

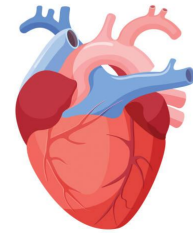


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UCB Class of 2023

Heart Attack Analysis

DigHum 100

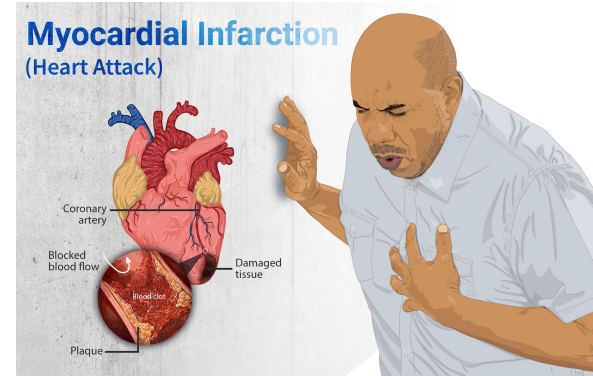
Professor: Adam Anderson
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<https://ortoday.com/could-you-have-a-heart-attack-and-not-know-it/>

Introduction

- Heart disease is the leading factor of human death.
- Heart Attack happens when the muscle of the heart didn't get enough blood. It's usually caused by the blockage of one or more coronary arteries.
- Fetal.
- According to CDC, 1 out of 5 heart attacks is silent.



[https://commons.wikimedia.org/wiki/File:Depiction_of_a_person_suffering_from_a_heart_attack_\(Myocardial_Infarction\).png](https://commons.wikimedia.org/wiki/File:Depiction_of_a_person_suffering_from_a_heart_attack_(Myocardial_Infarction).png)

About this dataset

- This modified dataset is taken from Kaggle.
- Kaggle Link:
<https://www.kaggle.com/rashikrahmanpritom/heart-attack-analysis-prediction-dataset>
- It's originally from <http://archive.ics.uci.edu/ml/datasets/Heart+Disease>.

	age	sex	cp	trtbps	chol	fbs	restecg	thalachh	exng	oldpeak	slp	caa	thall	output
1	63	1	3	145	233	1	0	150	0	2.3	0	0	1	1
2	37	1	2	130	250	0	1	187	0	3.5	0	0	2	1
3	41	0	1	130	204	0	0	172	0	1.4	2	0	2	1
4	56	1	1	120	236	0	1	178	0	0.8	2	0	2	1
5	57	0	0	120	354	0	1	163	1	0.6	2	0	2	1
6	57	1	0	140	192	0	1	148	0	0.4	1	0	1	1
7	56	0	1	140	294	0	0	153	0	1.3	1	0	2	1
8	44	1	1	120	263	0	1	173	0	0.0	2	0	3	1

More about the dataset

This dataset includes 303 patients and some of their physical characteristics.

- age
- sex
- exercise-induced angina
- number of major vessels
- chest pain type
- resting blood pressure
- cholesterol
- fasting blood sugar
- resting electrocardiographic results
- maximum heart rate achieved
- the chance of heart attack
- slope: the slope of the peak exercise ST segment
- old peak = ST depression induced by exercise relative to rest
- thal: 3 = normal; 6 = fixed defect; 7 = reversible defect

Research Questions

1. What factors contribute to the heart attack?
2. Which factor, among these variables, contributes to a heart attack the most?
3. Are heart attacks more likely to be caused by external or internal factors?
4. What can a person do to reduce their chance of getting a heart attack?

Methods/Tools

- Jupyter Notebook
- RStudio
- Inference test, plots, histograms, pie chart, heat map
- Github

Storyboard/Poster

https://lucid.app/lucidchart/invitations/accept/inv_654bbf20-a70e-4a3f-9b42-995cdcc821e5

Jupyter Notebook

https://colab.research.google.com/drive/15XbZ-4D5GKusjl7NseuFjrPWv_OLR1B?usp=sharing

Github Repository

<https://github.com/tingyuecui/Heart-Attack-Analysis>

Video

Hypothesis

1. I theorize that men are more vulnerable to heart attack comparing to women.
2. People with high resting blood pressure, worse chest pain, and high cholesterol might have a high chance of heart attack.
3. I assume the chest pain type might contribute the most.

