

MATTERS OF THE *Heart*

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There is an urgency to extend initiatives for cardiovascular health protection, such as increasing awareness for improved life style, nutritious and healthy food, and promote health wellness programmes to combat heart diseases. "Matters of the Heart" is designed to provide public health education in these areas.



Contents

- 1. STATINS: THE CHOLESTEROL POLICEMEN**
- Muhammed Asif PP, Third Professional MBBS
- 2. AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE** - Aghila Rani KG, PhD
- 3. COVID-19 PANDEMIC AND LIFESTYLE DISEASES: A VICIOUS CYCLE** - Mrinal Murali Krishna, MBBS
- 4. SELECTIONS** - In connection with the World Heart Day 2021, Indian Section of the International Academy of Cardiovascular Sciences (IACS) as part of its program 'Promotion of Heart Health Among Children' had in association with the Rajiv Gandhi Centre for Biotechnology held an essay competition among school children. Nine best entries are included in this issue.
 - 1. MATTERS OF THE HEART**
- Adithya Kishore (Won the first prize)
 - 2. MATTERS OF THE HEART**
- Ganga Ajith M (Won the second prize)
 - 3. MATTERS OF THE HEART**
- Aditya Krishnan (Won the third prize)
 - 4. PREVENTION OF HEART DISEASES**
- Angeline Ann Renji
 - 5. ഹൃദ്രോഗത്തെ നാം അറിഞ്ഞതെങ്ങനെ? ചരിത്രം-വികസനം** - Aparna Prabhakar
 - 6. GROWTH OF OUR KNOWLEDGE ABOUT HEART AND HEART DISEASE**
- Sarah Banerjee
 - 7. MILESTONES IN THE DEVELOPMENT OF OUR KNOWLEDGE ABOUT HEART AND HEART DISEASES**
- Adityan A
 - 8. A HEALTHY HEART IS THE KEY TO HEALTHY LIFE**
- Alana Shaji
 - 9. ADVANCEMENTS IN OUR KNOWLEDGE ABOUT HEART AND HEART DISEASES**
- Anagha Rajesh

STATINS : THE CHOLESTEROL POLICEMEN



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Introduction

Heart attack and stroke are the two great heists of life, and the villain? Though there are many culprits, elevated blood cholesterol level is a well-established risk factor for atherosclerosis [1], leading to heart attacks (ischemic heart disease), stroke, peripheral vascular diseases and subsequent deaths. After the establishment of a firm correlation between high plasma cholesterol and deaths from coronary heart disease (CHD) from the Framingham heart studies [2], the need for a ‘policeman’ to keep cholesterol levels in check became evident. The discovery of this ‘policeman’, the statin, is a story of careful observation, trials, setbacks, and rumors, which culminated in the birth of a successful drug with which millions of people have extended their lives.

Process of Discovery

Virchow, the father of modern pathology, first observed that arteries of patients dying of occlusive coronary vascular disease, such as myocardial infarction (MI), were often thickened and contained a yellowish fatty substance, subsequently identified as cholesterol. This pathological condition was termed ‘atheroma’ [2], the Greek word for porridge. Anitschkow and Chalatow explained the cause of this condition in 1913 by showing that feeding cholesterol to

rabbits rapidly produces atheromatous disease, similar to that found in man [2]. Following the establishment of a correlation between high cholesterol levels and diseases, researchers started to work towards novel ways of treating these diseases without altering diet and lifestyle. Akira Endo, a Japanese researcher, was a forerunner among them. In the late 1960s, when working at a medical college in New York, Endo noticed that heart attack was the leading cause of deaths in the US. Though many cholesterol-lowering agents such as nicotinic acid, cholestyramine, neomycin, and triparanol were available in the 1960s, their patient compliance was low. Nicotinic acid had side effects such as cutaneous vasodilation (widening of blood vessels in the skin) and gastric upset.

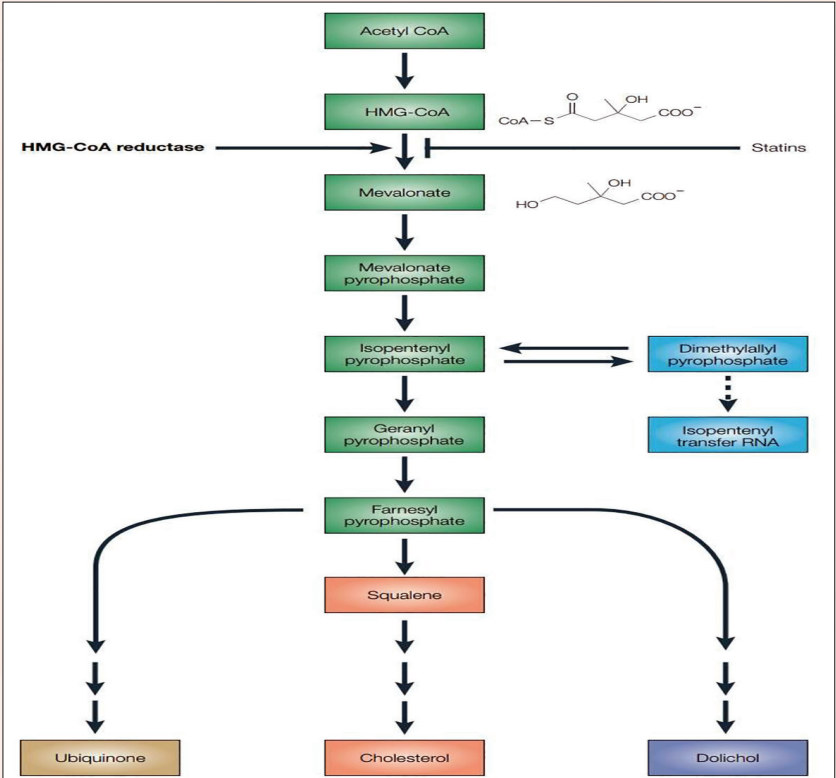


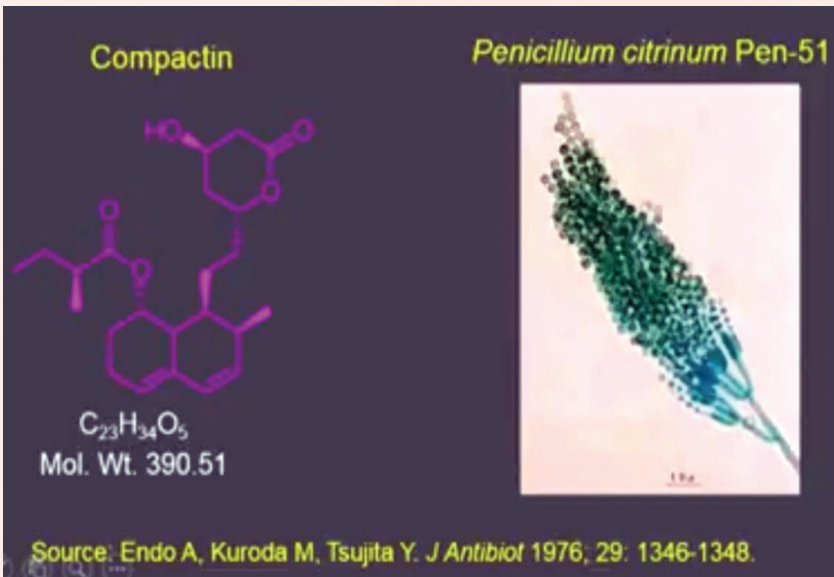
Figure 1 | **The cholesterol biosynthesis pathway.** Cholesterol biosynthesis is a complex process involving more than 30 enzymes. A simplified version is shown here, which highlights the step inhibited by statins, and shows the chemical structures of the starting material (HMG-CoA) and product (mevalonate) of this step.

Cholestyramine was not tolerated by all patients. Patients using neomycin had symptoms such as nausea and diarrhoea. Triparanol was effective in reducing cholesterol levels by inhibiting the final steps of the cholesterol synthesis pathway in the body, but this resulted in the accumulation of the sterol products of earlier steps. Because of their side effects, they were withdrawn in the early 1960s [3]. Based on Endo's experiences with many drugs, he hoped that inhibition of early steps of de-novo cholesterol synthesis would be helpful in lowering plasma cholesterol, without the accumulation of sterols observed with triparanol.

This hope propelled him to search for an inhibitor of the enzyme HMG-CoA reductase. The search was triggered by his observation that certain fungi produced compounds that inhibited the growth of sterol-requiring microbes. Endo conducted two types of assays using fungal culture broths. The first assay tested the capacity of broth to inhibit incorporation of ¹⁴C labelled acetate to non-saponifiable lipids in the early steps of the pathway. The cultures which inhibited incorporation were labelled as active. The second assay tested the ability to inhibit lipid synthesis from mevalonate to determine whether there was any inhibition in later steps. Those cultures which were active in the first assay (inhibited initial steps of pathway) and not active in the second assay (did not inhibit later steps of pathway) were thought-provoking. Such samples were predicted to contain a compound that inhibited early steps of the cholesterol synthesis pathway. The principal active component from these culture broths were isolated. This process continued for 2 years as Endo tested about 6000 culture broths!

