

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.

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THE CHILD WITH CONGENITAL HEART DISEASE: FROM DESPAIR TO HOPE



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It is with unparalleled joy and excitement that a couple greets the birth of their baby. In Kerala, it is likely to be the first or second baby only, as not many couples plan to expand their family any further. When the paediatrician tells them that the baby is not behaving well - it is blue or breathless or not maintaining blood pressure - and needs to be immediately evaluated by a paediatric cardiologist, their dreams are shattered. For the majority of people in India, a paediatric cardiac service is several hours, may be days away. The family also needs to find the money, usually a few lakhs of rupees, suddenly from their own resources. 90% of critically ill babies would not survive this

struggle. The lucky few with money and access to care would make it to a good pediatric cardiac center and they have a good chance of doing well.

This is not an exaggerated sob story. About one percent of live births result in a baby with congenital heart disease. At least a quarter of them are critical congenital heart diseases, where the affected baby will not survive, in the absence of surgical or catheter based intervention.¹ At a very conservative estimate, at least 50,000 such children are born in India every year. Infant surgeries done in India were a paltry 5000 in 2006¹; this has perhaps doubled in 10 years. The number of centres nationwide that have the capability to deal with such problems was less than 50 in 2015.² Please note that we were referring only to the critically ill babies. If you include the moderate and mild forms of heart disease, India will be witnessing the addition of 200,000 affected babies to the pool that is seeking surgical or catheter-based treatment, every year. It is a mind-boggling exercise to calculate the total burden of congenital heart disease in India at any point in time. The available infrastructure can make only a small dent on this load.

Indeed, we are not alone. The burden of supporting these patients is obviously more for countries with high fertility rates; a country with a fertility rate of eight per woman needing to support four times the burden of a country with a fertility rate of two per woman. Countries with the highest fertility rates tend to have the lowest per capita incomes (some

gulf countries being the only exceptions to this statement) rendering the state of the affected children hopeless, as their health care systems are overburdened with communicable diseases, rheumatic fever and similar afflictions that poverty and underdevelopment carry.^{4,5} As the governments (not all such countries have responsible governments) struggle to find resources for education, fertility control and empowerment of women, paediatric cardiac services remain a low priority. At least, now there is greater awareness about the global prevalence of congenital heart disease, backlog of untreated patients and poor access to cardiac care in low-income and middle-income countries. Humanitarian efforts to improve cardiac care in these countries hit the stonewall of paucity of funds and infrastructure, competing healthcare priorities and critical shortage of specialists.⁵

The last few decades have witnessed a tremendous progress in the outlook for a baby born with congenital heart disease.⁶ Overall surgical mortality has dropped below 5% for congenital heart disease in the developed world. Today, almost any congenital heart disease can be effectively cured or palliated. In developed countries, 85% of children born with CHD are today expected to receive timely treatment, often in the neonatal period, and survive to adulthood with a good quality of life, this has been rendered possible by the all-round advances in paediatric cardiac care-diagnostic imaging, surgical techniques, anaesthesia, and intensive care. Interventional paediatric cardiology has contributed

significantly to the improved survival of critically ill newborns.

The surgical results of two common cyanotic heart diseases illustrate this change.⁶ Total repair of tetralogy of Fallot was first reported by Lillihei in 1955, with a 40% mortality in the first 10 cases.⁷ This indeed was a breakthrough for a condition which had hitherto no treatment beyond a palliative shunt. But today uncomplicated TOF carries a surgical mortality approaching zero and with a mixed bag of complexity, mortality still should be below 5%. The evolution of management of complete transposition of the great arteries (TGA), the commonest cause for a blue newborn illustrates this success story even better.⁶ The natural history of neonates with TGA is one of rapid deterioration and early death within days or weeks. The atrial repair devised by Senning (1958) and Mustard (1963) dramatically improved survival with an 80% chance of surviving beyond the age 20 years. However the presence of the wrong ventricle (morphologic RV) as the systemic pumping chamber leads to progressive heart failure beyond this period. The arterial switch operation for TGA, performed first by Jatene (1976) and perfected and popularized by the surgical legends like Aldo Castaneda, Gerard Brom and Roger Mee, avoids most of the early and late problems of the atrial repair and confers an excellent long term outcome. It took almost two decades for a good number of surgeons to master this surgery. Today uncomplicated arterial switch carries a mortality rate below 1% and a mixed series would have mortality below 5%. With this kind of

progress we have raised our expectations so high that people do not expect any baby to die following cardiac surgery. News of a patient's death is likely to be met with disbelief and the question 'What went wrong?'⁸

