



IMPLICATIONS OF CARDIOVASCULAR DISORDERS ON HUMAN IMMUNITY

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Abstract

Immunity has been a major medical debate through the world for years now and has specially come under a strict scrutiny with the pandemic raging across the continents and making it all the more necessary for the people and the medical fraternity to review the aspects of immunity under the newly changed dimensions of the world. The pandemic brought to the fore the inherent human weaknesses and compelled the doctors to analyse the whole concept of human immune system under a new light. The study conducted on a chosen sample of 50 heart patients undergoing treatment for extremely critical heart conditions and coronary ailments threw up a vital statistic that revealed a lot about the bonding a human heart shares with the immune system. The patients who were randomly accessed from a famous cardiac hospital in the city of Kota were made available a questionnaire that tried to probe the intensity of their ailment and how critically it was affecting their immunity. Majority of questions asked were close ended that sought objective answers that could somehow help in unraveling the relation heart shares with the immune system. The sample set of people chosen were middle aged men and women between 35 to 65 in age with a history of heart condition for quite some time. The sample set was a blend of patients with varied heart ailments which encompassed Coronary heart disease, pericardial disease and a few with heart valve disease. Irrespective of what specific ailment they were suffering from, a common lack of immunity was detected amongst them all. It was evident out of the fact that they exhibited a shared vulnerability to certain illnesses.

It was kept in mind that questions took into consideration their food habits, their lifestyle, the symptoms that often troubled them, the medication they were prescribed and the influence these all had on their routine. Questions regarding their immunity and the additional ailments and disorders they suffered since the time they were diagnosed for a heart condition were chosen with careful precision. It was specially researched whether the patients in the sample set had some co-morbidities and how seriously and severely these pre-existing conditions were affecting their day-to-day lives. Affixing a link between cardiovascular disorders and a worsening immune system seemed to be a bit tricky as the answers provided by the respondents appeared a little vague sometimes and lacked direction. Although, to a large extent, the answers after a thorough analysis revealed the outcome that we had heard about and long suspected.

Key Words: *Pandemic, Vulnerability, Immunity, Co-morbidity.*

Introduction

Cardiovascular diseases have been a common disorder over the world for years now. A large number of people from all walks of life suffer different heart ailments usually in their middle ages. Though, off late such heart disorders have recently been found amongst youngsters as well. Although, it's often the lifestyle that is responsible for the prevalence of such disorders among the youth as well as the middle-aged. The long term consequences of such disorders are often lethal and may go beyond the limits of treatment. One such repercussion of heart disorder is a loss of immunity which is triggered due to several reasons. It is pretty much known that people with some or other sort of heart ailment don't enjoy a robust health which reflects a weak immune system. We have often witnessed people with heart diseases suffering shortness of breath after mild exertions. Although, the immune system weakens with age but a weak heart accelerates this deterioration. As is well known and widely discussed, chronic medical conditions especially of heart gradually weaken the response of the immune system when attacked by viruses of any kind.

A case in point was the attack of Covid-19 on a majority of patients with underlying heart conditions. Across the world the major sufferers during the pandemic were the ones with severe co-morbidities, characterized by heart and lung ailments. The heart and human immune system are highly integrated through hormones and neurotransmitters. As is medically proven, the white blood cells in the immune system carry the potential of warding off any infection the body might be assaulted with. Moreover, the circulatory system carries hormones via the endocrinal glands which further boosts the immunity and in the case of an imbalance may seriously thwart the immunity. Since our sample set comprised heart patients, they were all immuno-compromised. **They all had experienced some or other form of immunity deficit when faced with medical adversity.** It's medically elaborated that cholesterol formation in the blood vessels triggers the release of certain molecules from the immune system that damage the vessels and may cause a sudden heart failure and death. This effectively proves the vital role played by a good heart in building and sustaining human immunity and any malfunctioning of cardiac system may severely compromise immunity in the near and long term. It's also ascertained beyond doubt that diet and exercises usually prescribed to heart patients are aimed at building long term immunity among the patients.

OBJECTIVES

- To ascertain the severity of cardiovascular disorder among the sample set.
- To evaluate their recent experiences with Covid-19 and subsequent recoveries.
- To make sure if the patients in the sample set had lung conditions as well.
- To make it amply clear whether cardiovascular disorder was causing their digestion to suffer.
- Evaluating whether a heart disorder was somehow impacting the brain and associated nervous system.

