Temperature effect on heart disease

Nora Al-Thaalabi

The 19 Secondary for girls in Jeddah - school principal: Khadija Al-Masari

Abstract

The research aim is to study the relationship between temperature and the increasing rate of heart disease, where I used Globe data and statistics of heart patients from the Ministry of Health, by converting the data into tables and graphs.

I noticed that July has the highest rate of heart disease, the increasing rate was caused by the increase of temperature where it reached 38.96°C causing an *Isolated Arrhythmias*. these data prove the relationship between temperature and heart disease.

And I noticed that I need more data to validity of the results. So, I suggested designing an application that uses smart watches to fetch the data I need related to environmental temperature and heart health. In the end, I recommend a similar study that requires 10-year data on environmental temperature and heart disease to better understand the effects of heat.

Research Question

My family and I went to Mecca for Umrah and saw an old woman who was complaining of chest tightness and dizziness and the weather was hot and humid, so my colleague and I asked about the effect of the high temperature on human health, as I was curious about this topic, then I went to the Globe program supervisor and mentioned my idea. Then, I went to the biology teacher, who denied that there is a relationship between temperature and heart disease, so I liked the challenge and tried to prove the validity of the hypothesis.

What is the effect of temperature on increasing rates of heart disease?

Research Importance

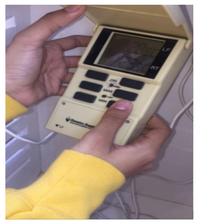
this research is important to our community. where the city I live in, has high temperatures ،which exposes many to health problems ،and it's possible to shed light on the relationship between heat and heart disease. And it could be important and benefits to health-care professionals regarding knowing how to treat heart patients.

Introduction

Every influential disease has a great cause for the cause of the illness, so what is a heart disease? It's a type of chest pain, and a feeling of discomfort, caused by a decrease in blood flow to the heart muscle. but can we predict the environmental effect on such diseases? I will answer this question in this research.

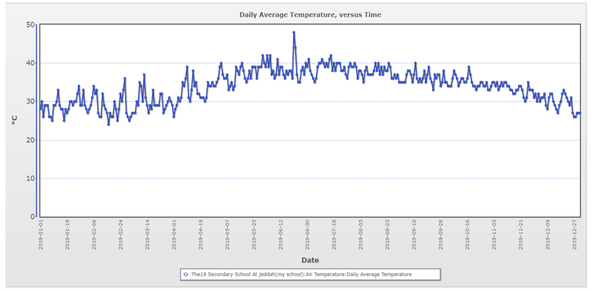
Research Methods

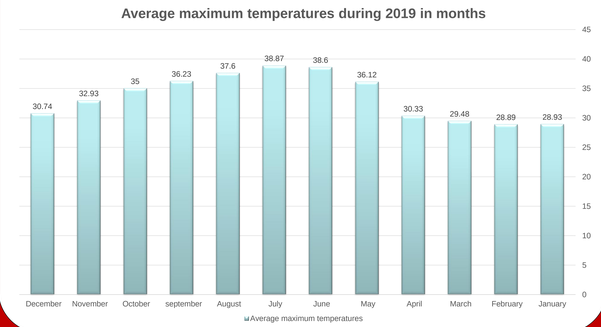
The temperature was entered into the Globe site using a device, Forestry suppliers digital max \ min thermometer. Where the device contains two sensors, one for measuring air temperature and the other for measuring soil temperature, it was put inside a box at a height of 1.5m from the surface of the earth and heat data was taken at noon on a daily basis and taking the minimum and maximum temperatures for both air and soil on a weekly basis as the device allows this As is shown.



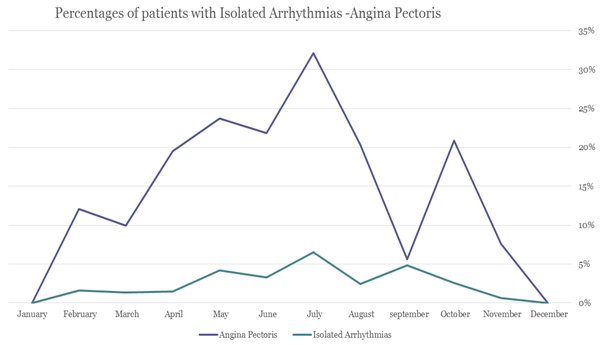
Pictures of the device ,while taking temperatures in school.