What about Indian children? Many Indian centres have current surgical and interventional results that match those of good western centres. But there are less than 50 centres in the country with the capability to deal with serious congenital heart problems. Even this number is misleading as the vast majority are to the west (and south) of an imaginary line connecting Chennai to Kanpur, as pointed out by Krishna Kumar.³ It is estimated that only 7-10% of neonates and infants in India with CHD receive timely surgery in the available centres. Conservative estimates for numbers of infants and newborns needing surgery are ~70,000-100,000 for all of India. This will require nearly 300-500 paediatric heart programs³. Assuming a minimum requirement of two paediatric heart surgeons per centre, it can be estimated that the country needs at least a 1000 dedicated paediatric heart surgeons. There are presently not even 50 dedicated paediatric heart surgeons in India who have the capability of performing infant and newborn heart surgery.

Health planners tend to view paediatric cardiac care against primary health care as mutually exclusive choices. Kothari has pointed out that while it would be foolish to take away the overarching importance of primary health care, it should

not be pitched against tertiary care in a binary choice². The treatment of heart defects definitely saves lives and does so cost effectively. With appropriate treatment, nearly 2/3 of congenital cardiac defects could be considered “nearly cured,” with a life expectancy touching normal, or only mildly abnormal. Correcting congenital heart defects in poor children have benefits that go farther. When children bear the dual burden of poverty and CHD, correction of CHD alone results in significant improvement in growth parameters⁹.

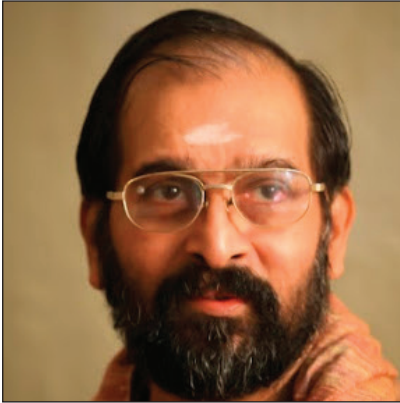
With all these limitations, how do we reach out to the underprivileged children afflicted with correctable congenital heart disease in India? The few Government centres (e.g. AIIMS, SCTIMST) need to be strengthened to deal with much larger numbers of children. The private institutions need incentives and coercion to accept underprivileged children for cardiac surgery. Philanthropic programmes and corporate initiatives need to be campaigned for. Many state governments have started insurance schemes that will give BPL children access to care in private hospitals. There is urgent need for a national programme for children with congenital heart disease which will support cardiac surgery and intervention in selected centres across the country.

In the years to come, we can hope that such collective initiatives will bring larger and larger number of children under CHD correction programmes and restore the lost childhood to these children.

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REWARDS OF A DISSONANT INTERLUDE IN MY MUSICAL LIFE



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I am the son of an extraordinarily talented and famous musician hailing from an ordinary family. Naturally, early days of my life were in an environment of 'swaras', 'ragas' and songs. My father Thiruvalla MK. Bhaskara Panickar, who was a nadaswaram maestro and music composer, taught me to play violin. Sadly, he passed away in his middle age. He had however seen that my life is smooth without any serious disharmony or discord. I never paid much attention to small ailments and falls and they never affected my thoughts. My heart was full of music, and I was always engaged in musical activities.