The objectives were chosen keeping in view what most cardiac patients commonly suffer. It is well documented in the medical journals published across the world that heart conditions bring a lot of associated traumas to the middle-aged people. These repercussions are either overtly visible or may continue to simmer inside the humans for a prolonged period before developing into life-threatening situations. It's often talked about by medical practitioners and patients with heart conditions are often warned about what might happen to them in the near or long term future. Immunity amongst them all is the worst hit as the circulatory system gets altered thereby bringing about hormonal disturbances and throwing the whole system into disarray. Further, the objectives also made it easy to decide a set of questions for the patients to respond to. It was more convenient to decide upon

the queries so that the outcome could be backed by justified answers. A cardiovascular patient stands susceptible to contracting several infections and it's all due to his compromised immunity.

Moreover, it's not just the case of catching infections, the same stands true for a seriously affected digestive and nervous system as a weak heart breeds an affected circulatory system which further makes the patient more likely to catch several other infections.

METHODS AND MATERIALS

Selection of subjects:

The research involved selecting a random sample of 50 patients in the age group 35 to 65, all sourced from the same Cardiac Hospital in the city of Kota. Since the research was aiming to connect cardiovascular conditions with a reduced immunity, as such all the patients were chosen with the underlying objective that they had an existing heart ailment. Also since they were all middle aged, it was well assumed that they were all past the age where a natural immunity characterized by youth is missing. It was also well ascertained that all of them were undergoing medication for their respective cardiac conditions and had already experienced certain health conditions which could be termed as an attack on immunity. Further, it was also ensured whether the respondents suffered co-morbidities and had been diagnosed with blood pressure, asthma and a few more associated disorders of respiratory or circulatory systems. This made the subjects absolutely ideal for the research as it was easy to question them on their existing conditions and also easy to link those conditions with any other ailment that could be construed as either a direct or an indirect result of the condition. Furthermore, in the light of the recent pandemic, it became quite easy to judge their condition as it was pretty well assumed that many among the respondents might have fallen a prey to covid-19 and thereby they were the best to answer questions concerning immunity.

Questionnaire:

The respondents were subjected to a detailed questionnaire so as to be able to assess how intricately their cardiovascular health was linked to their immunity. The objective of the questions was to evaluate as to how long and how severely they had been suffering all these years and for how long had they been experiencing certain common ailments and infections that could be directly correlated to their cardiac health. The idea was to reach an informed conclusion on the extent to which these infections could be called a result of weakening immunity. All the 50 respondents that were chosen as a sample were handed over the same questionnaire; as a result a certain degree of fairness in answers was expected. Moreover, it became much easier to relatively assess the outcomes as they were for the same questions.

1. They were initially asked questions regarding how long they have been cardiac patients. This gave a rough idea as to how severe their condition was. In fact this also made it simple to assess as to how long they have been going through their respective medications.
2. They were enquired whether they had suffered Covid-19 and how severe was the infection. It was hoped that the answer would help in justifying the loss of immunity.
3. They were also interrogated regarding the condition of their lungs. The objective was to ascertain whether at some point in their lives they had been diagnosed with a lung condition which could be related to a weak heart.

4. It was specifically kept in mind whether these patients had a prolonged history of cough and cold and if they were being administered medication for that. This question was again tied to assessing their state of immunity.
5. Further, the patients in the sample set were queried about the condition of their digestion and if they had been facing issues regarding a weak digestion. It's been proclaimed quite often that a weak heart may lead to acute and even prolonged gastrointestinal disorders as the heart is unable to pump enough blood required for an effective digestion.
6. It was remembered that a weak digestion could be remotely connected to a malfunctioning heart. And a trouble in digestion could never let a patient have a nutritive intake thereby severely affecting long term immunity.

DIETARY PRACTICES:

A healthy diet plays a crucial role in keeping one's heart functioning and beating as it normally should. It's only when people goof up with their eating habits that a heart quits functioning properly. Though, only eating habits can't be blamed for an under-performing heart. There are several other reasons that could be equally accused of causing a human heart to suffer. People often stress themselves out to the extent that hurts the functioning of their heart. Job related anxiety, heredity and a few more factors could lead to common heart ailments. But diet leads the chart. To a large extent people suffering a heart ailment are the ones who have deliberately or unassumingly preferred a diet for an extended period that leads to a gradual damage to their veins and arteries. It's often discovered that people tend to consume a lot of sugar, salt and saturated fats which over a period of time add up to cause a disorder. Refined carbohydrates, white rice, pasta and even bread may be considered a serious drag on one's heart.