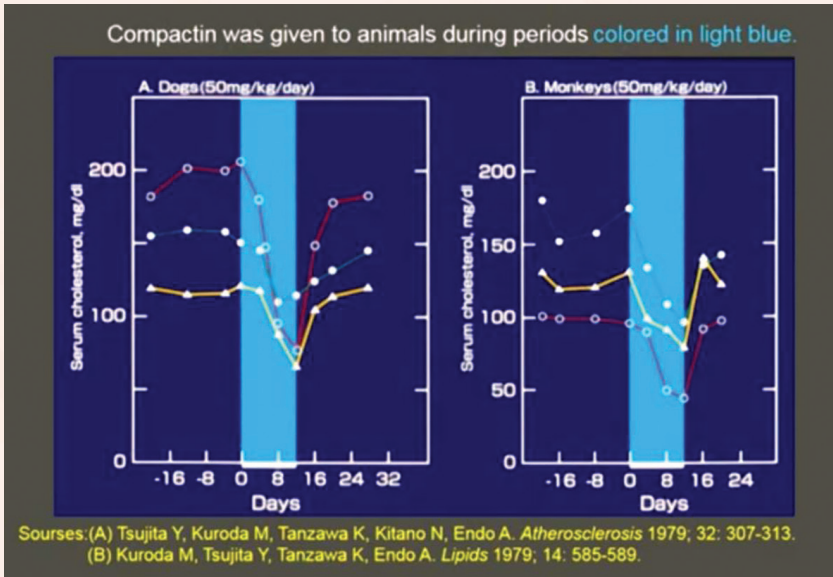
By late 1973, a compound from a strain of *Penicillium citrinum* was found to be effective and was named mevastatin. The same compound (designated compactin) was also isolated from *Penicillium brevicompactum*. Interestingly, when the structure of mevastatin was determined, its acid form showed amazing similarity with HMG-CoA, the natural substrate of HMG-CoA reductase. Additionally, the drug had 10,000-fold higher affinity for HMG-CoA reductase than the natural substrate did. Though the drug was isolated in the early

1970s, it faced many hurdles during trials. Studies showed that compactin was not able to lower blood cholesterol when given to rats for 7 days [3]. To investigate these discouraging results, Endo orally administered compactin to rats. After a few days, the rats were sacrificed and microsomal fractions of their livers were assayed for HMG-CoA reductase activity. It was determined that compactin had induced a 10-fold increase in hepatic HMG-CoA reductase. Thus, the need to introduce more animal models became clear. Hens laying eggs that contained a large quantity of cholesterol were used, followed by dogs and monkeys. The drug was highly effective and no adverse reactions were noticed.



Further problems arose when human trials began. Though total cholesterol was lowered, the first patient suffered from muscular weakness when the drug was given at 500 mg/day (but not 200 mg/day). Clinical trials were started in 1978, but most were suspended in mid-1980, because of a rumour that mevastatin had led to lymphoma (a tumour of the lymph gland) and toxic effects in some dogs. The data from this experiment has not been clearly reported. This rumour led to long-term toxicity studies, which determined that toxicity was only

present at high doses. Mevastatin was effective in humans at as low a dose as 0.2 mg/kg [4]. Thus, a dose of 200 mg/kg which produced toxic effects in dogs was a thousand times higher than the effective dose in humans. The drug was gradually modified, and in February 1979, Merck and Endo independently isolated lovastatin, based on experimental data. The drug was later approved by the FDA.



Impact

Since then, statins have helped millions of people reduce the risk of atherosclerosis and thereby its complications. Fourteen major clinical trials involving 91,000 patients with atherosclerotic cardiovascular disease have documented a 30% reduction in heart attacks after treatment with statins [5]. Recent analysis has indicated that the long-term cardiovascular benefits of statins greatly outweigh the risk of side effects in patients for whom they are recommended [6]. Additional studies have shown that statins are effective in treating symptomatic intracranial atherosclerotic plaques [7]. Above all, statins not only increase the longevity of patients, but also help to control the complications related to cardiovascular diseases without necessarily sacrificing our lifestyle and the gustatory delights we enjoy.

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AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE



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The corona virus pandemic has taught us the biggest lesson in life, that a healthy lifestyle helps one's immune system to be in the best shape possible to tackle pathogens. It is important to have a comprehensive and timely monitoring of disease burden in all age groups, especially in children and adolescents. Most of the life style disorders which relate to the problems adults have do not really manifest until a certain age. The seeds of the problems which are sown at a much early age, include a sedentary lifestyle due to lack of physical exercise, smoking, diabetes etc. By following a healthy lifestyle, most of the risk factors can be controlled reducing the risk for heart diseases later in life. It is alarming to know that a child born today is 500 times more likely to die of acquired atherosclerosis than of congenital heart diseases which makes it very important for kids to grow up with the understanding that they are in large measure responsible for their health.

Risk factors in childhood and adolescence that have a direct relationship on the probability of having cardiac disease later in life include an inactive lifestyle, obesity, smoking, high blood pressure, and high cholesterol.

Sedentary Lifestyle

Sedentary behavior among children contributes to delayed

cognitive development and a decrease in academic achievement. Sedentary lifestyle also leads to a range of impaired psychological health, increased risk of obesity and cardiovascular complications. Cross-sectional studies revealed that children and adolescents who participated in higher levels of physical activities had better HRQOL (Health-related quality of life) than those in an inactive lifestyle. Physical activity/exercise is directly associated with weight, age, sex, and socio-economic features of the individual. As per the WHO guidelines, children and youth aged 5–17 years old should participate in at least 60 minutes of moderate to vigorous-intensity of physical activity every day. With the advancements in technology and increased use of screen-based electronic devices like smart phones, laptops and widespread accessibility to the internet, children and adolescents spend more time engaging in sedentary activities than a decade ago. In order to develop awareness and improve health of the pupils, many countries have incorporated physical activity and/or sedentary behavior guidelines for school-age children and adolescents. In spite of the continued efforts, majority of the young people around the world, however, do not meet the required levels of physical activity.

Smoking

No doubt smoking among teenagers (high school kids) is a serious concern. The addictive tobacco carries with it an extremely high likelihood of heart disease, lung disease and colon cancer. Tobacco smoke is loaded with approximately 4,000 toxic chemicals, including oxidative gases, heavy metals, cyanide, and at least 50 different carcinogens. Both active and passive exposure to tobacco smoke significantly contributes to morbidity and mortality in children. Passive or environmental tobacco smoke (ETS) contains particles much smaller than those in mainstream smoke, and therefore has greater penetrability to the airways of children. The total nicotine dose received by children whose parents smoke is equivalent to actively smoking about 60 and 150 cigarettes per year. Smoking further causes a gradual decline in the activity levels of the children and adolescents increasing the prevalence of obesity. Long-

term exposure to ETS causes inflammation and an imbalance in the lipid profile that leads to lipid accumulation in the blood vessels of the heart and aorta leading to obesity. Obesity is a definite risk factor for coronary events later in life. Being the most preventable cause of death and the most serious risk factor for cancer, tobacco consumption needs to be monitored from young age itself.

High Blood Pressure/High Cholesterol

Systemic hypertension is the major cause of morbidity and mortality among adults. Recent studies report that the prevalence of primary hypertension is increasing among children. This is a growing problem and the condition is often overlooked in children and adolescents. Evidence on the short- and long-term effects of blood pressure elevation in childhood clearly shows that it is not a benign condition and early identification and appropriate management of hypertension in children and adolescents is important to prevent the development of hypertensive end organ disease. The contributing factors for high blood pressure in children are many including chemical exposure in early-life as well as environmental factors. It is advisable to screen the children for elevated blood pressure annually or at every hospital visit if risk factors are present. In addition, history and physical examination and targeted screening tests could be done to evaluate for underlying medical disorders like comorbid cardiovascular diseases, diabetes mellitus and hyperlipidemia. Similarly, it is recommended to perform selective screening in children whose first or second degree family members have had evidence of coronary artery disease below the age of 55 or for children whose parents are known to have high cholesterol or triglyceride levels, even if they have not yet developed coronary artery problems (National Cholesterol Education Program).

Prevention of Heart Disease Starts in Childhood

Even though children and teens do not show the symptoms of heart disease, the silent buildup of fat in the blood vessels can start in childhood and can have a serious impact on their adult life. Most of the risk factors that affect children can be controlled early in life,

lowering the risk of heart disease later in life which includes initiating lifestyle changes such as weight loss if overweight or obese, a healthy diet, and regular exercise. Exercise need not be complicated. It is important to know that lack of access to formal activities doesn't preclude exercise whereas participation in organized sports or dancing is necessary. Parents play a very important role in inculcating healthy lifestyle among children by encouraging healthy eating and regular aerobic exercises. Family activities/ group games should also be encouraged such as strolls and bike rides.

Healthy Food and Healthy Hearts

It is essential for children and adolescents to follow a healthy diet. A balanced diet should be high in fiber and low in fat without overdoing snacking in between meals. The recommended fat intake of children aged 4 to 18 years is 25 to 35 percent calories required per day and for children ages 2 to 3 years it is 30 to 35 percent of calories required. It is also essential to avoid fast food restaurants and monitor the serving sizes. The recent trend towards super sizing everything must be consciously avoided. As Benjamin Franklin stated "An ounce of prevention is worth a pound of cure". Prevention remains the best strategy and the sage advice is valid even today.

Raising Healthy and Happy Children

The American Heart Association (AHA) and the United States Department of Agriculture offer some exercise/dietary guidelines for children of ages 5 and older:

- Provide at least 30 minutes of enjoyable, moderate-intensity activities every day.
- Entertain 60 minutes of moderate to vigorous activity for children most days of the week.
- Alternative to 60 minutes of activity is to provide two 30-minute or three 20-minute periods of activity appropriate for the age, gender and development of your child.

- Monitor screen time and do not offer food as a reward for your children’s accomplishments.
- Enroll children in group activities like cycling, sports camps etc.
- Strict dietary guidelines to be followed from ages 2 onwards like restricting the amount of total fat consumed be no more than 30% of total daily calories and saturated fat less than 10% of total daily calories.
- Use the “age + 5” guideline for calculating the appropriate amount of fiber. For example; a 7-year-old should eat 12 grams of fiber ($7+5=12$). When their daily calorie intake reaches 1,500 or more, increase fiber to 25 grams.
- Children also should eat at least five servings of fruits and vegetables every day.

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COVID - 19 PANDEMIC AND LIFESTYLE DISEASES A VICIOUS CYCLE



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As of 20th December, 2020, the WHO reports nearly 75 million confirmed cases of COVID-19 worldwide with 1.7 million deaths [1]. Public health recommendations and government measures taken to abate the spread of the infection have indirectly impacted food availability, dietary quality, access to recreational areas, social activities, work and financial security [2]. These factors have radically changed lifestyle-related behaviours over time, especially daily eating, physical activity and sleep habits which are known to be independent risk factors for metabolic complications such as obesity, diabetes and cardiovascular disorders [2].

A large cross-sectional online survey was conducted during the unlock phase (August 15 to August 30, 2020) across various cities, towns and villages in India. Responses from 995 individuals showed a mixed effect of the preventive measures adopted to control COVID-19 on the lifestyle-related behaviour. A significant improvement in regular meal consumption pattern and healthy eating behaviour and reduction in unhealthy food intake were positive indicators, while significant reduction in physical activity and increase in sitting time, screen time and stress were negative indicators. The negative effect of lifestyle-related behaviours might outweigh the positive effect of

eating behaviour, which can lead to higher incidence of weight gain and associated metabolic complications [2].