I did not care whether I had any health problems. My focus was to improve my 'gifted' artistic talent, pass on my music knowledge to others, entertain 'rasikas' in music 'sabhas' and seek acclaim from music connoisseurs. I am fond of teaching. My days then were spent in the world of music with those who came to me for acquiring music knowledge. I served as a lecturer at Swati Tirunal Music College at Trivandrum and later as a Staff artist at Akashavani and these jobs were sufficient to take care of my living expenses. Even as a young violinist, I have accompanied on the violin, several legends in both Carnatic and Hindustani music world at concerts both in India and abroad. I have also had accolades during these concerts.

While thus living happily, quite unexpectedly when I was only in my late thirties, the rhythm of my life was disturbed for the first time. One day when I was in the recording studios of Akashavani, I felt dizzy and temporarily blind. I tried to relax thinking that the feeling was because of tiredness from excessive work or low blood pressure or weakness because of not taking food at appropriate times. A colleague of mine called my brother and they took me to a nearby hospital. A gentle and experienced physician there examined me and connected leads of an ECG machine to my chest and limbs to record the electrical activity of my heart. He heard a loud murmur in my heart and detected that I had a serious heart problem. I was advised to be admitted as early as possible to a hospital with an intensive care unit and warned that my

condition could be otherwise fatal for me. I was in the border zone of life and death. My brother and friend were shocked. How did I have such a serious heart disease and have had no signs or symptoms of it till then? I have always been active and used to walk long distances daily to go to temples and also to my office. I had recently trekked to Sabarimala without any problem. I had no 'vices' apart from occasional pan chewing.

I was without delay taken to a larger hospital. There, I was given a few injections and was admitted to the ICU. An efficient cardiologist Dr. C. Bharath Chandran examined me in detail. He informed us that my condition is very serious, chances of my survival are low and that response to treatment cannot be predicted. My family members could not believe. Hearing the news, my relatives, friends and also foes (I must add that they are few) rushed to see me. Their condolences and displays of grief along with recollections of my good deeds gave me a feeling of impending death. By the end of the day, the wind changed, thanks to the meticulous, sincere and rational treatment by Dr. C. Bharath Chandran. My deteriorating heart started functioning slowly. When the doctor informed that the patient has narrowly escaped from the jaws of death, my family was obviously happy. I could however sense disappointment on the face of some of the visitors. I was told that I need to undergo an operation at the earliest. I was diagnosed to have a defect in the aortic valve on the left side of my heart. The valve had narrowed and became stone like (calcified) thus obstructing the flow of blood from the heart. That valve had

to be replaced. But as I was weak, operation was not possible immediately.

I always had a fear for hospitals and I was now in a hospital not knowing how long I would remain alive. I could not think properly and became disinterested in everything. I was sad that I had no control of my wishes or desires. Tubes in nose and mouth made paths for food and medicines to my body. According to my horoscope, I was to have a royal life during this period. Certainly a royal life! A more than comfortable bed in an air conditioned room in an old palace (the hospital where I was, used to be a palace once), all my bodily functions being monitored all the time, nutritious food, beautiful nurses in attendance and a good number of visitors seeking appointment to see me. I just had to lie down listening to the advices, opinions and consoling words of my well-wishers. Am I not enjoying? Indeed, a royal life. If this condition persisted, I may not have liked to return home at all.

When I was alone, I thought: "Why did this happen to me, someone who was galloping like a horse suddenly being tied to a cot? I am a pure vegetarian. Never have I taken alcoholic drinks, or smoked tobacco knowingly or unknowingly, in my life. I never had any ill habits apart from occasional pan chewing. I was disturbed that a person like me who never had any 'bad habits' and foremost, a sincere devotee of God, who had never knowingly harmed any one, had to have a serious heart disease. Did my irregular eating habits, tension during

concerts, sleep deprivation and pan chewing contribute to my heart condition? I was soon enlightened; a healthy life style does not make one immune to heart diseases. A healthy life style certainly helps in reducing the risk for heart diseases. It would also help one to respond to medical treatment better. Later, I was glad to hear that my condition was probably because of a birth defect of the aortic valve, which progressed slowly and finally the valve leaflets had become hard and stiff unable to open and close as they should. The condition is termed calcific aortic stenosis. Mercifully, I was not responsible for my condition.

