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CMP 464

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Factors of Heart Failure

Introduction

Cardiovascular diseases, otherwise known as heart diseases, are the number 1 leading cause of death globally ahead of cancer according to the CDC’s statististics. Roughly it is most prominent in people around the ages of 45-75. Using data provided by the UCI machine learning repository, a prediction dataset was crafted by taking features from different cases of heart failure to give a picture of relevant medical factors to heart failure. This data is a combination of multiple medical datasets for a total of 918 observations after cutting out any duplicate information.

Analysis

Common factors that are known by the general population being age, and cholesterol levels.



This chart displays an age range of male patients starting from early 30s to early 80s. Below is a chart with the age range of female patients from around a similar age range.



The average age around these ranges is 52 for women and 53 for men. The same was done for cholesterol as seen below(The charts being for 1. women and 2. men respectively):



As shown here cholesterol averages around the 250 mark for women with the outliers being around the 400-500 range. While below for men there is a much lower starting range but also a much higher ending point as it goes into the 600s with a similar average. Both of these would be considered high cholesterol levels.



A typically “safe” range of cholesterol is anything below 200, the lower the better. It's around this average that you should be concerned and seek more information from your doctor when informed during a checkup.

Uncommon Factors

A more specific factor that might not be known are: the types of chest pain which are, TA: Typical Angina, ATA: Atypical Angina, NAP: Non-Anginal Pain, and ASY: Asymptomatic This pain can lead to slightly differing averages from other predictive features. Below are the averages for the four categories of chest pain for women and men.

The above data is a representation of the average blood pressure across four types of chest pain divided by if the patients had heart disease and if they didn’t. (First and second respectively)



Before diving into the numbers, it is important to define angina: a severe type of chest pain caused by an inadequate supply of blood to the heart. A good level of resting blood pressure should be lower than 120 with 120-129 being “elevated” blood pressure levels . The averages seen from patients with heart disease would fall under “high” blood pressure. Patients without heart disease typically had “elevated” blood pressure with typical angina diving into the “high” spectrum.



Following the same order, these are the averages for a patient's heart rate. A typical healthy heart rate is around 220 - a person’s age. Taking the average age into account (52) you would get a maximum heart rate of 168. Patients with heart disease average far below that curiously enough, asymptomatic chest pain is one of the lower averages supporting that even though a patient might not feel any severe chest pain, it does not correlate to a clean bill of health. This trend persists in patients without heart disease as seen in the second figure.



Average cholesterol levels both with and without heart disease average around unhealthy levels, however patients with heart disease average closer to 250, a much more dangerous level.

Conclusions

Using these few factors one can conclude that while not having heart disease, the average patient is close to dangerous levels of factors like cholesterol, blood pressure, and max heart rate. The data shows that these numbers, in most cases, aren’t too far apart and any number that approaches these should be met with more communication with a medical professional. Even when one doesn't have chest pain, you can still find yourself in danger of heart disease.

This data was provided at:

fedesoriano. (September 2021). Heart Failure Prediction Dataset. Retrieved [Date Retrieved] from <https://www.kaggle.com/fedesoriano/heart-failure-prediction>.