Then I contacted the Ministry of Health and asked them for statistical data for patients arriving in hospitals in Jeddah city with heart diseases, I asked for the data to be shown in days of the number of patients admitted to hospitals. And not long after, I received the data from the Ministry of Health, which contained many diseases, and I focused on (Isolated Arrhythmias -Angina Pectoris) and excluded the rest. The data was displayed in months ،not days ،as requested ، forcing me to calculate the average maximum temperature for each month instead of the graph as shown in the figure





Then I converted the number of patients with Angina Pectoris) to percentages to facilitate the comparison process and clarify the existence of the relationship or not between the temperature and the ratios of patients admitted to hospitals. Also, repeated the process for patients with Isolated Arrhythmias As shown in the figure.



Unfortunately, I received missing data from the Ministry of Health for the months of January and December of 2019 for people with Isolated Arrhythmias -Angina Pectoris. Because the time taken to collect lost data may be prolonged, the spreadsheet was created from February to November.

A spreadsheet showing the number of patients with various heart diseases

Total	Isolated Arrhythmias	Heart Failure	Acute Myocardial Infraction	Angina Pectoris	
182	3	131	26	22	February
221	3	149	47	22	March
200	3	117	41	39	April
118	5	73	12	28	May
183	6	117	20	40	June
168	11	77	26	54	July
162	4	83	42	33	August
124	6	81	30	7	september
115	3	68	20	24	October
157	1	117	27	12	November

The previous table was used to calculate patient percentages and compare them to average maximum temperatures as shown in the table.

Average temperatures	Isolated Arrhythmias	Angina Pectoris	Months
32.93 °C	0.63%	7.64%	November
35 °C	2.60%	20.86%	October
36.23 °C	4.83%	5.64%	september
37.6 °C	2.46%	20.37%	August
38.87 °C	**6.54%**	**32.14%**	**July**
38.60 °C	3.27%	21.85%	June
36.12 °C	4.23%	23.72%	May
30.33 °C	1.50%	19.50%	April
29.48 °C	1.35%	9.95%	March
28.89 °C	1.64%	12.08%	February

Discussion & Results

It is clear from the previous table that in the months in which the average maximum temperature was greater than 35 ° C, the ratios were high for *Isolated Arrhythmias* patients where it became clear that the patients were affected by high temperatures and the highest rates were in July where the average maximum temperature was 38.87 ° C and the percentage of patients entering to Jeddah city hospitals 6.54% with *Isolated Arrhythmias* disease was the highest ,While the rates differed for *Angina* patients.

While the percentages for Angina Pectoris patients where the highest in July also, when the average maximum temperature reached 38.87 °C and the percentage of patients entering Jeddah hospitals was 32.14% ،but in the rest of the months the numbers differed, we can not confirm without sufficient data for the rest of the months of 2019 and if We wanted to confirm the relationship We need to compare other cities with high and low temperatures inside the country and compare the statistics of patients inside. Also we thought about bringing data for temperature for five or ten years and requesting statistical data from the Ministry of Health for heart disease also for the same period of time and studying them further.

Conclusions

concluded that there is a relationship between high temperature and heart disease, as in July the proportion of heart patients increased as a result of the high temperature and its impact on them. It's became clear that I need more data. As I reached my need for accurate data that tracks patients or people during their daily routine, so I suggest adding an application that combines Monitoring the heart rate, such as that found in some smart watches, but the application that I propose also collects the temperature of the environment in which the patient or person is present, which provides a close monitoring of heat effect on heart patients. However, the question is, what is the reason for the decrease in the percentage of heart patients in September?

Bibliography

-Globe website https://vis.globe.gov/GLOBE/

-Dr. Hassan Shamsi Pasha, How to protect yourself from heart disease.1998

-Dr. Ahmed qureirea , the effect of thermal extremism on human health. 2012

-The Ministry of Health in Saudi Arabia .

-The MajorHill Physics Series. 2011

I want to thank teacher Nadia Al-Samdani for introducing me to the Globe program and helping me to start this project. Thanks to the Ministry of Health for helping collect data