I have always had some doctors coming to me to learn violin. All of them came to see me. Some of them were working in Sree Chitra Tirunal Institute for Medical Sciences and Technology at that time. They wanted me to shift to their hospital. Dr. KG. Balakrishnan, the Chief of Cardiology there, was the father of one of my students. Fortunately, Dr. Bharat Chandran had no objection. For a few days at Sree Chitra, nothing happened. I was becoming anxious as there was no talk of surgery. I started praying to all the GODs I knew. I saw doctors as sons of God and nurses as angels. Their soothing words and solace from my relatives gave me courage and peace.

Though that period was one of agony and struggle, now when I recall some incidences, I cannot but laugh. May be, you would enjoy hearing those stories. These are of unsought opinions from visitors and well-wishers. The innocent advices they

gave, only out of love for me were often inappropriate. Many visitors of patients do not consider how their words would affect a patient.

When I was hearing consoling words and trying to be courageous, a fellow patient in the same ward used to frequently come to see me. He was a music lover and a fan of musicians, including me. He used to recite interesting stories of the musical world. Then on a departing note, he would blast a bomb. He would advise, “Sir, I have heard that you are short tempered and hence you have a lot of enemies. Why do you keep the resentment for them? When they come to meet you, behave lovingly. Why to keep anger and resentment now, at this stage of your life? We all need to bid farewell to this world soon”. Isn’t this enough? All the courage I was trying to muster used to fade away. He continued this advice almost every day. I started feeling that I may not need surgery. I informed my doctors of my fear of continued hospital stay and my desire to go home. They said that the date of my heart operation was already fixed and that I cannot be discharged. I became more scared on hearing the news and wanted to run away. Then, Dr. MS. Valiathan, the well-known cardiac surgeon and the then Director of Sree Chitra Tirunal Institute visited me. He gave me permission to go home and return two days before the date fixed for operation. He warned me that I should take complete bed rest at home, reduce conversations and follow the doctor’s advice very strictly. Wow, I got my breath back. I reached home. A room had been specially arranged for me.

Visitors continued to come and despite my family's requests they did not allow me complete rest.

One day a highly respected musician and one of my mentors came to see me. As soon as he came, he told: "Sasi you should not talk; You just listen to me. Tell me how did you get this heart problem?" Imagine my plight. He first told me to be silent, and then he asks me a question which needed a long answer. I started explaining from the beginning. In between he would tell me not to talk. Then would come another question: "Did you have pain in the beginning?" I would again start talking. My brother soon recognized my predicament and diplomatically escorted my benefactor out of my room.

Yet another sympathetic visitor told me: "Sir, you be happy. We are not masters of our destiny. It is all in God's hands. What you are undergoing now is God's decision. You should be glad to know that some of your friends and I have decided to institute either an award in your name or provide on your behalf financial support to poor students of music. We have already formed a committee. Final decision would only be after your permission. Fund raising has already started. We understand that you would be fine for atleast another 2-3 days. I would come again for a discussion after a couple of days. I was aghast that my friends are already thinking of instituting something in my memory.

Another lovable aged woman came to meet me. As soon as she came, she started crying. Then her crying stopped as if

a switch was turned off. "Is your operation very costly, my son? Do you think God would appreciate if you would allow someone to cut up your body that He has gifted to you? Any way what can be done? It is your fate! Good that I was able to come to visit you today. I could at least see you. My dear God, save Sasi. Here is the only person who used to give me some 10 or 50 rupees when I needed. Whom will I ask when he has gone? He, who gave me mouth, may send me food too. Bye my son. Attukalamme protect me..." She too seemed to know my destiny.

Another well-wisher, a staunch devotee of God and who proclaims himself that he has direct connections with all the Gods used to come to see me often. "Sir, I have ordered for a special puja in your name in the temple; I have given for a 'kedavilaku' (a lamp which would burn for ever) in that temple. You know that the result is fast and predictable. I have given for 'pushpanjali' (offering by flowers) in another temple. I have arranged for some other offerings in other temples. You should know that you would get the benefits only if these offerings are done using your own money." He asked me to give him a huge sum. How can I not give? I was pleased that he did not offer for my benefit an elephant or a mast of gold to these temples.

