

# Heart Attack Analysis and Prediction Dataset

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Capstone Project I



## Hypothesis

Some significant predictors of heart attacks are age, gender, and underlying health issues. Specifically, an older male with high cholesterol is more likely to experience a heart attack compared to a younger female.

- To test this hypothesis, we will draw statistical analysis on the dataset to determine if there are any significant relationships that pose risk to a heart attack. By testing the hypothesis, a researcher can gain insights into the data that contribute to heart attacks and inform potential interventions or treatments.

# Variable definitions in the dataset

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## Variables

**Age:** Age of the patient in years

**Sex:** Gender; 1=Male 0 = Female

**exang:** exercise induced angina (1 = yes; 0 = no)

**ca:** number of major vessels (0-3)

**cp:** Chest Pain type chest pain type

- Value 1: typical angina
- Value 2: atypical angina
- Value 3: non-anginal pain
- Value 4: asymptomatic

**trbps:** resting blood pressure (in mm Hg)

**chol:** cholesterol in mg /dl fetched via BMI sensor

**fbs:** (fasting blood sugar > 120 mg /dl) (1 = true; 0 = false)

**\_restecg:** resting electrocardiographic results

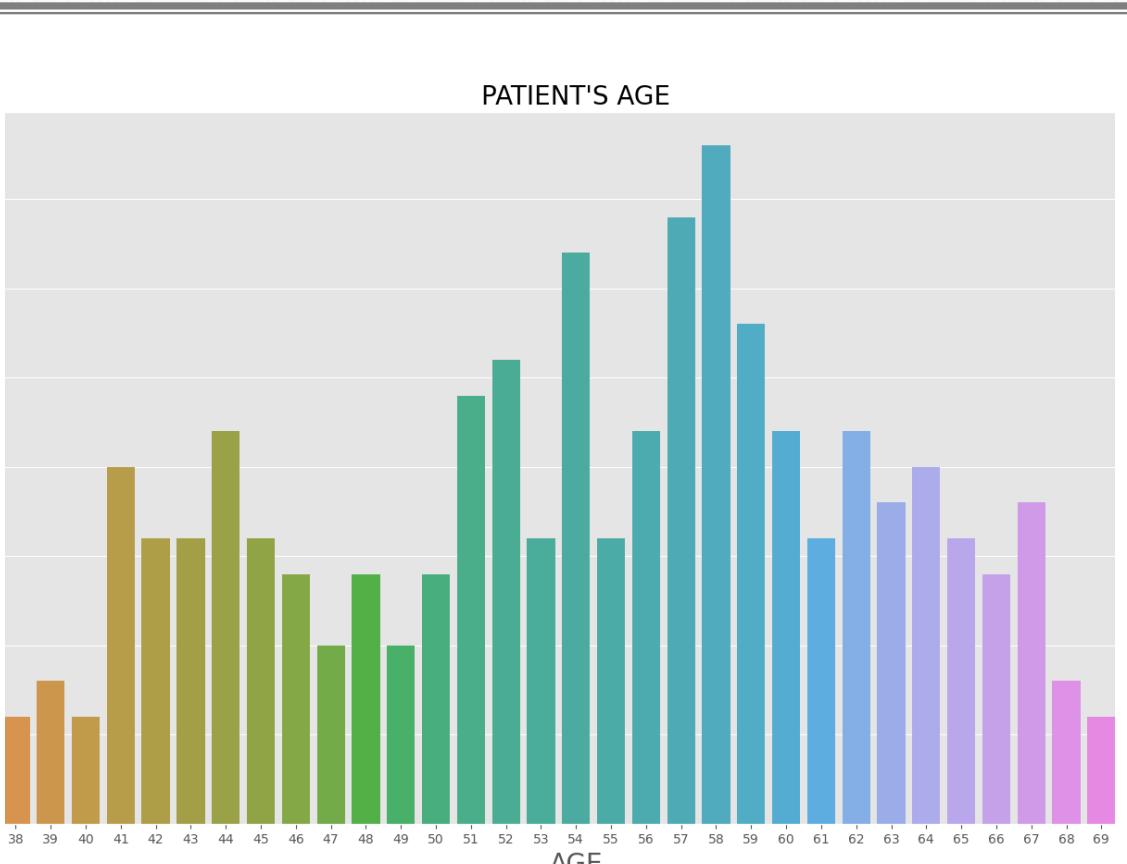
- Value 0: normal
- Value 1: having ST-T wave abnormality (T wave inversions and/or ST elevation or depression of > 0.05 mV)
- Value 2: showing probable or definite left ventricular hypertrophy by Estes' criteria