Instead, there should be a stress on green leafy vegetables, especially spinach which is believed to contain vitamins, minerals and anti-oxidants. All the more spinach is a rich source of Vitamin K that protects the arteries and is also believed to encourage proper blood clotting. Even, walnuts and beans are a rich source of healthy nutrients and thereby super boosters for heart. Further, citrus fruits, broccoli, ginger and yogurt also carry the properties to strengthen human heart. Additionally these foods are also known to be great for immunity and may prevent the people from catching common infections. The questionnaire also included a few queries regarding the dietary intake of respondents so that it could be safely ascertained whether it was the diet that was causing the heart and immunity to suffer. Heart patients are normally recommended whole grains, barley, oats and brown rice. It's often advised by medical practitioners that whole wheat and whole grain is commonly associated with low cholesterol and thereby effectual for the health of heart. Consequently these diets are effective for immunity as well. A robust immunity can thus be described as an outcome of a carefully chosen diet. The research laid a great stress on dietary practices as it was to be ascertained whether the chosen subjects in the sample set were actually adhering to good and healthy dietary practices or not. Assessing one's heart and immunity simultaneously is a work of precision and the two factors are found to be interdependent.

Data Analysis:

Frequency	No of patients
Less than 2 years	16
2 to 4 years	28
4 to 6 years	04
More than 6 years	02

Table 1: Duration of how long the samples has been suffering cardiovascular condition

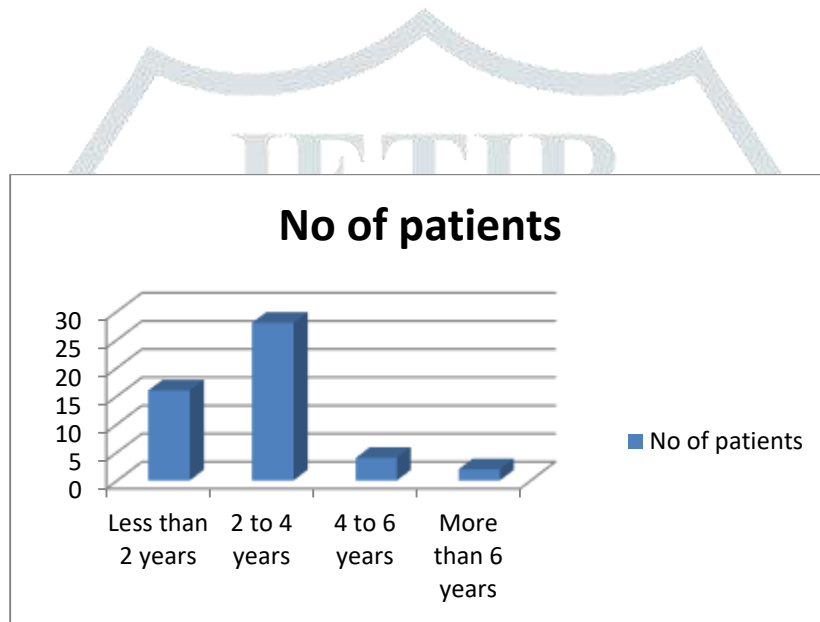


Figure 1: Shows Majority of Respondents with Heart Condition over Last 2 to 4 Years

The data reflects the statistic of the sample surveyed. It clearly defines that majority of the respondents were diagnosed with a heart condition over the last 2 to 4 years. As a result they were an ideal lot to investigate whether they had actually suffered the consequence of lack of immunity in some or the other way. Also since the sample set were middle aged people, it was believed that their immunity was under a stress as a result of age as well.

