

Heart Failure Analysis

By: Elaine Acaba Torres and Sarah Mitchel

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Introduction

Cardiovascular diseases are the number 1 cause of death all over the world, and heart failure is a common event caused by CVDs. We studied 299 patients in this dataset to understand the following:

What are the causes of heart failure? Since there are many factors that have a role in heart failure, we will focus on the age and gender of the person. While also comparing the levels of serum creatinine, serum sodium, and CPK. Lastly, **is smoking a factor in heart failure? Are there any trends in these relationships?**

Conclusion

Having low or high serum sodium can be a result of heart failure, especially in older adults. In some cases, severe serum sodium can worsen heart failure symptoms and lead to further cardiac damage. In our dataset, we have the same levels between genders.

Creatine phosphokinase (CPK) is an enzyme abundantly present in cardiac muscle cells. When the total CPK level is very high, it most often means there has been injury or stress to the heart. Normal values would be between 10 to 120 micrograms per liter (mcg/L). If the CPK levels are high, then it could cause heart attack or it could lead us to see that the person had a heart attack.

An increase in serum creatinine, also termed worsening renal function, commonly occurs in patients with heart failure, especially during acute heart failure episodes. The typical range is 0.59 to 1.35 Milligrams per decilitre. Increased levels of serum creatinine indicate decreased kidney function, which is a common complication of heart failure. Elevated serum creatinine levels are a sign of impaired kidney function and may indicate that the heart failure is progressing. On the other hand, pre-existing kidney disease can also increase the risk of developing heart failure.

Cigarette smoking is a risk factor for the development of heart failure and that can lead to conditions such as high blood pressure or coronary artery disease. Out of the 96 deaths reported, we can conclude that there are more males with a higher risk of heart failure than women. And if we look deeper in our dataset, there are a higher number of deaths at the age of 60 due to smoking.

In our dataset, we have a varied range of patients between the age of 40 to 120. Our average age of patients is 61 years old and the majority of the patients with CVD's fall under the age of 60-65 or between the age of 50-55. The age of 40 has over 50 days of the reporting of death. This shows that the older the patient is likely to have less days till the death date. The average range of age reporting deceased is in the 60-70 range.

Looking more in depth, we can see in the pie chart that 64.9% of the patients with Cardiovascular Disease are males and 35.1% are females. And 32.1% of the patients are dead during the follow up check up due to Cardiovascular Disease. We have 203 patients alive and 96 deaths due to Cardiovascular Disease.

Recommendations

Based on the information provided, we recommend the following:

- Monitor their serum sodium and creatinine levels regularly, as imbalances in these electrolytes can worsen heart failure symptoms.
- Consult with a healthcare provider to properly manage their heart failure and related conditions.
- Quit smoking to reduce the risk of further cardiac damage, as well as to improve overall health.
- Maintain a healthy diet and engage in physical activity as advised by a healthcare provider.
- Adhere to medication regimens as prescribed by a healthcare provider.

By following these recommendations, individuals with heart failure can work towards managing their condition and improving their overall health and well-being.