**thalach:** maximum heart rate achieved

**target:** 0= less chance of heart attack 1= more chance of heart attack

# Age

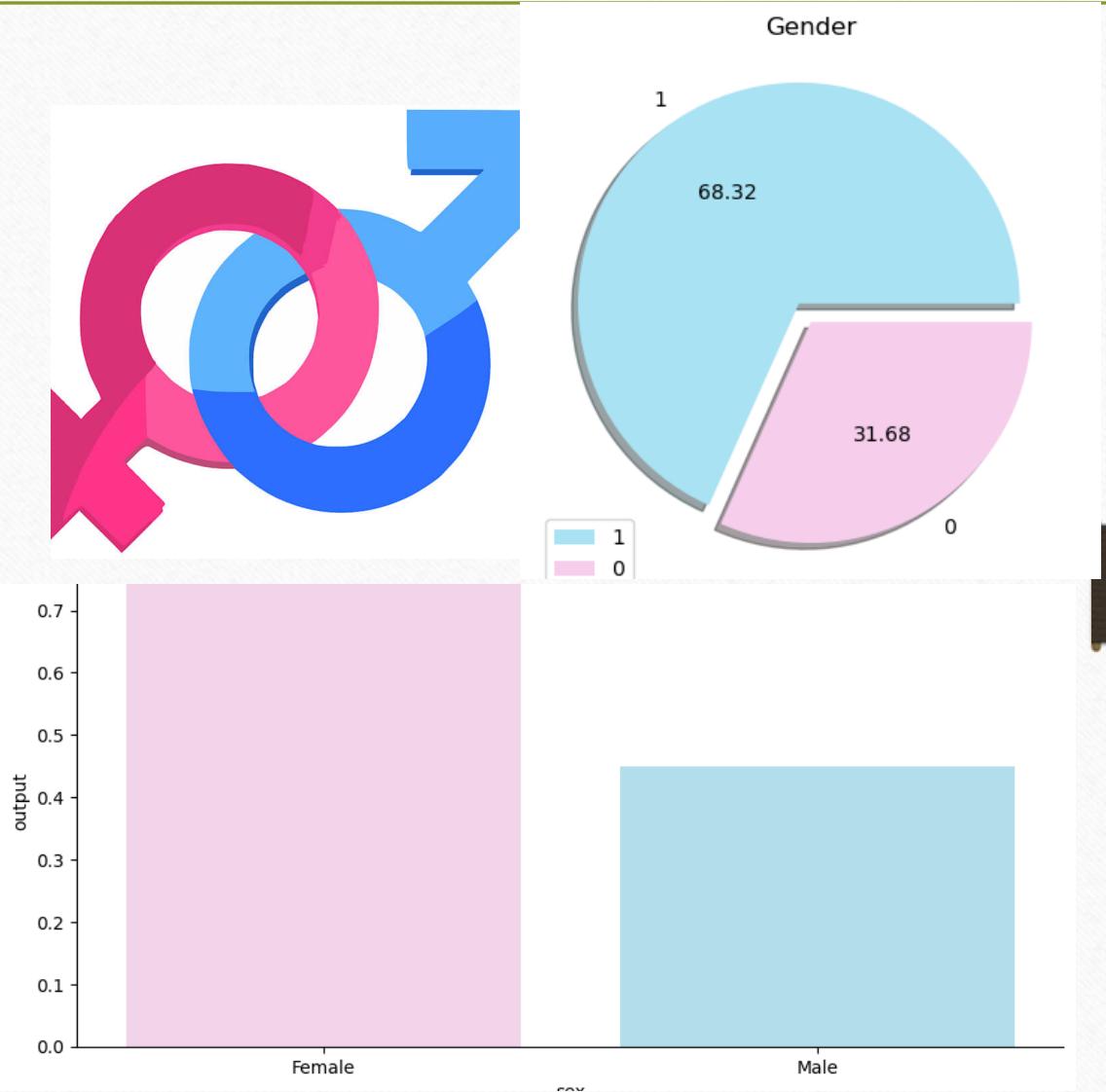
- The patient's age range are between 29-70 years old.
- Majority of patients who experienced heart attacks were between the ages of 50 and 60.
- Patient's age of heart attack decreases after 62.
- This goes against the hypothesis- where the older an individual is, the more likely he/she will experience a heart attack.