Ailment	Yes	No
Suffered Covid-19	43	07

Table 2: Data Related to Patients Suffered from Covid-19

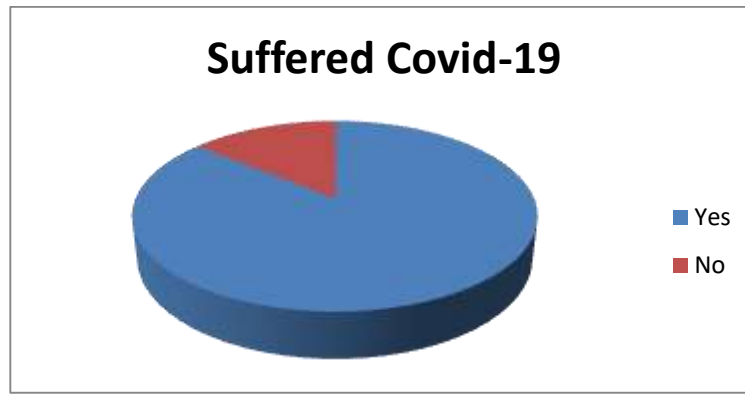


Figure 2: Presents Majority of Heart Patients Surveyed Suffered from Covid-19

The pie representation clearly shows that a vast majority of heart patients surveyed suffered from Covid-19. Almost 43 amongst the 50 respondents who were questioned answered that they had gone through the rigor of pandemic and had to take a heavy medication to get over the infection. Some were even hospitalized for prolonged lengths of time and had to be kept on ventilator with critical conditions. It can be clearly construed that these patients had critically low immunities and as such they contracted the infection. Though, a lot many people during the peak of pandemic caught the infection and had to be medicated against that, but it was medically proven across the world that the ones who suffered worrying levels of Covid-19 were those who had pre-existing conditions either of heart or of lungs. In fact, they revealed in the questionnaire that their consulting doctors had not just treated them against Covid-19 but had also put them on alert regarding their heart conditions.

Ailment	Frequency
Severe Lung Conditions	18
Mild Lung Conditions	23
No lung Conditions	09

Table 3: Respondents Diagnosed with Lung Conditions

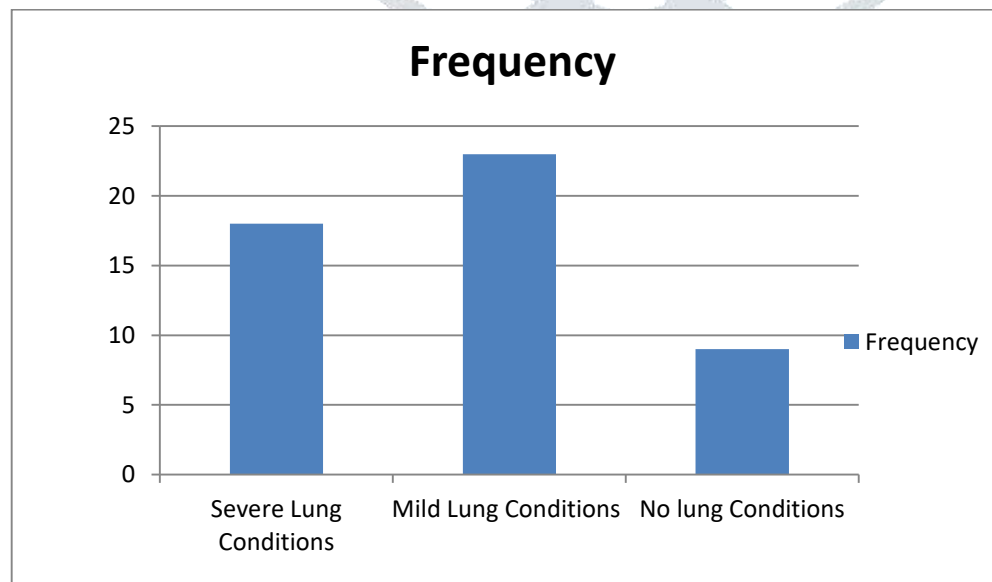


Figure 3: Shows Respondents with Cardiovascular Ailment are also Diagnosed with Lung Conditions

The statistical outcome in the bar chart was a shocking revelation. It was found that the patients didn't just have a cardiovascular ailment, a substantial number of them had been diagnosed with weak lungs as well some time not long back in the past. This was a clear reflection of a co-morbid condition. Almost 23 amongst them had mild lung disorders and had taken medication for that off and on. In fact 19 amongst them had suffered severe lung infections and had even been hospitalized for that in the past. These shocking exposures starkly clarified the vulnerabilities of cardiovascular patients. Their immunities were so much compromised that they were not just a victim of cardiac disorders but a big chunk out of them had malfunctioning lungs as well.