A sedentary lifestyle can undoubtedly increase the risk of obesity and cardiovascular diseases. An interesting study done in London busmen in 1949 showed that the incidence of coronary heart disease is less in the middle-aged conductors of London's double-decker buses than in the drivers of the same age. In particular, the "sudden death" rate of conductors under 50 is one-third that of drivers [3]. By using information on sizes of uniforms, it has been shown that the girth of conductors was less than that of drivers in each 5-year age group from 25-29 to 60-64 [4]. This suggests that physical inactivity due to sustained quarantine and social distancing during this pandemic can increase the risks for obesity and downregulate the ability of organ systems to resist viral infection.

Confinement to the home and psychological distress due to the COVID-19 pandemic may lead to harmful health behaviours, such as overeating, sedentary behaviour with reduced physical activity, elevated alcohol and tobacco use and increased screen time causing impaired sleep. All of these behaviours are associated with non-communicable diseases and can interfere with immunity [5]. Unhealthy eating habits together with a reduction in physical activity contributes to weight gain during quarantine. A reduction in our physical activity will increase oxidative stress, Oxidative stress is mutually linked to inflammation, often associated with an increased risk of dysfunction of the lining cells (endothelium) of the blood vessels [6]. In addition, obesity is associated with elevated circulating levels of inflammatory cytokines, which are subsequently decreased with weight loss. In obese individuals, adipose tissue becomes dysfunctional, promoting a pro-inflammatory, hyperlipidaemic, and insulin-resistant environment that contributes to cardiovascular disease [7].

Obesity was associated with an approximately 3-fold increased risk for severe COVID-19 (33.3% vs. 14.7%, respectively), and longer hospital stay (median 23 vs. 18 days, respectively) was noted in obese vs. non-obese patients [8]. Obesity has also been associated

with a significantly higher rate of ICU admission or death [9]. Further, obesity class I (BMI>30 kg/m²) and obesity class II (BMI>35 kg/m²) have been associated with an increased risk for need of invasive mechanical ventilation in patients hospitalized for COVID-19, independent of age, sex, diabetes mellitus and hypertension [9, 10]. Obesity in turn is a risk factor for the development of diabetes and hypertension. Both diabetes history and hyperglycaemia are independent predictors for the fatality of COVID-19. Diabetes can increase the risk of immunodeficiency, lung injury, infectivity and virulence of SARS-CoV-2. Additionally, the viral infection might in turn induce glucose dysregulation in pre-existing diabetes, or even cause new-onset diabetes in those without a history of diabetes, which can work as an amplification loop and form a vicious cycle [11].

It is thus necessary to promote physical activity at home during quarantine. The 2019 American College of Cardiology/American Heart Association Guideline on the Primary Prevention of Cardiovascular Disease recommended “at least 150 minutes per week of accumulated moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity” to reduce Atherosclerotic cardiovascular disease (ASCVD) risk. Additionally, “engaging in some moderate- or vigorous-intensity physical activity, even if less than this recommended amount, can be beneficial to reduce ASCVD risk”. Today, there are thousands of workout videos available on the Internet, allowing individuals to perform these workouts independently. A physically active lifestyle may counteract the negative impact of prolonged phases of social distancing on physical and mental health during the COVID-19 pandemic.

A balanced and healthy diet containing enough macronutrients and diverse micronutrients is a prerequisite of an optimally functioning immune system. High-energy ‘Western’ diets and obesity are major risk factors for a more severe course of COVID-19. Given the reciprocal relationship between sleep and immunity, sufficient restorative sleep is needed for adequate immune functioning. Reducing smoking rates and limiting alcohol intake are important in decreasing disruptive effects on the immune system and improving

the ability to cope with infection [5].

People with pre-existing conditions, such as diabetes, are at high risk of a severe disease course and it is essential that blood glucose should be carefully monitored, as chronic hyperglycaemia can lead to immune dysfunction. Patients should be encouraged to continue medication prescribed for hypertension, diabetes or dyslipidaemia [12]. Continuation of usual care for people with diabetes by incorporating telehealth, with a larger focus on sick day management, early detection and testing for COVID-19 where possible and increased blood glucose testing to account for changes in daily routine, diet and mental health should be encouraged [13].

At present, physical distancing and face masks are undoubtedly the best preventive measures to avoid exposure to SARS-CoV-2. However, appropriate lifestyle changes as mentioned above can help curb the vicious cycle of lifestyle diseases and COVID-19 infections and may contribute to shifting the population distribution of infection risk and preventing severe outcomes of COVID-19.

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MATTERS OF THE HEART



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Khalil Gibran once said, “Beauty is not in the face, beauty is a light in the heart”. The human heart feels the things the eyes cannot see and knows what the mind cannot understand. If you think with your head, a heart is just an organ for pumping blood, but if you think with your heart, you know that a heart is the core of human existence. A heart feels and expresses. This proves that heart matters.

During this pandemic time, one may not be able to avoid vulnerability but still be kind to your heart. Mark Twain’s thoughts on losses sound all the more insightful in these pandemic times. “Nothing that grieves us can be called little: by the eternal laws of proportion a child’s loss of a doll and a king’s loss of a crown are events of the same size.” The heart is not something to be messed with. It provides oxygen to all parts of the body. Once it stops, the story is over for us. Some part of the brain can go haywire, still we live. Some part of the kidney or the liver can go haywire, still we live. But if the heart goes haywire, there is no chance we can live. From ancient times to modern digital world, it has been proven that heart is the most important organ other than the brain for human existence.

Buddha said “Thousands upon thousands of lights is inferior to a light of heart. Only within our body, with its heart and mind, can bondage and suffering be found and only here can we find true liberation. Karma grows from our hearts.”

The theme for this year’s World Heart Day celebrated on 29th

September is “Use Heart to Beat the Cardiovascular Diseases.” This campaign has been rightly put forth in these COVID-19 pandemic times as heart disease has been recognized as the leading cause of death among Indians accounting for about 28% of the total deaths in the country. It is a severe situation that has to be addressed immediately.

The overall management of heart disease starts with awareness. Change in one’s behaviour and lifestyle and belief that the life can continue after heart diseases. Going by Benjamin Franklin, “The heart of a fool is in his mouth, and the mouth of a wise man is in his heart.”

It is shocking to know that cardiovascular diseases still remain the leading cause of death in the world over the past 15 years.

From mummies in ancient Egypt to the current digital era our understanding of heart and vascular diseases has come a long way. From William Heberden who brought “anfina” to the notice of medical profession and stethoscopes to complex CABG and PCI’s, we have come a long way in the journey of studying our heart.

Still, the heart diseases and treatment remain elusive to the common man – from lifestyle modification to complicated surgeries.

As a student, I think that any great structure requires a strong foundation built with hard work. So, the need of the hour is to create public awareness about heart diseases and seeking early medical care with the help of new technological advances and expert specialist care.

Using your heart is about using these three things:

- Your head – to understand and act on behaviour for healthy heart
- Your influence – your example
- Your compassion

We can also use our heart to make better diet choices, quitting detrimental activities like smoking and drinking and exercising regularly. We should listen to our heart by not letting COVID-19 stop regular exercises and check-ups.

Children have to be lured away from calory rich food. Obesity is to be avoided at all costs. Use your heart to make kids understand the importance of being physically active, reduce sedentary time. Reduce Screen time.

We should have a heart to lead by example and indulge in at least 60 minutes of moderate to intense physical activity every day ourselves.

I would like to end this essay by quoting the lines of Christina Rossetti:

'My Heart Is Like a Singing bird
Whose nest is in a water 'd shoot;
My heart is like an apple-tree
Whose bows are bent with thickest fruit;
My heart is like a rainbow shell
That paddles in a halcyon sea;
My heart is gladder than all these...

The poet in these lines is celebrating her birthday.

Let child be the father of man and every person celebrate each and every birthday heartily.

ഹൃദയത്തിന്റെ കാര്യങ്ങൾ



ഗംഗ അജിത്. എം
XII , Divison E2
V & GHSS, Manacaud

സ്നേഹപൂർവ്വം.....

“നീ ആ പറഞ്ഞത് മുറിവേൽപ്പിച്ചത് എന്റെ ഹൃദയത്തിനെയാണ്” ഇങ്ങനെ ഒരു വാക്ക് കേൾക്കാത്തവരായി ആരുംതന്നെ ഈ ലോകത്ത് ഉണ്ടായിരിക്കില്ല. നമ്മളിൽ പലരും ഒരുപക്ഷെ ഈ വാക്ക് ഉപയോഗിച്ചിട്ടു മുണ്ടാകും. അത്രത്തോളം നമ്മുടെ മനസ്സിൽ വലിയൊരു സ്ഥാനം ഹൃദയത്തിനുണ്ട്. നമ്മളിൽ പലരും, അല്ല ഭൃതിഭാഗം ആളുകളും വ്യക്തിപരമായ പല കാര്യങ്ങളും ഒടുവിൽ വിഷമകരമാകുമ്പോൾ ‘ഹൃദയത്തിൽ തറച്ചു’ എന്നൊക്കെയുള്ള ശൈലികൾ ഉപയോഗിക്കുന്നത് പതിവാണ്. അത്രയേറെ നമ്മുടെ ജീവിതവുമായ ഹൃദയം അടുത്തു കഴിഞ്ഞിരിക്കുന്നു. നമ്മൾ നമുക്ക് പ്രിയപ്പെട്ടതിനെതിനേയും ഹൃദയത്തോട് ചേർത്തു വെയ്ക്കുന്ന ശീലം ഇന്നോ ഇന്നലെയോ തുടങ്ങിയതല്ല.

എന്നാൽ “ഹൃദയം” എന്ന അവയവത്തെപ്പറ്റി നമ്മളിൽ എത്രപേർക്കറിയാം? നമ്മളിൽ പലരും മറന്നുപോകുന്ന ഒരു കാര്യമുണ്ട്. കാര്യം നാം പുറമെ ഹൃദയംനൊന്തു എന്നൊക്കെ പറയുമെങ്കിലും, അത്രപെട്ടെന്ന് നമ്മുടെ ഹൃദയത്തിന് പ്രശ്നങ്ങൾ ഉണ്ടാവുകയില്ല. നമ്മുടെ ശരീരത്തിൽ ജീവൻ നില നിൽക്കുന്നതുതന്നെ ‘ഹൃദയം’ എന്ന അവയവം ഒന്നുകൊണ്ടുമാത്രമാണ്. ഹൃദയമിടിപ്പ് എന്ന് നിൽക്കുമോ, അന്ന് ഒരു മനുഷ്യയുസ്സ് കൂടി തീരുന്നു.