Another friend of mine who visited me was an ardent follower of naturopathy. He said: "Sir, by naturopathy you can avoid the necessity of operations. I read in a book recently that for heart

diseases, taking cucumber is very good”. I was furious and asked him to get out. I was to undergo surgery in two days and he wants me to try cucumber treatment on me. He may be right that naturopathy has some potential to mitigate some diseases. I wondered whether when I was in the borderland of life and death was the right time to discuss the potential of naturopathy. I can recite more stories, may be some other time.

I reached the hospital two days before the date of my operation. As one who would look out for the dog in the house of a prior visit, the first thing I did was to search for my old mate in the ward. Fortunately for me, he had had his operation and been discharged. My situation was of one sitting on a fence. From my relatives, I understood that Dr. Valiathan gave me only 2% chance to survive after the operation. I really do not know whether it was because of prayers of my relatives and friends or because of God’s love for Dr. Valiathan, I had a successful replacement of my aortic valve. When I gained consciousness the next day, I saw happy faces around me.

Gladly, I returned home from the hospital after the mandatory stay of a week. I felt like as if I have had a rebirth. I was not able to do things as earlier for about 2-3 months. I was anxious whether the foreign valve made of metal and plastic would function efficiently inside my body. Slowly, when I started working, this anxiety decreased. Still, I was like someone who is trying to ride a cycle for the first time. I was also worried

whether my chest would pain when I place the violin on it for a long time and whether the sound of my replaced valve would be caught on the mike when I play violin during concerts. I realized later that these were silly doubts. Cardiologists at Sree Chitra Institute helped me for an early return to a normal routine.

After nearly three decades, one day I developed shortness of breath. It was found that the replaced new valve was leaky. I was saved from a second valve replacement by the efficient care of new and younger cardiologists at Sree Chitra Institute. They cured me with only medicines. I am healthy now and follow the advices of Dr. S. Sivasankaran and Dr. S. Harikrishnan who had saved me the second time. Like a 'culprit on bail' who is asked to sign at police station once in a month, I am forced to go to the hospital for a prothrombin test (PT test) once in two or three months. This is the only time I remember that I have undergone a major surgery.

I strongly believe that I have God's blessings which have helped me to enjoy another 35 years of life after a critical illness and an open heart surgery. God's grace! I think that it is the most fundamental and immortal truth. Yet, we should realize that God needs to take care of a large number of people some with diseased and many with normal hearts. I have possibly a place in His 'good books', but it does not mean that I follow a reckless life and depend on Him to save me all the time. We should try to reduce his work load as a token of appreciation for the love

and mercy he showers on us. I feel I should always be grateful for His mercy. I believe that it is our duty to look after our body and our life, which are precious gifts. This thought has made me follow a healthy life style. I am careful regarding my diet, medicines and exercise. I admit that I do not perfectly follow all the instructions of my doctors. I also do not neglect them. I do go for my regular check-ups. I have no worries about being sick. May be, because I am always engaged in musical activities, or may be because I am unaffected by incidents that cause tension or sorrows, or may be because I do not have any bad habits which affect my health, or because my blood pressure does not rise from unhappy thoughts or as I am fated to listen to other people's stories for some more years, I continue to live happily and peacefully.

I continue to go for concerts and teach students. I wrote and published an amusing book. I have produced several music CDs as well. The valve replacement allowed me to live long to receive an award from the Kendra Sangeeta Nataka Academy and honours from several other institutions. I am thankful to God, my doctors and my well-wishers. May God bless them all!

(This article is translated from a Malayalam version)

IS THE GLASS HALF FULL OR HALF EMPTY?