Interpretations & Conclusions

In this dataset, women are more vulnerable to heart attack than men. The different chest pain also contribute to the heart attack. Among three types of chest pain, people with the second type of chest pain are more likely to have a heart attack. The correlation is 0.43 for pain type and chance of heart attack.

People with higher chance of heart attack are more likely to have a higher maximum heart rate. We specifically did a two sample t-test to verify this observation. In the calculation, the p-value is extremely small. It verified our hypothesis. The correlation is 0.42 which is relatively high among all other factors.

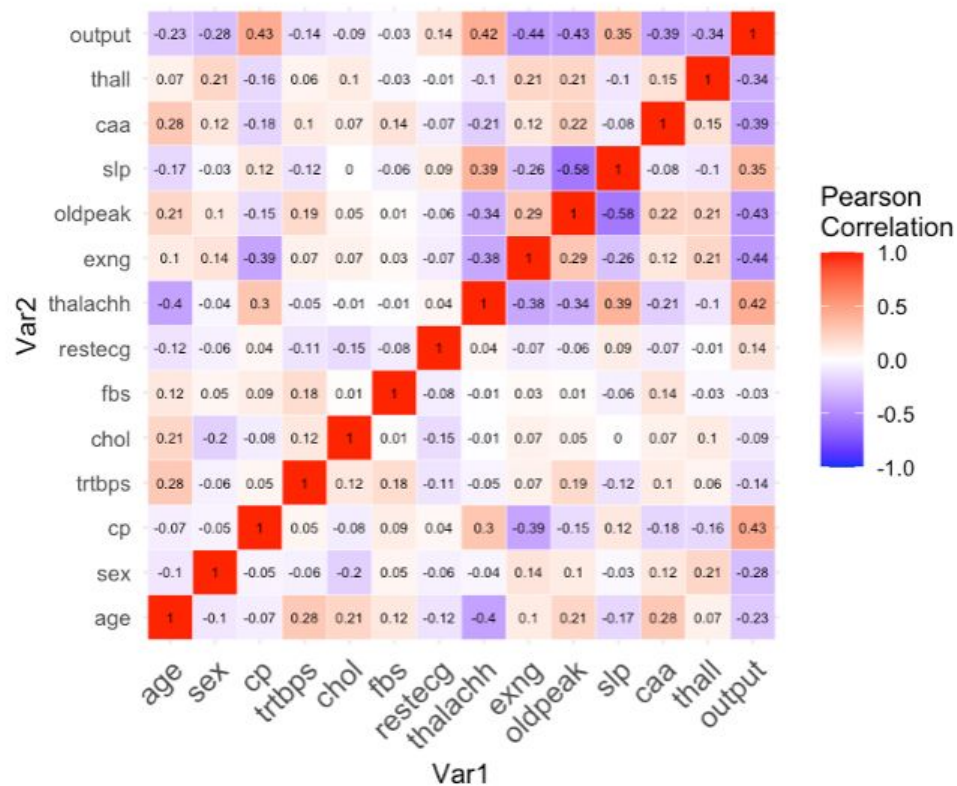
Interpretations & Conclusion Continued

Cholesterol level and resting blood pressure are not significant factors of determining chance of heart attack. By looking at the correlation heat map, we can see that the correlation between cholesterol level and chance of heart attack is -0.09. The correlation between resting blood pressure and chance of heart attack is 0.14.

In order to reduce chance of heart attack, people should try to reduce their maximum heart rate. People can do some moderate exercise such as walking, yoga. They should also decrease the chance of having the second type of chest pain. They should be aware of this pain type when they have it.

Heat Map

Correlation heat map between 14 variables



Interpretations & Conclusion Continued

In this dataset, the heart attack is more likely to be caused by the internal factor, specifically the chest pain type. However, we still need to take the external factors into account. This is because the internal factors sometimes are related to external factors. For example, the blood pressure can be manipulated by eating specific type of food. Therefore, both internal and external can contribute to heart attack.

For future work, people can analyze a larger data to get more accurate results since this dataset only contains 303 patients. Future researchers can also collect more data about external factors such as diet habits and exercise habits to further analyze the correlation between them.

Works Cited

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5. <https://www.kaggle.com/rashikrahmanpritom/heart-attack-analysis-prediction-dataset>