ഹൃദയത്തിന് ‘ഹൃദയം’ എന്നപേര് ലഭിച്ചതിനുപിന്നിലും ശാസ്ത്രമുണ്ട്. ‘ഹൃദ്’ എന്ന സംസ്കൃത പദത്തിൽ നിന്നുത്ഭവിച്ച പദമാണ് ഹൃദയം. ‘ഹൃദയം’ എന്ന വാക്കിന്റെ അർത്ഥം കേന്ദ്രം, മദ്ധ്യം എന്നൊക്കെയാണ്. ഹൃദയം ഒരു ആന്തരികാവയവമാണ്. ശരീരത്തിലെ എല്ലാ ഭാഗങ്ങളിലേക്കും രക്തം ശുദ്ധീകരിച്ച് പമ്പ് ചെയ്യുക എന്നതാണ് ഹൃദ

യത്തിന്റെ പ്രധാന കർമ്മം. മാംസപേശികൾ കൊണ്ട് ഉണ്ടാക്കപ്പെട്ടിരിക്കുന്ന ഹൃദയത്തിന്റെ പ്രവർത്തനം മനോനിയന്ത്രണത്തിന്റെ പരിധിക്ക് പുറത്താണ്. അതെ, നമ്മുടെ വികാരങ്ങൾ ഹൃദയത്തെ ബാധിക്കുന്നില്ല എന്നർത്ഥം. നമ്മളിൽ ദേഷ്യം, സങ്കടം, ദുഃഖം, സന്തോഷം, കരച്ചിൽ, ഭയം എന്നിങ്ങനെ പലതരം വികാരങ്ങൾ ഉണ്ടാകുന്നത് തലച്ചോറിന്റെ പ്രവർത്തനത്തിലൂടെയാണ്. അതായത്, നമുക്ക്, ദുഃഖമോ വിഷമമോ തോന്നുന്നത്, നമ്മുടെ തലച്ചോറ് ആ വികാരം പുറപ്പെടുവിക്കുന്നതു കൊണ്ട് മാത്രമാണ്. കാര്യം നാം മുന്നേ പറഞ്ഞതുപോലെ ‘ഹൃദയത്തെ വേദനീപ്പിച്ചു’ എന്നൊക്കെ പറയുമെങ്കിലും ശാസ്ത്രീയപരമായി ചിന്തിക്കുമ്പോൾ, അത് വെറുമൊരു തലച്ചോറിന്റെ പ്രവർത്തനം മാത്രമാണ്.

നാം ഉറങ്ങുന്നത്, നമ്മുടെ ക്ഷീണം അകറ്റാനാണ്. നാം വിശ്രമിക്കുമ്പോൾ, കണ്ണുകൾ ഉൾപ്പെടെ ഭൂരിഭാഗം ബാഹ്യ-ആന്തരിക അവയവങ്ങളും വിശ്രമത്തിലേക്ക് വഴുതി വീഴുന്നു. എന്നാൽ വിശ്രമവേളയിൽവരെ ഹൃദയത്തിന് ജോലിയാണ്. നാം വിശ്രമിക്കുമ്പോഴും ഹൃദയം പ്രവർത്തിച്ചുകൊണ്ടേയിരിക്കും. നേരത്തെ പറഞ്ഞതുപോലെ ഹൃദയമിടുപ്പനിൽക്കുമ്പോൾ, മനുഷ്യൻ മരിക്കുകയും ചെയ്യും. ഇങ്ങനെ വിശ്രമാവസ്ഥയിൽ വരെ സ്പന്ദിക്കേണ്ടിയിരിക്കുന്നതു കൊണ്ട് പണ്ട്കാലങ്ങളിൽ ഹൃദയം, മനസ്സിന്റെ മുഖസ്ഥാനമാണെന്ന് വിശ്വസിക്കുന്നു. ഇന്നും സ്നേഹത്തിന്റെ പ്രതീകമായിയാണ് ഹൃദയത്തെ കണക്കാക്കുന്നത്. രസകരമായ കാര്യം എന്തെന്നാൽ നാം സ്നേഹത്തിന്റെ പ്രതീകമായി കാണുന്ന ഹൃദയത്തിന്റെ രൂപം, പല സാമൂഹിക മാധ്യമങ്ങളിലും മറ്റും ഹൃദയത്തിന്റെ ചിത്രം, ശരിക്കുമുള്ള ഹൃദയം അല്ല. കേട്ടുകേൾവിയുള്ള കഥയാണ്, ഒരു വിദേശി യുവാവ് തന്റെ പ്രണയം തുറന്നു പറയുവാനായി വളരെയധികം പരിശ്രമിച്ചെങ്കിലും തന്റെ പ്രണയിനി എന്ത് പറയുമെന്നുള്ള ഭയംകൊണ്ട് തന്റെ പ്രണയം ഒഴിപ്പിച്ചുവെച്ചു. സാങ്കേതികവിദ്യകൾ ഒന്നും പുരോഗമിച്ചിട്ടില്ലാത്ത ആ സമയത്ത് അയാൾ തന്റെ പ്രണയിനിക്കായി ഒരു കത്തയച്ചു. അതിൽ ഹൃദയത്തിന്റെ ചിത്രം മുൻപ് കണ്ടിട്ടില്ലാത്ത അയാൾ തന്റെ മനസ്സിൽ തോന്നിയ ഒരു ചിത്രം വെച്ചു. അതിന് ചുവപ്പുനിറം നൽകി തന്റെ കത്ത് പൂർത്തിയാക്കി. അന്നു മുതൽ എല്ലാപേരും ആ ചിഹ്നം തങ്ങളുടെ ഹൃദയത്തിന്റെ സൂചിപ്പിക്കാനായി ഉപയോഗിച്ചു തുടങ്ങി. ശരിക്കുമുള്ള ഹൃദയത്തിന്റെ ചിത്രം പിന്നീട് കണ്ടുപിടി ചെയ്തെങ്കിലും, ഇന്നും ആളുകൾ ഈ ചിഹ്നം തന്നെ തങ്ങളുടെ ഹൃദയത്തെ സൂചിപ്പിക്കാനായി ഉപയോഗിക്കുന്നു. ശരിക്കുമുള്ള ഹൃദയത്തിന്റെ രൂപത്തിന് ഒരു ശരിയായ ആകൃതി ഇല്ല. ആർട്ടറി

കളും മറ്റുമുള്ള അവയാണ് ഹൃദയം. ഇങ്ങനെ യഥാർത്ഥ്യത്തിൽ നിന്നും വിട്ടുനിൽക്കുന്നുണ്ടെങ്കിലും ഇത് ഹൃദയത്തിനെപ്പറ്റി ഉള്ള രസകരമായ ഒരു കഥയാണ്.

നമുക്കിനി ഹൃദയത്തിനെ ശാസ്ത്രത്തിന്റെ കണ്ണുകളിലൂടെ നോക്കാം. മാംസപേശികൾ കൊണ്ട് ഉണ്ടാക്കിയ ഒരു അവയവമാണ് ഹൃദയം. ഓരോരുത്തരുടേയും ഹൃദയത്തിന് അവരവരുടെ മുഷ്ടിയോളം വലിപ്പമുണ്ടാകും. ഹൃദയത്തിന് ഏകദേശം 250 ഗ്രാം മുതൽ 350 ഗ്രാം വരെ തൂക്കമുണ്ടാകും. ഹൃദയമാണ് നട്ടെല്ലുള്ള ജീവികളിൽ ഭ്രൂണാവസ്ഥയിൽ വെച്ച് ഉണ്ടാവുന്ന ആദ്യത്തെ അവയവം നെഞ്ചിന്റെ മദ്ധ്യഭാഗത്തുനിന്നും അല്പം ഇടത്തേക്ക് മാറിയാണ്. ഹൃദയം സ്ഥിതിചെയ്യുന്നത്. മുൻവശത്ത് നെഞ്ചെല്ല്, വാരിയെല്ല് എന്നിവയാലും പിറകിൽ നട്ടെല്ല്, വാരിയെല്ല് കൊണ്ടുള്ള ഒരു പ്രത്യേക അറയാൽ ഹൃദയം സംരക്ഷിക്കപ്പെട്ടിരിക്കുന്നു. ഇങ്ങനെ വളരെയധികം ഭദ്രതയിൽ പ്രകൃത്യാ മനുഷ്യശരീരത്തിൽ സൂക്ഷിച്ചിട്ടുള്ള രണ്ടേ രണ്ട് അവയവങ്ങളെ ഉള്ളൂ - ഹൃദയവും തലച്ചോറും.

പഠിക്കാൻ തുടങ്ങിയാൽ, മടിവരാത്ത എന്നാൽ വളരെ രസകരവുമാണ് ഹൃദയം. നമ്മളിൽ ആരും ഒരിക്കലേങ്കിലും നമ്മുടെ സ്വന്തം ഹൃദയമെടുപ്പ് ശ്രദ്ധിക്കാത്തവരായി ഇല്ല. പൾസ് റേറ്റ് നോക്കി നമുക്ക് ഹൃദയമിടുപ്പ് അറിയുവാൻ സാധിക്കും. സാധാരണയായി കൈമടക്ക്, കൈത്തരമ്പ്, ചെവികളുടെ പിൻഭാഗം എന്നിവയുടെ പിൻഭാഗം എന്നിവയുടെ തൊലിപുറത്ത് കൈവിരൽ അമർത്തിയാൽ നമുക്ക് പൾസ് റേറ്റ് അറിയാൻ സാധിക്കും. എന്നാൽ ഏറെ രസകരവും എന്നാൽ അധികമാർക്കും അറിയാത്ത ഒരു രീതി കൂടെയുണ്ട്. നമ്മുടെ സ്വന്തം ഹൃദയമിടുപ്പ് കേൾക്കാൻ. എന്തെന്നാൽ നാം തിരിഞ്ഞ് മലർന്നു കിടന്ന്, ശ്വാസം മയത്തിൽ വിട്ടാൽ, നമുക്ക് ഹൃദയമിടുപ്പ് ഹൃദയമിരിക്കുന്ന ഭാഗത്തുനിന്നുതന്നെ കേൾക്കാൻ സാധിക്കും. രാത്രി ഉറങ്ങുമ്പോൾ, നിശബ്ദതയിൽ കണ്ണുകൾ മെല്ലെയടച്ച് ശ്രദ്ധിച്ചിരുന്നാൽ ഇത് കേൾക്കാൻ സാധിക്കും.