Surya Ramachandran



“Alcohol, in moderation, is good for the heart”. This is a commonly repeated statement which is used by people as an excuse to drink. The statement has also been often a subject of scientific study by both clinicians and experimental researchers. Ask a doctor and one can hear the numerous ways by which excessive alcohol drinking can affect each organ of the body from head to toe, ranging from depression, stroke, psychosis, neuropathy, liver cirrhosis, kidney failure, oedema (swelling) of feet to chronic non communicable diseases such as cardiovascular diseases and cancer. The moment the word “moderation” comes into play, opinions are divided and biased. Research has not yielded proper answers in black and white and grey areas prevail. Alcohol and research have

therefore always had a difficult relationship.

People who enjoy alcohol will like to hear only good things about alcohol. As a result positive news outweighs negative facts. In addition, the influence of wealthy global alcohol industry mars productive scientific research. The truth is however ugly and inconvenient. There are proven ill-effects of alcohol which needs to be highlighted. The average age of starting alcohol in low income and developing countries such as India has dropped to 13-15 years of age.

The following facts of alcohol need to be emphasized and the general public should be educated about it:

1. Alcohol is toxic to the liver and by products of alcohol can damage liver tissue causing cirrhosis and cancers. Earlier the onset of drinking, earlier the start of disease.
2. Alcohol intake by young adults can cause unnatural deaths by road accidents, drowning, freak accidents and suicide.
3. It can cause cancer of the mouth, esophagus, breast, stomach, liver, intestine and other organs.
4. Alcohol intake causes addiction. Most people start at low levels but with time consume more and become dependent on it. The safe upper limit of alcohol has been revised from 21 units to 14 units per week for both men and women in most European countries and America.

In 2015, a Hamilton based research team (Population Health Research Institute, PURE) studied information from 12 countries. They divided the sample population of 1,15,000 adults into four groups based on their income: (i) high, (ii) high middle income, (iii) low middle income and (iv) low income. The individuals were followed for an average of four years of which 36000 people reported drinking of alcohol. The study published in the Lancet, 2015 is the first to investigate associations between alcohol consumption and outcomes in a prospective cohort of countries at different economic levels in five continents.

Based on their alcohol intake, the study population was divided two groups: (i) Never drinking and (ii) Current drinking. Based on quantity of intake, the subjects were divided into: (i) low intake (7 drinks/week), (ii) moderate intake (7-14 drinks/week) and (iii) high intake (more than 14 /week).

The population was followed up for 4 years and outcomes such as cardiovascular disease, alcohol related cancers, injury and admission to hospital were measured. Cardiovascular diseases included cardiovascular death, myocardial infarction (heart attack), stroke or heart failure. Cancers included those of mouth, esophagus, stomach, colorectal, liver, breast, ovary and head and neck cancers.

Although current drinking was associated with a 24% lower risk of heart attacks, there was no reduction in the risk for

mortality or stroke. A 51% increase in risk of alcohol related cancers was seen. An increased risk of death was seen in those with high alcohol intake and heavy episodic drinking.

The authors also identified differences between countries of different levels of prosperity. High income countries included were Sweden and Canada. Upper middle income countries were Argentina, Brazil, Chile, Poland, South Africa and Turkey. China and Columbia were included among low middle income countries whereas India and Zimbabwe were included in low income countries. For higher income countries, current drinking was associated with a 16% reduction in the risk of a combination of all the outcomes (death, cardiovascular disease, heart attack, stroke, cancer, injury and admission to hospital). But in lower income countries there was a 38% increase in risk. Harmful alcohol use was most common in lower income countries where one in eight current drinkers had high levels of intake of alcohol and one in three had a heavy episodic drinking pattern. Senior author, Dr Salim Yusuf says “Because alcohol consumption is increasing in many countries, especially low and middle income countries, the importance of alcohol as a risk factor for diseases might be underestimated. Therefore global strategies to reduce harmful use of alcohol are essential”. The study published in the Lancet has a team of eminent clinicians and epidemiologists contributing from India. Dr V Mohan, Madras Diabetes Research Foundation (MDRF), Prof V Ramankutty, Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) and Dr. Prem

Mony, St. John's Research Institute were part of the team.