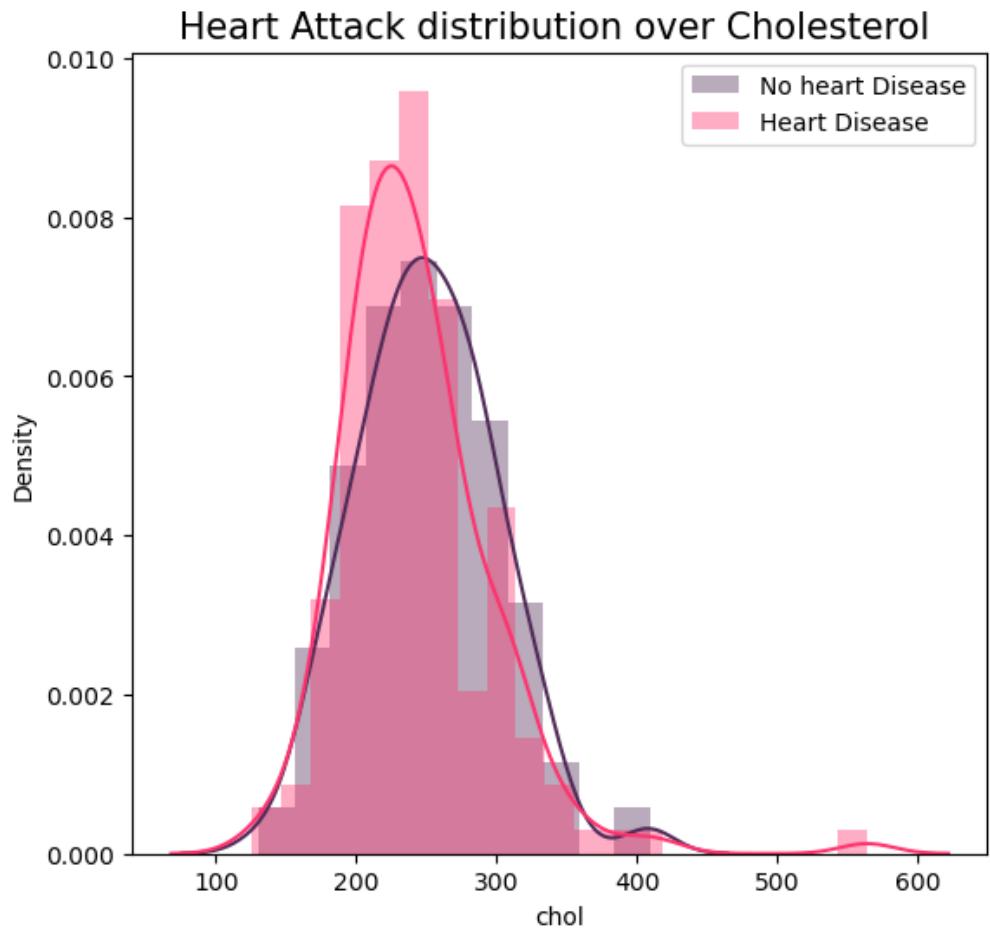
# Gender

0 = female, 1 = male

- In this data, **68.3%** of the patients are **male**, while **31.7%** are **female**.
- Which is approximately 207 males and 96 females.
- The sex of patients are not equivalent.