നാം എല്ലാവർഷവും ലോക ഹൃദയ ദിനം ആഘോഷിക്കുന്നു. എന്നാൽ ഓരോ വർഷവും ഹൃദ്ദരോഗികളുടെ എണ്ണം ഇന്ത്യയിൽ കൂടിക്കൂടി വരുകയാണ്. ഹൃദയാഘാതം ഇപ്പോൾ സാധാരണക്കാരിലും സാധാരണക്കാരെപ്പോലും ആക്രമിച്ചു കഴിഞ്ഞു. വേദനാജനകമായ കാര്യമെന്തെന്നാൽ എല്ലാ പ്രായക്കാർക്കും ഇന്ന് ഹൃദ്ദരോഗം ഉണ്ടാകാം.

ചിലകുട്ടികൾ ജനിച്ചമുതൽ അല്ലെങ്കിൽ വേറെ പ്രശ്നം കൊണ്ട് ഹൃദയബന്ധ അസുഖങ്ങൾ ഉണ്ടാകുമ്പോൾ ഭൂരിഭാഗം ഹൃദ്‌രോഗികൾക്കും ശരിക്കും പറഞ്ഞാൽ അസുഖം അവർ വരുത്തിവയ്ക്കുകയാണ്. ചിട്ടയില്ലാത്ത ജീവിതം, ആധുനിക ഭക്ഷണശൈലി, അമിതമായ ലഹരി ഉത്പന്നങ്ങൾ എന്നിവയെല്ലാം ഇതിന് കാരണമാകുന്നു. കുട്ടികളിൽ നിരാശാരോഗം (ടെൻഷൻ) മൂലവും ഹൃദ്‌രോഗങ്ങൾ ഉണ്ടാകുന്നു. ഹൃദയം മാറ്റൽ ശസ്ത്രക്രിയ യിലൂടെ നാം മറ്റൊരു ജീവനാണ് രക്ഷിക്കുന്നത് എന്ന കാര്യവും നാം മറന്നു പോകരുത്.

ഹൃദയം വളരെ രസകരമായ ഒരു അവയവം തന്നെയാണ്. നമ്മുടെ ജീവൻ നിലനിർത്തുന്ന ഒരു ഹൃദയത്തെ, ഹൃദ്‌രോഗത്തിൽ നിന്നും നമ്മൾ തന്നെയാണ് രക്ഷിക്കേണ്ടത്. ചിട്ടയായ, ആരോഗ്യപ്രദമായ ജീവിതം നാം നയിക്കണം, നമ്മുടെ ഹൃദയത്തെ അറിഞ്ഞ്, ഇനിയുമെങ്കിലും ആരോഗ്യ പ്രദമായ ഒരു ജീവിതം നമുക്ക് ജീവിക്കാം.....

MATTERS OF THE HEART



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Covid 19 has been an unprecedented opponent to mankind. In spite of the several medical advancements made, a cure is currently non-existent. We have already heard about lots of troubling things lately, lots of people losing their jobs, social isolation, several celebrities reporting bankruptcy, cases of domestic violence having doubled, to name a few.

In these troubling times, compassion is perhaps the most wanted thing currently. And compassion is always connected with our heart than our brain. When you hear someone say the word 'heart', what do you think? What is the first thing that comes to your mind? A pump right? A not so simple organ, the size of your fist. A magical thing that keeps all of us alive.

It is way more than that.

In the 17th century BC, the Egyptians believed that intelligence resided in the heart. A fact you might think is not true. When you hear someone say 'that guy has a big heart', what do you think? It means obviously that the guy cares, no? This term 'a big heart' arises from the fact that our hearts have a lot more power than we think it has. Obviously it never stops. It beats 100,000 times per day. Isn't that's magic. The heart is where we find our comfort and safety in the darkest of times. It is what binds us together and what breaks when we are apart. The heart has its own magic- love.

Research has shown that the heart has an intelligence which

gets influenced by our brain, our emotions, choices etc. Believe it or not, the heart sends more signals to the brain than the other way. A part of the vagus nerve arises from the brain stem and it has numerous innervations in the heart. It is a part of the autonomic nervous system (ANS). The pattern of heart rhythms known as heart rate variability (HRV) is a reflection of our emotional state and is influenced by the ANS. In times of stress or fear, the vagus nerve tone decreases. When one is calm, open and relaxed, the tone of the vagus nerve is increased. When we are compassionate and loving, our HRV is highly irregular and in times of anger frustration etc, our HRV becomes smooth and regular. Our HRV is thus contrary to our normal expectation.

One of the greatest causes of sudden cardiac arrest and what results in death is a lack of heart rate variability- an arousal to threat and decreased vagal nerve tone.

Feelings like compassion arise from the heart. This is proven by the fact that while a strong emotion can silence a thought, it is hard to think ourselves out of a strong emotion. When we look inward, we become more aware of what is happening within us. This is when we connect with our heart. The result is that we become more open, go outward and connect with others. This is what the intelligence of the heart teaches us- connect with our heart to connect with all around us. The mind wants us to divide and keep us separate, the heart wants us to connect and be one.

How does this connection with others help you? Well, we are wired for social connection and when this is cut off, we get sick. Isolation and loneliness will put you at a greater risk for disease and death than smoking. Social connections trigger the same reward centres in our brain that are triggered when people use drugs, alcohol etc.

If that's still not enough evidence, what about one's personal experience? When we read the story of a lost child, our heart can ache, when we feel ashamed or forgotten, our heart can feel tight and constricted, it feels like it can break and sometimes does. But

under pressure of intense love or immense suffering, our heart can crack wide open and never be the same again. This is reality, there is actually a condition called Broken Heart Syndrome. It includes a part of your heart temporarily enlarging and doesn't pump well, while the rest of your heart functions normally or with even more forceful contractions. This is mainly caused due to an emotionally stressful event.

To conclude, it is rightly said that our heart is much powerful than the brain- when the brain changes, we change but when the heart changes, it changes how we perceive the world and that changes absolutely everything.

PREVENTION OF HEART DISEASES



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A good health can add years to your life and life to your years. Our body is made up of many different organs like eyes, nose, hands, legs, etc. and the coordination of all these parts is essential for the growth and development of a human being. Different systems like the skeletal system, muscular system, circulatory system and digestive system form an organism. All of these work together for the proper efficiency of the human body. Even if one part of these systems or organs gets a problem or is damaged, our body won't be able to work properly. Proper functioning of these systems is required for a human being to live.

The heart is one of the most important organs of the body. It is a part of the circulatory system. It is a muscular organ, divided into four chambers, namely two atria and two ventricles. Among which, the right atrium and ventricle make up the right portion of the heart, and the left atrium and ventricle make up the left portion of the heart. The size of the heart is about the size of a clenched fist. The human heart functions throughout a person's lifespan and is one of the strongest and hardest working muscle in the human body. A healthy heartbeat is a wonderful treat for our body.

Cardiovascular or heart diseases are the leading cause of death in today's society. Heart conditions include problems in the vessels, structure and blood clots. The most common types include coronary

heart disease (damage or disease in the heart's major blood vessels), atherosclerosis (hardening of the arteries), cardiac arrest (sudden, unexpected loss of heart function, breathing and consciousness), heart failure (a chronic condition in which the heart does not pump blood as well as it should), high blood pressure or hypertension (a condition in which the force of the blood against the artery walls is too high), stroke (damage to the brain from interruption of its blood supply), arrhythmia (improper beating of the heart, whether irregular, too fast, or too slow) etc.

There are many reasons that can raise our risk for heart diseases. Some of them can't be prevented, like family history, age, sex and ethnicity. Some of them are caused because of intake of certain medicines, excessive alcohol use, smoking, obesity, physical inactivity etc. We can reduce the risk to get heart problems and prevent heart diseases up to a certain limit by various means.

Consumption of alcohol and tobacco products can cause high blood pressure and damage to our heart and it also adds calories to our body which can increase our weight. If we stop or limit the consumption of alcohol and tobacco products, it can improve the health of our health. Being obese or over weight can add to the risk of heart problems. Excess weight can increase the chances of developing heart problems which includes high blood pressure, high cholesterol and diabetes. Controlling our weight can reduce the risk of getting heart diseases. Reducing weight by even small quantities can be beneficial in many ways for our body and heart.

Regular exercise and yoga can also reduce our risk of heart diseases. It is truly said by Gene Tunney, "*Exercise should be regarded as a tribute to the heart.*" It strengthens our heart and improves blood circulation. It helps us control our weight and reduces the chance of developing conditions that may put a strain on our heart such as high blood pressure, high cholesterol and diabetes. Even if we walk for a few steps in between, it can help a lot. Including exercise in our lives can really help in our overall health conditions. Aim for a few moments of stretching or walking or any other kind of exercise in between.

Eating a healthy diet is very important for the good health of our heart and body. Eating plenty of fresh fruits, vegetables and whole grains is very essential for our health. Avoiding or limiting items like sugar, salt, processed food, oily food and food that contain saturated fat is essential. Managing stress is important for a good heart health. Stress can cause heart diseases by increasing blood pressure. Extreme stress is a cause for heart problems. Some people find unhealthy ways like smoking and drinking to cope with stress. This can add more problems to our health. Some ways that can help to manage stress are meditation, focusing on something peaceful and calm, listening to music and exercising.

Controlling our blood pressure and cholesterol level are also important for good heart health. Blood pressure should be checked regularly, at least once a year for most adults, and more often for people with high blood pressure. By different ways, try to take steps to control high blood pressure. High levels of cholesterol can clog our arteries and the risk of coronary heart disease and heart attack. Intake of medicines if needed and changes in our lifestyle can lower our cholesterol levels. It is also important to keep diabetes under control. High blood sugar can damage our blood vessels and the nerves that control our heart and blood vessels. Therefore, ensure regular testing for diabetes as well.

Having a good sleep is very important for our health. Most adults need seven to eight hours of sleep. Making sleep a priority in life can improve the overall health of our body. Make sure to have good sleeping habits. If sleeping problems are observed, make sure to contact the doctor and to get proper treatment for it. Keeping our bedroom dark and quiet can help us sleep.