The general belief and propaganda that alcohol in moderation is good for health only serves to pacify a drinker to continue the habit. The study in the Lancet provides proof for the concept that alcohol use is associated with no overall benefit. Most of the previously reported studies were merely observational studies which are considered to be of low quality scientific evidence. Moreover, the positive observations of heart disease and alcohol drinking have not been reproduced in the Indian population which has a distinct genetic and lifestyle pattern. Professor K R Thankappan and colleagues had reported in the *Atherosclerosis* in 2010 that those who drank alcohol had a 40% increased risk in developing heart disease and the more they drank worse was their heart disease. The Lancet study had included a considerable population from India and showed that alcohol use was associated with much greater risk of death and cancer. This is in contrast to wealthy western countries and confirms the idea that the said protective role of alcohol in these countries is only a marker of otherwise healthy lifestyle.

People believe what they want to believe. It is always nice to discover that something you hoped was true is really true. But, can your desire for an answer affect the way you evaluate the evidence? When it comes to health and disease, the answer is NO!

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GENDER DIFFERENCE MATTERS; WOMEN ARE MORE AT RISK FOR HEART DISEASES

KG. Aghila Rani

Heart diseases claim women and men in nearly equal numbers globally. As per a recent survey by American Heart Association, women worry more about getting a breast cancer than a heart disease, even though casualties due to coronary artery diseases in women are increasing every year. The belief is that heart disease tends to show up at an older age and hence need not be a matter of concern for younger women. Women discuss more about breast cancer or know women of their age who have had a breast cancer but rarely about women with heart diseases. National Cardiovascular Network database has reported about the gender differences in in-hospital mortality after coronary artery bypass graft surgery (CABG). Younger women had a greater risk of in-hospital mortality than men, irrespective of the fact that women at all ages have a better heart function (left ventricular ejection fraction) and relatively clean coronary arteries. Many a times, early symptoms in women remain unnoticed and are mistaken for panic disorder or stress and physicians hardly educate them about coronary risk factors. In women, symptoms are mostly subtle. Often such symptoms occur while resting or asleep. It is essential for women to understand that heart attack may occur without a chest pain. Some of the common symptoms

are discomfort in the neck, jaw, shoulder area, shortness of breath, sweating, vomiting, dizziness, pain in one or both the arms and fatigue. Sometimes, a pressure or tightness could be felt in the chest area (women tend to have blockages in the smaller arteries in addition to the main arteries that supply blood to the heart, a condition called small vessel heart disease or coronary microvascular disease) and that could be easily be mistaken for stress or mental agony by most of the women. One in eight women report chest pain during a heart attack and the condition is mostly described as pressure, aching or tightness rather than pain. This is because, in most of the cases, a crushing pain is not experienced by women. It is essential for women to be aware that their symptoms are often different and compared to their counterparts they are more likely to die within a year of having a heart attack.

Coming to the risk factors for coronary heart disease, other than the traditional high cholesterol, high blood pressure, obesity, factors that affect both women and men equally, factors that play a bigger role in women include: physical inactivity, menopause, mental stress/depression, diabetes, smoking, pregnancy complications etc. In addition, women under the age of 65 and with a family history of heart disease need to pay more attention to heart disease risk factors. Hormone estrogen plays a vital role in protecting women from heart diseases by increasing the amount of good cholesterol (HDL) and decreasing bad cholesterol (LDL). After menopause, however, women have higher levels of total cholesterol than

men. Higher levels of triglycerides are yet another major factor contributing to cardiovascular risk in women.

It is a need of the hour to identify the biological, social and medical bases of gender differences for heart disease and its risk factors. All women face the threat of heart disease and an understanding and awareness of symptoms and risks unique to women may facilitate to fine-tune prevention, diagnosis, and treatment for heart diseases in women.

HAVE A HEART!