- However, majority of patients who had high risk of heart disease were female.



# Cholesterol



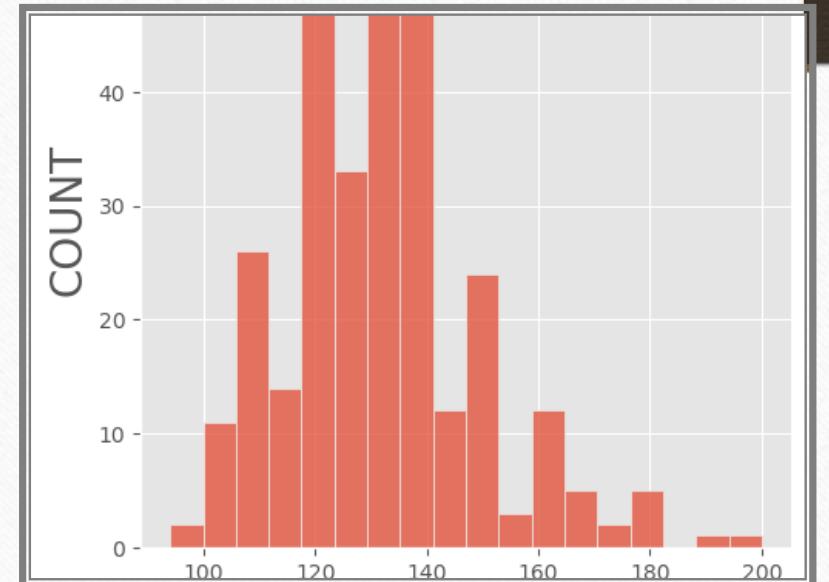
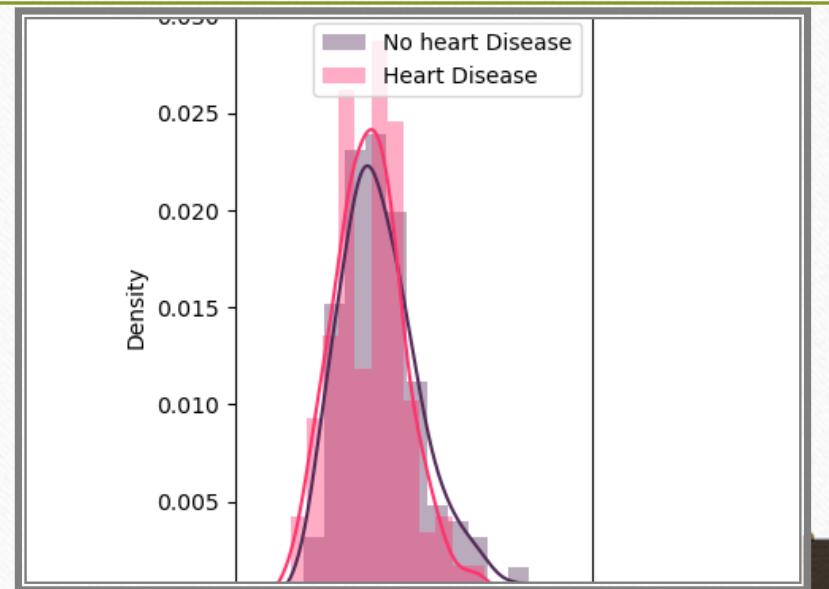
Cholesterol value in patients is between 120 and 300.