If we change a few things here and there in our life, it can affect our health in a variety of ways. **Healthy habits are your heart's desire.** Paying attention to our health and maintaining proper health can improve our heart and body as whole. Maintaining good health can also improve the overall well- being of our mind and body. It is truly said: *“Do your part, care for your heart”*

ഹൃദ്രോഗത്തെ നാം അറിഞ്ഞതെങ്ങനെ? ചരിത്രം-വികസനം



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Cotton Hill, Thiruvananthapuram, Kerala

ഹൃദയം : ചുരുട്ടിപ്പിടിച്ച മുഷിയോളം വലുപ്പമുള്ള താളാത്മകതയാർന്നു സാധാ മിടിക്കുന്നൊരു കുഞ്ഞൻ അത്ഭുതം. ചെലിൽ ജീബ്രാൻ ഒരിക്കൽ ലോകത്തോട് വിളിച്ചു പറയുകയുണ്ടായി. സൗന്ദര്യം മുഖത്തിലല്ല നിന്റെ ഹൃദയത്തിലാണ് എന്ന്. ഹെലൻ കെല്ലറകട്ടെ ഒരവസരത്തിൽ പറഞ്ഞു ലോകത്തിലെ മധുര മനോതജ്ഞമായ കാര്യങ്ങളറിയാൻ ഹൃദയത്തിനു മാത്രമേ സാധിക്കുമെന്ന്. നിങ്ങളുടെ ഹൃദയത്തിനു പിന്നാലെ പോകാനുള്ള ധൈര്യമാർജ്ജിച്ചെടുക്കുന്നു എന്ന്. സ്റ്റീവ് ജോബ്സ് പറഞ്ഞു വെച്ചതും നിന്റെ ഹൃദയത്തിൽ ഞാൻ കുടിയിരിക്കുമെന്നും ഷേക്സ്പേർ അക്ഷരതാളിൽ കോറിയിട്ടതും നാം അറിഞ്ഞതാണ്. കാല്പനികതയുടെയും സാഹിത്യ ചരിത്രങ്ങളുടെയും വമ്പൻ പുസ്തക താളുകൾ മറിക്കുമ്പോൾ ഹൃദയത്തിന്റെ മാനസികാവസ്ഥയുടെ വേഷം ധരിപ്പിച്ചു നിർത്തിയത് കാണാം. എന്തെല്ലാം എഴുത്തുകൾക്കാണ് ഈ കുഞ്ഞൻ അവയവം ചാലകശക്തിയായത്. അത്രമേൽ ഇഷ്ടപ്പെട്ടൊരാളെ കാണുമ്പോൾ ഹൃദയം പട പട മിടിച്ചതും, ചില പിരിഞ്ഞുപോകുകൾ ഹൃദയം നൂറുകിയതും മനുഷ്യാല്പത്തിതൊട്ടേയുള്ള കഥകളാണ്. എന്നാലീകഥ നായകനെ അഥവാ ഹൃദയത്തിന് കാര്യമായ തറ പരിവേഷം നാം കൊടുക്കുന്നില്ല.

ലോകമരണങ്ങളിൽ നാലിൽ ഒന്നും ഹൃദ്രോഗവുമായി ബന്ധപ്പെട്ടാണ് വരുന്നതെന്ന് കണക്കുകൾ പറയുമ്പോൾ, കുറ്റവും പഴിയും ശാപവചനങ്ങളും അനാരോഗ്യകരമായ ഭക്ഷണത്തിനുമേലും ജീവിതശൈലിക്ക് മേലും നാം വെച്ചുകെട്ടുകയാണ് പതിവ്. ആധുനിക സമൂഹമിന്ന് പേടിയോടെ ദൃഷ്ടികൾ പഴിക്കുന്നത് ഹൃദ്രോഗത്തിലേക്കാണ് എന്നാൽ പ്രാചീനകാലത്തിലേക്കു തിരിഞ്ഞു നോക്കുമ്പോൾ ഹൃദയപ്രശ്നങ്ങൾ നമു

കൊപ്പം സഹായാനം ചെയ്യുന്നതായി കാണാം. അമേരിക്കയിലെ ഹാർട്ട് അസോസിയേഷന്റെ രണ്ടായിരത്തി ഒൻപതിലെ കണ്ടെത്തൽ പറയുന്നത് 1203 ബിസിയിൽ മരണപ്പെട്ട ഫറവോയുടെ 3500 വർഷം പഴക്കമുള്ള മമ്മിയിൽ അരതറോസ്കളിറോസ്സിന്റെ ലക്ഷണങ്ങൾ ഉണ്ടായിരുന്നു. ഒട്ടുമിക്ക ജനങ്ങളും ഇതേ പ്രശ്നത്തിൽ അന്ന് മരണപ്പെട്ടിരുന്നു. ആശ്വാസധായകമായ ഇനുകളിലെ വസ്തുത എന്തെന്നാൽ ഒട്ടനവധി ഹൃദയരോഗങ്ങൾ കണ്ടെത്തി ചികിത്സിക്കാനും സാധ്യമായ തലമുറയാണ് ഇന്നുള്ളത്. ഇത്തരം അവസ്ഥയിൽ നമ്മെ എത്തിച്ചത് ചില അറിവില്ലായ്മകളിൽ നിന്ന് ഉരുത്തിരിഞ്ഞ അറിവുകളാണ്.

ഏറെ വിവാദങ്ങൾക്കു വഴിതെളിച്ച ഡാവിൻസിയുടെ വിലയം ഹാർട്ടിയുടെ ഒരു കൂട്ടം കണ്ടുപിടിത്തങ്ങൾക്കൊടുവിൽ ഹൃദയരോഗത്തെ പാട്ടി ആദ്യമായി നമുക്ക് ദിശാബോധം നൽകിയത് ഫെഡറിക് ഹോഫ്മാൻ ആയിരുന്നു. ചില ഹൃദയ പ്രശ്നങ്ങൾക്ക് കാരണം കൊറോണറി ആർട്ടറിയിലൂടെ ഒഴുകുന്ന രക്തത്തിന്റെ അളവ് കുറയുന്നതാണ് എന്ന് അദ്ദേഹം കണ്ടെത്തി. തന്റെ ഡ്രഗ് ഡിസ്കവറി പ്രാക്റ്റിസ്റ്റ് പ്രോസസ്സ് ആൻഡ് പെർസ്പെക്റ്റീവ് എന്ന പുസ്തകത്തിലദ്ദേഹം ഈ കണ്ടെത്തലിനെ പറ്റി വിവരിക്കുന്നുമുണ്ട്. പതിനേഴാം നൂറ്റാണ്ടിന്റെ രണ്ടാം പകുതിയിലാണ് ജനങ്ങൾ ഹൃദയരോഗ കാരണങ്ങൾ അറിഞ്ഞു തുടങ്ങിയതുതന്നെ.

അനന്തരം വിലയം ഹോസ്പെൽ എന്ന ഭിഷഗ്വരൻ ആഞ്ചിനെയെപ്പറ്റി പഠനം നടത്തുകയും അതൊരു രോഗമല്ല. മരിച്ചു ഒരു അവസ്ഥയാണ് എന്ന് കണ്ടെത്തുകയും ചെയ്തു. ഈ കണ്ടെത്തലിനൊരു സാധ്യകരണം എന്നോണം 1912 ൽ ജെയിംസ് വി ഹെറിക്ക് ആഞ്ചിനെയെന്ന രോഗാവസ്ഥയിലേക്കു നയിക്കുന്നത് കൊറോണറി ആർട്ടറിയുടെ മന്ദമായുള്ള ചുരുക്കമാണ് എന്ന് കണ്ടെത്തി. ഹൃദ്രോഗവുമായി നേടിയെടുത്ത അറിവുകളുടെ യാത്രയിലെ സുപ്രധാനമായ നാഴികക്കല്ലായിരുന്നു ഈ കണ്ടെത്തൽ. ഇരുപതാം നൂറ്റാണ്ടിലെത്തുമ്പോഴായിരുന്നു ഹൃദയാരോഗ്യത്തെ പറ്റിയുള്ള വ്യാപകമായ പഠനം ആരംഭിക്കുന്നത്. ഇതേ കാലഘട്ടത്തിലാണ് അസോസിയേഷൻ ഫോർ പ്രെവെൻഷൻ ആൻഡ് റിലീഫ് ഓഫ് ഹാർട്ട് ഡിസീസും അമേരിക്കൻ ഹർട്ട് അസോസിയേഷനും സ്ഥാപിതമായത്.

ഹൃദയരോഗ്യത്തിനായി ആരോഗ്യദായകമായ ഭക്ഷണം ഒരു അനുവാദ്യതയാണെന്നത് നമുക്ക് ഇന്ന് പുതിയ അറിവല്ല. എന്നാൽ ഇരുപതാം നൂറ്റാണ്ടിൽ മറിച്ചായിരുന്നു സ്ഥിതി. ആ കാലഘട്ടത്തിലെ ചില കണ്ടെ

ത്തലുകളാണ് നമ്മെ ഈ തിരിച്ചറിവുകളിലേക്ക് എത്തിച്ചത്. 1950 കളിൽ ജോൺ ഗോഫ് മാന്റും കൂട്ടരും. രണ്ടുതരം കൊളസ്ട്രോളുകളെ (ഘളഘല മിറ ളഘല) കണ്ടെത്തിയത് ഭക്ഷണക്രമവുമായി ഹൃദയരോഗ്യത്തിന് ബാധിപ്പിക്കുന്നതിനും കാരണമായി. ഇതേ സമയത്താണ് അൻസൽ കേസും തന്റെ യാത്രാവേളയിൽ കൊഴുപ്പുകുറഞ്ഞ ഭക്ഷണം കഴിക്കുന്ന മെഡിറ്റേറിയൻ ജാപ്പനീസ് ജനങ്ങളിൽ ഹൃദയപ്രശ്നങ്ങൾ കുറവാണെന്നു കണ്ടെത്തിയത്. ഹൃദ്രോഗത്തെ നാമറിഞ്ഞത് എങ്ങനെയെന്ന ചരിത്രപുസ്തകത്തിലെ മറ്റൊരു സുപ്രധാന ഏടാണ് ഇതും.