Ailment	No.
Irritable Bowel Syndrome	24
Diarrhea	08
Nausea and vomiting	18

Table 4: Depicts Data Regarding Digestive Disorders

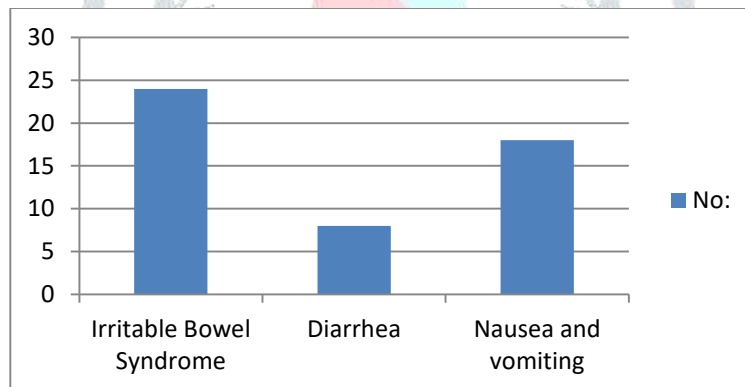


Figure 4: Shows Majority of Respondents Suffered from Irritable Bowel Syndrome

The bar graph is a clear indication to the fact that almost half the respondents were suffering from irritable bowel syndrome. Such a huge majority can't be a coincidence. It shows that their heart ailment was somehow linked to their digestive disorders. Not just that, around 18 out of the 50 in the sample set admitted to the problem of nausea and frequent vomiting, once again validating the belief that cardiovascular problems in the long term may gradually lead to chronic stomach distress. It clearly lays bare the fact that while under the strain of cardiovascular disorder, the heart apparently gets incapable of pumping the required blood to the guts as a result retarding the metabolism and making the whole system unmanageable.

Ailment	Severe	Mild	None
Running nose	29	12	09

Table 5: Respondents Having Symptoms of Running Nose



Figure 5: Reflects Most of the Respondents Suffer from Running Nose

The data represented through the pie clearly validates the well known fact that a big proportion of cardiac patients suffer running nose pretty much throughout the year. This year long disorder in a way clarifies that a prolonged heart disease makes them lose their immunity. Though it's well known that a constant irritation in one's throat is often ignored by the people as something common and innocent. Though the reality contradicts the belief. A runny nose is an ominous sign of a weak heart and thereby a weak immunity as well. Such people often suffer shortness of breath also. Thereby a cardiovascular patient could have a runny nose or Rhinorrhea and the nasal congestion that he suffers as a result of that could be called a remote symptom of a malfunctioning heart and a weak immunity.

Conclusion:

- The analysis of data is clear evidence that a huge majority of respondents in the sample set were a victim of lack of immunity resulting out of a weak heart. They were all patients of cardiovascular disease and were undergoing a strict medication for that. That in itself made them worthy subjects for the sample set. The answers expose certain well known facts. Almost a majority suffered a covid-19 attack which could be attributed to their weak immunity.
- A careful analysis also throws open the fact that a huge proportion out of them had lung conditions as well which they all developed after being diagnosed with the heart disease. Almost all reported shortness of breath which reflects a weak immunity. The given statistic reflects the fact that a malfunctioning heart gradually developed a lung condition which worsened over a period of time.
- It could also be concluded with certain degree of authority that a considerable lot amongst them were found to be suffering from digestive disorders like irritable bowel syndrome and nausea recurring with a disturbing frequency which again indicates a fragile immune system. A weak heart is unable to send adequate blood to the guts and that over a prolonged period results in a malfunctioning digestive tract and a weak immunity arising out of it.
- Most of the respondents revealed a shocking propensity towards cough and cold that lasts across the year. This is not unusual as inflammation of nasal tissues can be a result of weak heart and thereby an indication of weak immunity as well. It's well documented that during the days when covid was raging; patients with

nasal congestions had a bad time. It was medically proven that they were the ones with a weak immunity and thereby were the most prone to catching the infection.

Recommendations:

- 1) People with a history of cardiovascular disorders are quite susceptible to a deteriorating immunity. They develop immunodeficiency when heart doesn't function with optimum efficiency. They should keep a strict check on their dietary practices. Try consuming green leafy vegetables that contain anti-oxidants and Vitamin K that are responsible for keeping the arteries healthy and would thereby maintain immunity as well. Certified dieticians can be of great help when it comes to deciding the right mix of healthy food.
- 2) Further, a regular monitoring of the health of their heart holds the key to sustaining a dependable immunity. A routine check-up will keep them updated regarding the state of their vital organs and in case of a snag would be alerted by their doctor regarding a need to take action.
- 3) Routine exercises as prescribed by their doctor along with the suggested medicines would enable them to keep their immunity in the right shape. In the case of a new development, the doctor should be informed at the earliest, so that a thorough investigation can be done and if some changes are required in the medication, the doctor could advise that with enough time at his disposal.
- 4) Things that prove to be harmful for the health of the heart are counterproductive to immunity as well. Habits like smoking or consumption of alcohol should be a priority as they are not just a burden on the heart but a serious deterrent to good immunity as well.

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