Patients with cholesterol above 200mg/dl are more than likely to have heart attack.

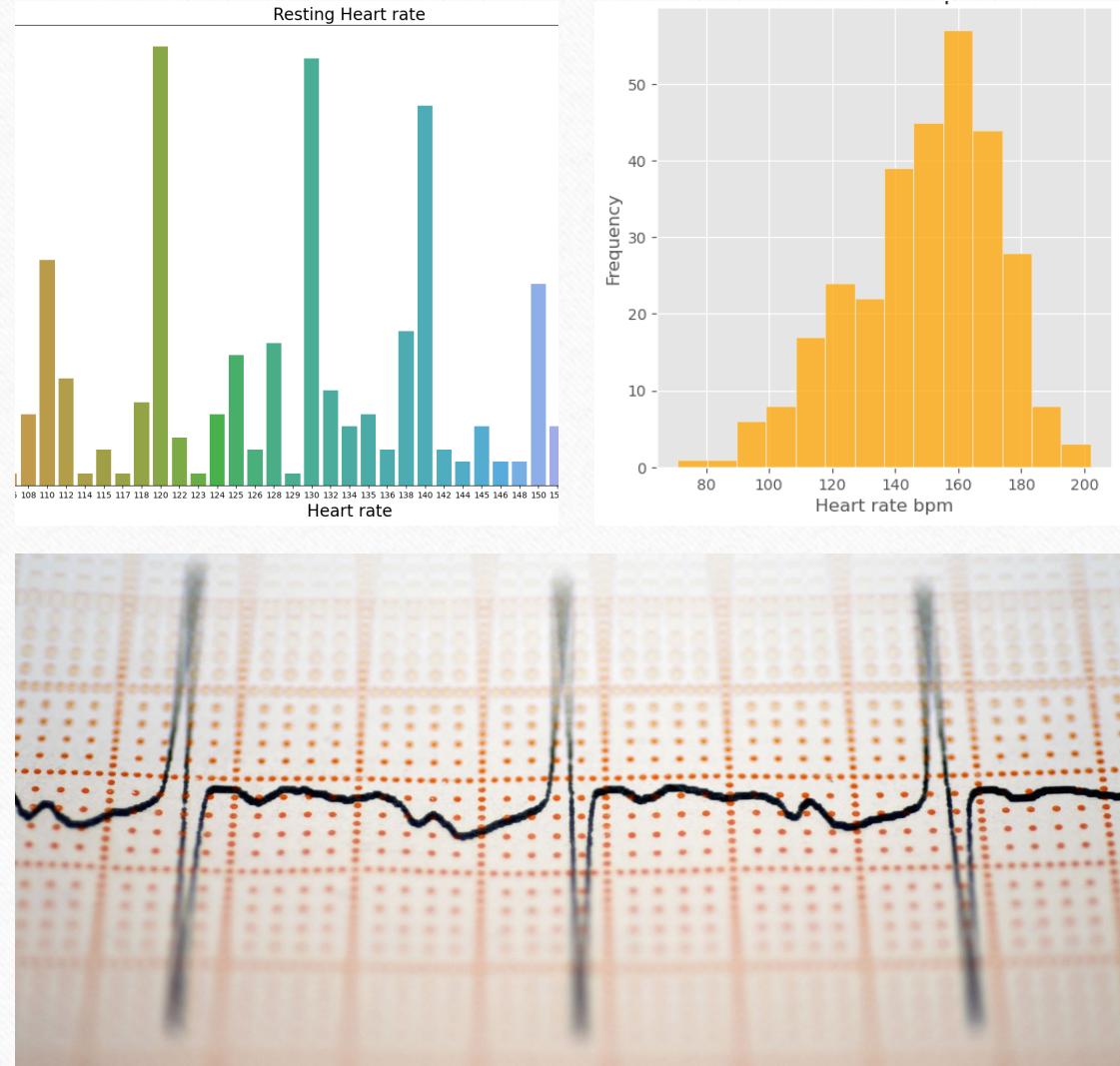
# Blood pressure

- The maximum blood pressure for patients were between 110-140 systolic
- Resting blood pressure 120 mm/hg and higher can lead to heart attack.

