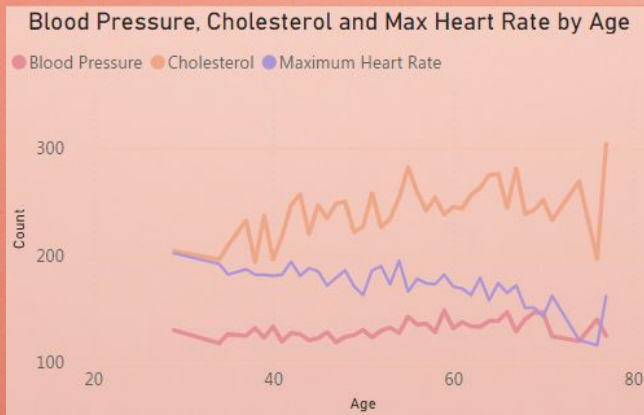● Have Heart Disease ● No Heart Disease
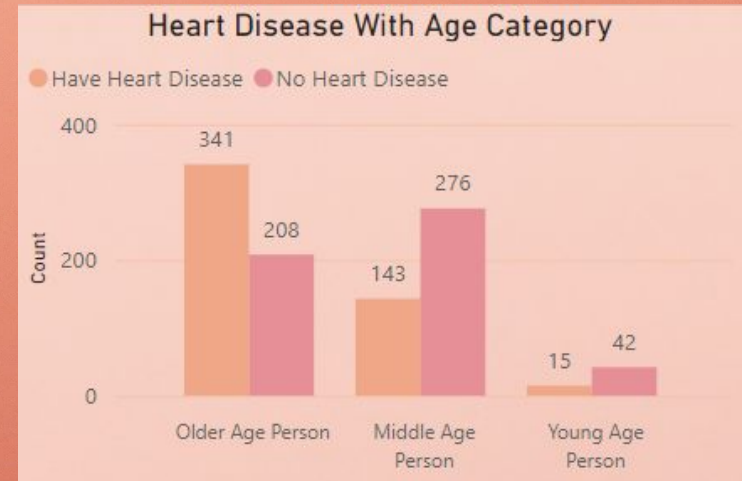
Young Age Person : 29 - 40 Age
Middle Age Person: 40 - 55 age
Older Age Person: over 55 Age

The most common type of chest pain in males is asymptomatic chest pain. Asymptomatic chest pain means there are no noticeable symptoms like discomfort or pressure in the chest. This finding suggests that many males might experience heart issues without realizing it.


Chest Pain VS Gender
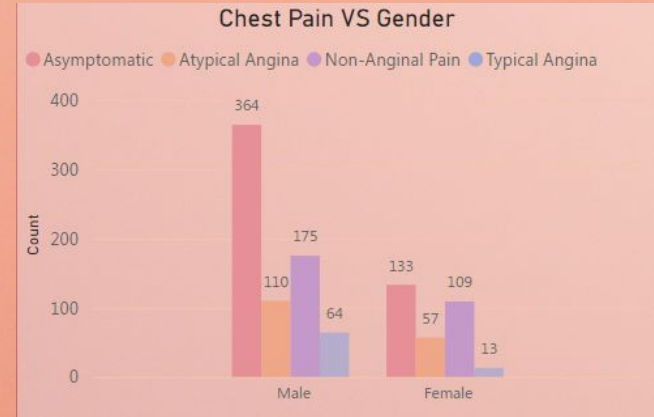
Note:

1) Asymptomatic: This means having no symptoms. For example, someone might have a medical condition or disease, but they don't show any signs of it.
2) Atypical Angina: Angina is chest pain or discomfort that happens when your heart muscle doesn't get enough oxygen-rich blood. Atypical angina means the symptoms don't fit the classic pattern. It might feel different from typical chest pain and might not be triggered by physical exertion.
3) Non-Anginal Pain: This refers to chest pain or discomfort that isn't caused by reduced blood flow to the heart. It might stem from other issues like muscle strain, indigestion, or anxiety.
4) Typical Angina: This is the classic type of chest pain or discomfort that's often described as a feeling of pressure, squeezing, or tightness in the chest. It's typically triggered by physical exertion or stress and relieved by rest or medication.

Blood Pressure, Cholesterol and Max Heart Rate by Age

Blood Pressure: This measures the force of blood against the walls of your arteries. Normal blood pressure is typically around 120/80 mmHg. As you age, it's essential to monitor blood pressure regularly to reduce the risk of heart disease and other health issues.

Cholesterol Levels: Cholesterol is a fatty substance in your blood that's crucial for cell function, but high levels can increase the risk of heart disease. Total cholesterol levels should ideally be below 200 mg/dL. As you age, keeping cholesterol in check through a healthy diet and exercise becomes increasingly important.

Maximum Heart Rate (MHR): This is the fastest your heart can beat during intense exercise. It's often estimated by subtracting your age from 220, but individual variation exists. In general, maximum heart rate decreases with age, so adjusting exercise intensity accordingly can help maintain cardiovascular health.

ST depression VS Age
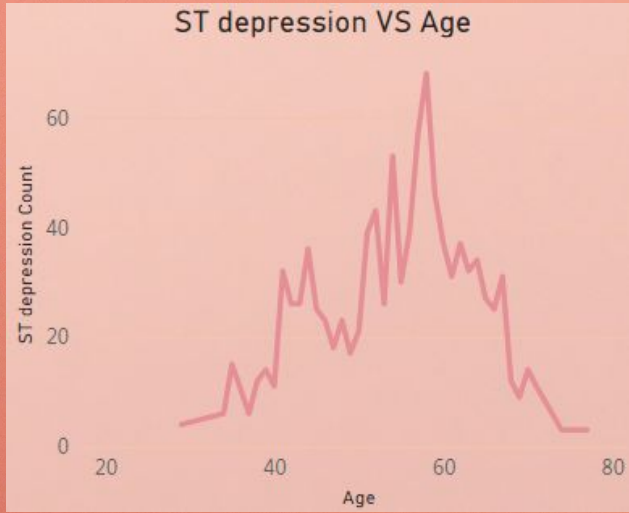
ST Depression by Age: As people age, the likelihood of experiencing ST depression may increase due to factors like reduced blood flow to the heart, coronary artery disease, or other heart-related issues.

Role in Heart Diseases: ST depression is often a sign of inadequate blood supply to the heart muscle, usually caused by narrowing or blockages in the coronary arteries. Conditions such as angina, myocardial ischemia, or even heart attacks can cause ST depression. It serves as a crucial indicator for healthcare professionals to assess the severity of heart disease and determine appropriate treatment strategies.

Conclusion

This project focused on carefully cleaning and preparing the dataset, and then analyzing it thoroughly using important features and measurements. The aim was to find patterns and insights that could help improve heart health. By doing this, we wanted to gain a better understanding of how to optimize heart health conditions.

Thank You