അറിവില്ലായ്മകൊണ്ട് ചികിത്സിക്കാതിരുന്ന ഹൃദ്രോഗങ്ങളും ആ ചരിത്രപുസ്തകത്തിലുണ്ട്. ഇത് പഠിച്ചു പ്രശ്നങ്ങളറിഞ്ഞു പിന്നീട് ആരോഗ്യദായകമായ പുത്തൻ കണ്ടെത്തലുകളിലേക്കെത്താൻ വഴിവിളക്കായ ചില സംഭവങ്ങളുമുണ്ട്. 1935 ൽ അമേരിക്കൻ പ്രസിഡന്റ് റൂസ്വെൽറ്റിന്റെ അൻപത്തിമൂന്നാം വയസ്സിലെ രക്തസമ്മർദ്ദം 140/മി.മി മെർക്വറിയും രണ്ടാം ലോകയുദ്ധത്തിനിടയിൽ (1940) രക്തസമ്മർദ്ദം ഉയർന്ന് 180/105 ൽ എത്തി. എന്നാൽ അദ്ദേഹത്തിനെ ചികിത്സിച്ച പേട്രാൾ വൈറ്റ് ഈ രക്തസമ്മർദ്ദത്തിന് ചികിത്സ നൽകിയില്ല. ഇവയ്ക്കു ചികിത്സ വേണ്ട എന്നുള്ളതായിരുന്നു. പൊതുവെയുള്ള വിശ്വാസം. കൂടാതെ വളരെ കാഠിന്യമേറിയ പാർശ്വഫലങ്ങൾ സമ്മാനിക്കുന്ന മരുന്നുമായിരുന്നു ആ കാലത്തുണ്ടായിരുന്നത്. ശേഷം റൂസ്വെൽറ്റിന്റെ ഹൃദയം വലുതാവുകയും അദ്ദേഹത്തിന് പക്ഷപാതം പിടിപെടുകയും ചെയ്തു. രക്തസമ്മർദ്ദം വീണ്ടും ഉയർന്നു 230/120 മി.മി വരെയെത്തുകയും 1945 ൽ തലച്ചോറിലേക്കുള്ള രക്തസ്രാവത്താൽ അദ്ദേഹം മരണമടയുകയും ചെയ്തു. ഈ സംഭവത്തിനുശേഷം കണ്ടെത്തി രക്താതിസമ്മർദ്ദം ഹൃദ്രോഗത്തിന് ഹേതുവാണെന്ന്. ഇതുപോലെ സംഭവങ്ങളും മരണങ്ങളും ദുരനുഭവങ്ങളും ഓരോ ഘട്ടത്തിലും ഹൃദയത്തിന്റെ ആരോഗ്യം കാത്തു സൂക്ഷിക്കുന്നത് എങ്ങനെയെന്നും ഹൃദ്രോഗത്തിന് ഉർവ്വരമായ മണ്ണൊരുക്കുന്ന ഘടകങ്ങൾ എന്തെല്ലാമെന്നും ഹൃദയസംബന്ധമായ അസുഖങ്ങളെപ്പറ്റി അറിയാനും സഹായിച്ചു. ഇന്ന് സാങ്കേതികമായി വികസിച്ച ഹൃദ്രോഗ ചികിത്സ.

നിങ്ങളുടെ ഹൃദയത്തിനെ കേൾക്കൂ. എന്ന് ഡയാന രാജകുമാരി പറഞ്ഞതിനെ അനുവർത്തിക്കാം. കേൾക്കാം സ്നേഹിക്കാം, അറിയാം മനസ്സിലാക്കാം ഹൃദയത്തെ. കാലമിനിയും മുന്നോട്ട് പോകും പുത്തനറിവുകൾ നാം നേടും. പ്രത്യാശിക്കാം ഹൃദ്രോഗമില്ലാത്ത ഒരു കാലത്തിനായി.....

GROWTH OF OUR KNOWLEDGE ABOUT HEART AND HEART DISEASE



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Heart disease is the preeminent cause of death in the whole world. It causes 4 out of every 10 deaths in United States. Heart disease kills more women than all cancers combined. We know that heart disease is the most common disease in today's generation. But do we know when it was first discovered and what were the treatments in those times? Before knowing about the history of heart disease lets first know what heart disease is and what are the types of heart disease. Heart disease in general terms means that the heart is not functioning normally. There are three most common types of acquired heart diseases: 1) coronary artery disease due to atherosclerosis, 2) congestive heart failure and 3) abnormal heart rhythms. The most common type of heart disease is coronary artery disease (CAD). CAD happens when arteries that supply blood to heart muscle become hardened and narrowed. Congestive heart failure occurs when the heart muscle cannot pump blood as well as it should. Bad heart rhythms or arrhythmia is the improper beating of heartbeats which may be too fast or too slow.

The History of Cardiovascular disease is believed to have existed all the way back to the start of humanity. There is evidence that approximately 3,500 years ago, Egyptians had cardiovascular disease — specifically atherosclerosis in different arteries of the

body. A study on Mummies found that Pharaoh Merenptah, who died in the year 1203 BCE, was plagued by atherosclerosis. Of the other mummies studied, 9 of the 16 also had probable-to-definite evidence of atherosclerosis. The evidence showed that high-status Egyptians may have eaten a lot of fatty meats from cattle, ducks, and geese. It is also believed that 2000 years ago in ancient India, fat was observed to be linked to heart disease. According to Ayurveda, Indian traditional medicine, cardiac disease is most often related to deviations in the ‘Pitta’ energy. Pitta regulates all metabolic processes in the body as well as body temperature and our hormonal balance. This is especially true with regard to heart attacks and strokes, because when pitta is out of balance it causes “fiery” negative emotions-intense irritability, agitation, jealousy, even rage. However, the first evidence of heart disease was reported when Leonardo da Vinci (1452–1519) dissected the heart of a 100-year-old man who had died suddenly and peacefully. He sketched the human heart (Figure 1) and produced the first known

description of coronary artery disease. Leonardo realised that blood was in a circulation system and influenced William Harvey’s discovery in 1616 that blood was pumped around the body by the heart. William Harvey (1578–1657), physician to King Charles I, discovered that blood moves around the body in a circulatory manner from the heart. Friedrich Hoffmann, Professor of Medicine at the University of Halle, described that coronary

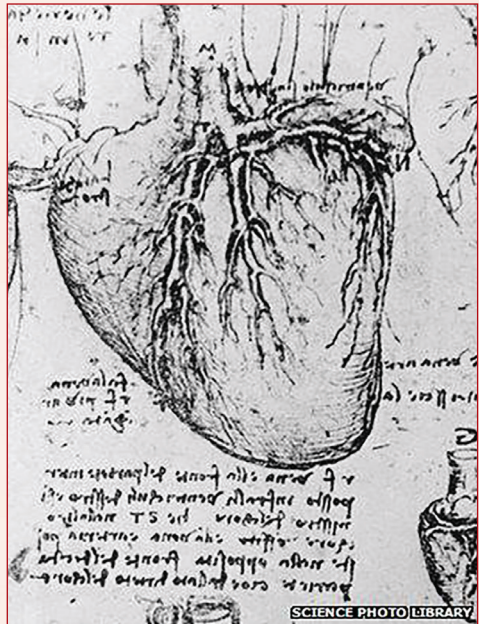


Figure 1: Leonardo diagram showing the heart and its blood vessels.

heart disease started in the “reduced passage of blood within the coronary arteries.”

In 1915, an organization called the Association for the Prevention and Relief of Heart Disease was formed by a group of physicians and social workers in New York, USA. In 1924, multiple heart association groups became the American Heart Association (AHA) and dedicated their time to know more about heart and heart diseases. The patients came to the clinic and had little hope for treatment or a fulfilling life. Just a few years later, doctors began to experiment with probing the coronary arteries with catheters. This would later become left heart catheterization with coronary angiogram. Both, Portuguese physician Egas Moniz (1874–1955) and German physician Werner Forssmann (1904–1979) were credited as pioneers in this field. In 1958, F. Mason Sones (1918–1985), a paediatric cardiologist at the Cleveland Clinic, developed the technique for producing high-quality diagnostic images of the coronary arteries. This test is now regularly used to accurately diagnose coronary artery disease.

In 1948, researchers under the direction of the National Heart Institute (now called the National Heart, Lung, and Blood Institute) initiated the Framingham Heart Study, the first major study to help us understand heart disease. In the early 1950s, University of California researcher John Gofman (1918–2007) and his associates identified today’s two well-known cholesterol types: low-density lipoprotein (LDL) and high-density lipoprotein (HDL). He discovered that men who developed atherosclerosis commonly had elevated levels of LDL and low levels of HDL. Also in the 1950s, American scientist Ancel Keys (1904–2004) discovered in his journey that heart disease was rare in some Mediterranean populations where people consumed a lower-fat diet. He noted that the Japanese had low-fat diets and low rates of heart disease as well, leading him to speculate that saturated fat was a cause of heart disease. These and other developments, including results from the Framingham Heart Study, led to the first attempts at urging Americans and rest of the world to change their diets for better heart health.

It was in the 1960s and 1970s that treatments like bypass surgery and percutaneous balloon angioplasty were first used to help treat heart disease, according to the Society for Cardiovascular Angiography and Interventions. In the 1980s, the use of stents to help prop open a narrowed artery came into play. As a result of these treatment advances, a diagnosis of heart disease today is not necessarily a death sentence. Also, in 2014, the Scripps Research Institute reported a new blood test that may predict who is at high risk for the occurrence of a heart attack. Today, we know more about how to treat different heart diseases to lengthen and improve quality of life. We also know about how to reduce our risk of heart disease. But our knowledge is not enough to reduce the heart disease burden. And we're still a long way to go to eradicate heart disease completely from human history.

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MILESTONES IN THE DEVELOPMENT OF OUR KNOWLEDGE ABOUT HEART AND HEART DISEASES



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This year, the World Heart day fell during the pandemic of a novel corona virus, which at this moment is still spreading at a higher rate throughout the world. The health facilities in the country are overburdened dealing with patients with Covid-19. Thus, availability of health services for patients suffering from other diseases have been restricted, especially for patients with cardiovascular diseases. The result has been a hike in the mortality rate for patients with heart disease, which is quite saddening considering how much knowledge and technologies are currently available for treating cardiovascular diseases. Several physicians and scientists have contributed to the knowledge about the anatomy and functions of the heart that we have at present. We have to respect their efforts, their contributions and the determination they had, at a time when faith stood above science.

Faith and science are two sides of a same coin, separated by an expanse so small, but wide enough that one side cannot see the other. There was a time when religious interpretations on heart had a strong influence on traditional medical practices, paintings, crafts and teachings. During the 2nd BC, renowned Greek philosophers like Aristotle, Plato, Erasistratus and others led a scientific renaissance to change these interpretations. It was a challenge for these philosophers and scholars to understand the anatomy and the functions of heart.