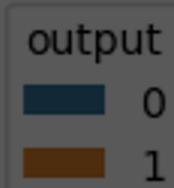


# Heart Rate + Resting Heart Rate

1. Most of the patients Heart Rate lies between (155-165).
2. The higher the maximum beats per minute, the higher the probability of the patient having a heart attack.
3. There is a parallel increase up to 150. However, after a value of 160, patients with a low probability of having a heart attack decrease.



# TYPES OF CHEST PAIN WITH RESPECT TO OUTPUT



## CHEST PAIN

- Angina is chest pain caused by reduced blood flow to the heart muscles. It's not usually life threatening, but it's a warning sign that you could be at risk of a heart attack or stroke.
  - Patients who had typical angina were more likely to have a heart attack, whereas those who were asymptomatic had the least cases.

COUNT

100

80

60

40

20

0

asymptomatic

non-anginal pain

atypical angina

typical angina

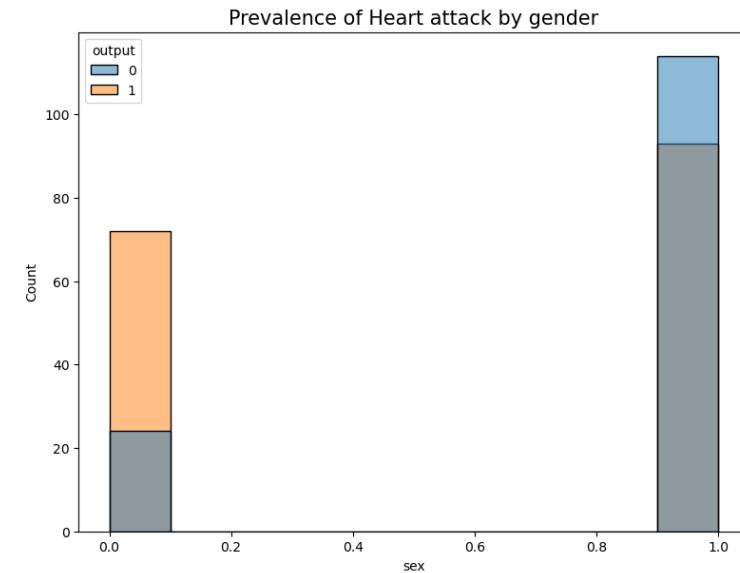
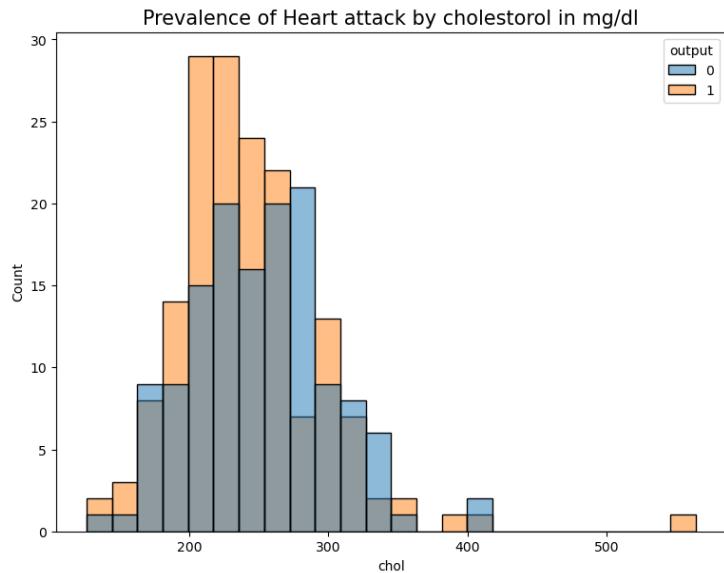
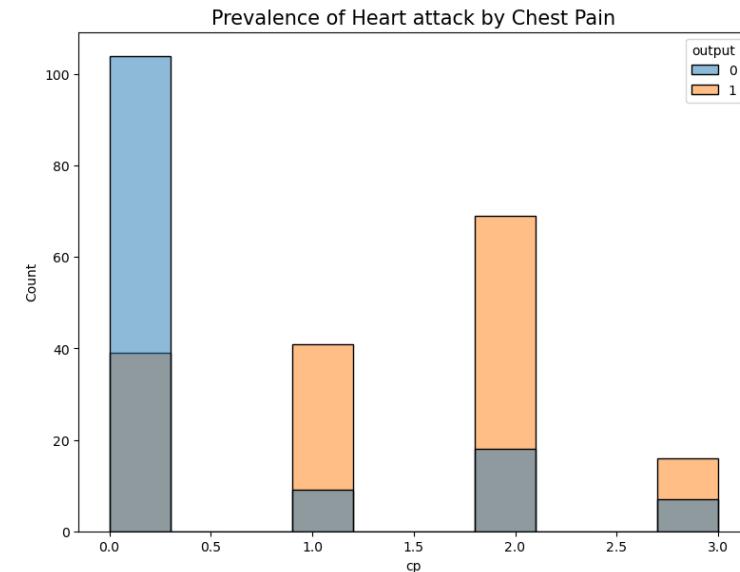
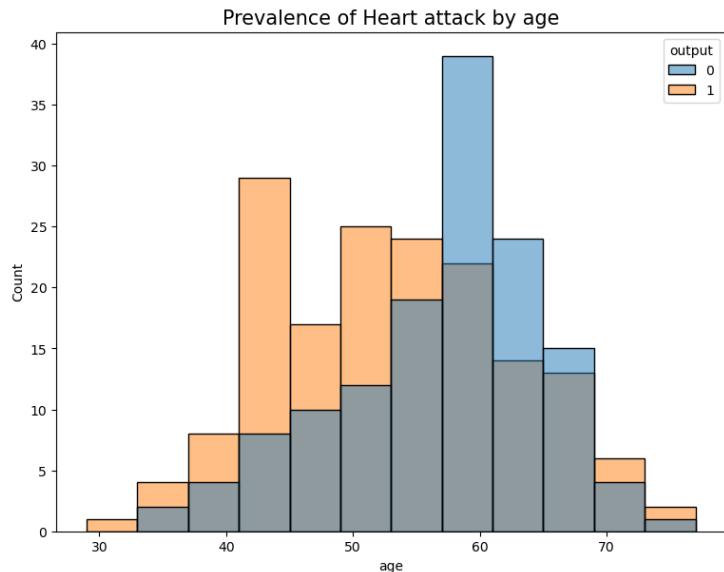
TYPES OF CHEST PAIN

# Relationship between Variables and Risk of Heart Attack

*By age, chest pain, cholesterol, and gender*

- 0 (blue) = High chance of heart attack
- 1 (orange) = low chance of heart attack

*For more, please view the Correlation Plot and 3D Scatterplot on syntax*



# CONCLUSION

*After reviewing the overall graphical analysis, we are able to conclude the following:*

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Females are more likely to have a heart attack.

High cholesterol = high chances of heart attack.

Increased resting heart rate will have high chances of heart attack.

There are no strong relationship between age and heart attack.

Patients who were between the age of 50-60 experienced the most heart attacks.

Around 68.2% (207) are male patients and 31.8% (96) are female patients.

Most of the patients have type Value 1 Chest Pain which is typical angina Value.

Most of the patient's systolic blood pressure lies between (130-140).

Most of the patient's cholesterol level lies between 200-250.

Most of the patient's heart R=rate lies between 155-165.