Aristotle's findings are considered as the earliest. He described heart as an organ that acted as a source of blood. Later, Plato agreed that heart was the source of circulating blood. Hippocrates argued that blood circulated from the heart to lungs. It was Erasistratus, who discovered that the heart pumps blood through heart valves. He said that veins and arteries radiate from the heart and become progressively smaller with distance. But he believed that air flowed through these vessels. Most of his findings were not accepted and were later subjected to debate.

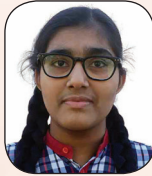
A prominent dissenter was Galen. He argued that heart does not pump blood, and instead its motion only sucks the blood in and out. He showed that veins and arteries carry blood. He claimed that the heart has chambers and blood passes from one chamber to the other through 'pores'. He also described the role of lungs in blood circulation. Even though he was later proved wrong, his theories remained unquestioned for thousands of years. In the 11thCE, Ibn-al-Nasif, through his magnum opus Commentary on Anatomy in Avicenna's Canon challenged Galen's theory that blood circulate through pulmonary system not from right to left atrium. William Harvey's findings on heart anatomy led to the overhaul of Galen's doctrine. It was a huge breakthrough, when William Harvey, an English physician, published *De motu Cordis*, in 1628. He is credited for the systematic explanation of circulation of blood and mechanisms of the heart. His findings led to a new era of other discoveries related to heart. At that time, no one challenged these findings, as the anatomy of the heart was known from heart dissections and illustrations made by Leonardo da Vinci, 500 years ago. Instead, each discovery led to new ones. It is evident from Arthur Keith and Martin Flack's discovery of the sinoatrial node in 1906, which was inspired by the discovery of the atrioventricular node by Sunao Tawara. Most important discovery of 19th century was the electrocardiogram (ECG) by Willem Einthoven. He received the Nobel prize in 1924. With this discovery, scientists began to focus on heart diseases, which had remained as a threat for years. After Einthoven, scientists focused on methods for the diagnosis and treatment of heart diseases which led to several major discoveries including the invention of the Swan-Ganz

catheter (1970) and the 3-D bioprinting of the heart (2003). Heart diseases were not recognized for millions of years. It was Leonardo da Vinci, who identified a diseased heart for the first time in 11th CE. William Harvey, was the one who conducted in-depth studies on heart diseases. He was the one who stated that angina (chest pain) is a symptom of heart disease. In the early 18th century, several physicians such as William Osler, James Herrick and James Hunter made significant contributions to our knowledge on cardiovascular diseases. When compared to present times prevalence of heart disease were much less during that period. In the 21st century, heart diseases contribute to more than 30% of deaths world-wide.

Among the several forms of cardiovascular disease, coronary artery disease is the cause for increased death rate. Each year, 18.2 million people (about 6.7% of the population) die of coronary artery disease. One out of every 4 deaths is because of coronary artery disease. Despite, all the new technologies for diagnosis and treatment of the disease and the availability of a variety of drugs such as aspirin, beta blockers, nitroglycerin, ACE inhibitors and lipid lowering agents, we have not been able to achieve effective prevention. Coronary artery disease is a lifestyle disease, resulting from cholesterol deposition (atherosclerosis) in vessel walls. The aftermath is heart attack, a condition which is quite common, first reported in Egypt in 14thBCE. In the USA, one person dies every 36 seconds because of a heart attack. Though heart transplantation gave a new hope for patients with heart failure from chronic coronary artery disease, the numbers of transplantations that can be done are insufficient to meet the demand from the increase in the number of patients every year.

The Framingham heart study has shed much light on the influence of diet, exercise, obesity, diabetes and uncontrolled blood pressure on increasing the risk for cardiovascular diseases and contributed to understanding ways to improve heart health through life-style changes. A healthy life-style would contribute to a healthy heart. At present times, even as humanity unites to fight against the COVID pandemic, it is also important than ever to take care of the health of our heart.

A HEALTHY HEART IS THE KEY TO HEALTHY LIFE



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Heart disease describes a range of conditions that affect your heart. Diseases under this disease umbrella include blood vessel diseases such as coronary diseases, heart rhythm problems (arrhythmias) and heart defects that one is born with (congenital heart defects) among others. The term 'heart disease' is often used interchangeably with the term 'cardiovascular disease.' Coronary heart disease generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke. Other heart conditions such as those that affect the heart's muscle, valves or rhythm, also are considered forms of heart disease.

One can prevent heart disease by following a heart-healthy lifestyle. One of the best things a person can do for their heart, is to stop smoking or using smokeless tobacco. Chemicals in tobacco can damage the heart and blood vessels. Cigarette smoke reduces the oxygen in the blood and heart rate because the heart has to work harder to supply enough to the body and brain. There is good news though. Your risk of heart disease starts to drop in as little as a day after quitting. No matter how long or how much the person smoked, he/she will start reaping rewards as soon as the person quit.

A healthy diet can help protect the heart, improve blood pressure and cholesterol and reduce the risk of type 2 diabetes. A heart healthy

eating plan includes: vegetables and fruits, beans or other legumes, lean meats and fish, low fat or fat-free dairy foods, whole grains, healthy fats such as olive oil etc. Two examples of heart-healthy food plans include the Dietary Approaches to Stop Hypertension (DASH) eating plan and the Mediterranean diet. There should be also limited intake of the following: salt, sugar, processed carbohydrates, alcohol, saturated fat and Trans fat.

Lack of sleep can do more than leave a person yawning. It can harm the health too. People who do not get enough sleep have a higher risk of obesity, high blood pressure, heart attack, diabetes and depression. Most adults need at least 7 hours of sleep each night. Making sleep a priority in life is one of the best ways.

Some people cope with stress in unhealthy ways such as overeating, drinking or smoking. Finding alternative ways to manage stress such as physical activity, relaxation, exercises or meditation can help improve one's health. Regular, daily physical activity can also lower the risk of heart disease. One doesn't have to exercise strenuously to achieve benefits but he/she will be able to see bigger benefits by increasing the intensity, duration and frequency of workouts.

I would like to conclude with a quote: "Health is like money, we never have a true idea of its value until we lose it."

ADVANCEMENTS IN OUR KNOWLEDGE ABOUT HEART AND HEART DISEASES



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Heart is an organ about the size of our fist, that pumps blood throughout the body. Throughout the ages our knowledge about the functioning of heart and heart related problems have undergone a drastic change leading to our current knowledge of the heart.

In 1628 William Harvey published one of the most important works in the history of science and corrected an ancient mistake. He demonstrated the circulation of blood inside our body.

According to Galen an ancient Roman doctor, blood was formed inside the lungs from the food that we eat. This idea existed for the next 1500 years! Galen also discovered pulmonary circulation. According to him, the liver was the primary organ for the production of blood. In contrast to the Erasistratus theory, Galen believed that arteries were filled with blood, which was infused with the vital spirits by a mixture of air from the lungs through the pulmonary vein and heat from the heart. The heart itself was not a muscle and did not have a pumping function - blood simply passed through it. Like Erasistratus, Galen adopted that blood was not recycled, but rather evaporated or consumed by the organs through a single-pass open

system. In the 4th B.C., the Greek philosopher Aristotle described heart as a hot, dry three chambered organ. He thought that the other organs surrounding the heart (brain, lungs etc) existed to cool the heart. Later Leonardo Vinci was one of the first westerners who opposed the idea of Galen and described the heart as a muscle. His drawings of the heart were highly accurate. Until the 17th century the body was thought to have two separate channels for carrying the blood. The veins carry nutrient rich blood from lungs to the rest of the body while the second system consisted of scarlet blood which is essential for life.

After obtaining a medical degree, Harvey returned to England and was a great success as a doctor. He carried out several experiments through which he studied the structure of heart and the circulation of blood in a variety of species. Harvey believed that the one way valves present in the veins meant that blood could only travel in one direction. He demonstrated that if he tied off an artery then the side nearest to the heart will bulge out and if he did the same to a vein then the side away from the heart will expand. He also proved that blood flows through two loops, pulmonary circulation and systemic circulation.

In the 16th century Realdo Columbo confirmed pulmonary circulation by performing vivisection on animals. He also discovered that heart allows blood to flow in one direction that is, from left ventricle to the lungs and from there to the right ventricle to the aorta.

Heart disease refers to condition affecting the heart.

Research shows that even the ancient Egyptian Pharaohs had cardiovascular diseases, specifically atherosclerosis (narrowness of the arteries) in various arteries in the body. Researchers believe that their diet could be the reason for this. Rich Egyptians and those who held high status in the society used to eat fatty foods including geese, cattle, ducks etc.

We don't know when exactly coronary artery diseases were

discovered but it is known that Leonardo da Vinci studied about these coronary artery diseases.

Many thought that angina (chest pain and tightness in the chest) as harmless. Later American cardiologist, James B Herrick concluded that the gradual narrowing of the coronary artery could be the cause of angina. Today it is found that ischemic heart disease (when heart does not get enough blood or oxygen due to narrowing of the artery) leads to angina.

Another type of heart disease is because of a is the congenital heart defect (a birth defect-CHD). It is a defect in the structure of the heart and the main vessels present at the time of birth. The cause of congenital heart defect is often unknown. Examples of genetic problems associated with CHD are Down syndrome, Turner syndrome etc.

The ancient Egyptians, Greeks and Chinese are credited with the measurement of the pulse and its association with various illness. From the work of Galen, we could further relate the pulse as the function of heart. Willem Einthoven revolutionized the study of Arrhythmia (irregular heartbeat) with his work on Electrocardiogram (ECG). It is a simple test which is used to find the rhythm of our heart. Sensors attached to the skin are used to detect the electrical impulses produced by our heart every time it beats. An ECG shows the part of the heart which has been damaged. It can also show evidence of previous heart attacks or one that is in progress.

Thus through numerous studies and over the ages we have been able to study about the heart and its related diseases.

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THE HEART FAILURE CONFLUX

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Message by Prof. Ashutosh Sharma
Secretary - Gov. of India, Department of Science and Technology

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 - Diabetes Mellitus Type 1 and Type 2
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 - Diabetes Mellitus
 - Diabetes Mellitus Type 1 and Type 2
 - Diabetes Mellitus Type 1 and Type 2

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