Sudheesh AP

More than a lakh number of men, women and children are on the transplant list and only an approximate number of few ten thousands are lucky enough to get their needy organ. More than thousands are still being added to the list every single day. It is shocking to see that each day many hundreds around the world die waiting for a transplant. Many have died over the last couple of years waiting for a new organ mostly because the families of potential donors were not sure of their deceased relatives' wishes and when the decision is left to them, many decided it is just safer to say "no". A disinclination to talk about the transplants makes the scenario even worse and adds to the shortage of organs for donation. But when we 'put ourselves in the shoes of someone who is waiting for a transplant', then we will know that if we are willing to accept an organ to save the lives of our loved ones, we might as well show the willingness to donate the extraordinary gift of life to another family.

In hospitals, when a person cannot breathe on their



own, they are provided the help of advanced machines and ventilators to keep them alive. In most of the cases, the person might be brain



dead and the moment life support is taken off, the heart will stop beating due to lack of oxygen and their skin turns pale due to lack of blood. The approximate maximum time for organs/tissues harvesting for transplantation is: Lung: 4-6 hours; Heart: 4-6 hours; Liver: 24 hours; Pancreas: 24 hours and Kidney: 72 hours. The major organ which has donor scarcity is the heart. Organs such as kidney or liver can be donated by any healthy person provided all the criteria match for donation. If a critical organ such as the heart cross the time window of harvest, it is often declared to be dead. Because of all these reasons, scientists and researchers' are coming up with newer ideas to get a healthy organ for transplant. Recently researchers in Australia have revived dead hearts even after the harvesting time had crossed 20 minutes after the harvest window and used it for transplantation saving many lives. The research was 12 years joint effort between Victor Chang Cardiac Research Institute and Sydney's St. Vincent's Hospital headed by Professor Bob Graham and team. They have developed a specialized fluid and a pump that provides the heart with oxygen reducing the damage and preserving the tissue. The heart retains its normal pink colour upon receipt of this special fluid from the pump, which helps to resuscitate

the organ, making it to beat the heart yet again. This is critical since if the heart beats in the machine it is a good sign of its possible function after the transplantation. By maintaining the donor heart functional and fresh, the novel procedure doubles the four-hour harvest window for transplant. The extended period provides time for a perfect match to be found. Although this technique was adopted only in a few cases, the success was 100 percentages. The numbers keep growing each day as many hospitals in and around Australia are using this technique. However the problem of scarcity of organs like heart remains unsolved. The recent trends in the science of prosthetics and advances in soft robotics where the heart is 3-dimensionally printed using specific bio-printers are the hope. A group of Swiss researchers promote of this idea that this invention overcome the main problem associated with artificial hearts which use metal and plastic fittings which are not completely compatible with the normal body tissue and can also damage blood as well as alter its flow because of unnatural movements style inside the body. A small research team at ETZ- Zurich, Switzerland and Deutsches Herzzentrum Berlin, Berlin, Germany led by the doctoral student Nicholas



Cohrs has created what they claim is the first artificial heart that is entirely soft, made of silicon fibers. Its pumping mechanism consists of silicone ventricles and mimics a real heart. It has all the four chambers and an additional closed chamber which fills and deflates to generate the pumping action. It is soft and flexible inside and it does not interfere with the general blood flow. Another big advantage is that it is made as a single part and not of pieces fitted together. The current developed artificial heart does not last for more than a few thousand beats which is for about half an hour. We have to find materials and designs that would work much longer than this, may be for a life time.

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HIGH-VOLUME ENERGY DRINK AND THE RISK OF ADVERSE CARDIOVASCULAR OUTCOMES

Ciji Varghese

Energy drink is a cocktail of multiple ingredients containing high amount of caffeine, sugar or sweeteners, carbonated water, herbal extracts and vitamins meant to boost physical and mental alertness. It is safe for a healthy adult to consume a total of 400 mg of caffeine a day which is almost equivalent to four cups of coffee (90 mg each).

Caffeine, a natural methyl xanthine, by antagonizing adenosine receptors acts as a central nervous stimulant in humans. Caffeine has a similar structure to adenosine, a chemical that is present in all human cells. In the brain, adenosine acts as a central nervous system depressant. Adenosine promotes sleep, and suppresses arousal by slowing down nervous activity. Adenosine binding causes blood vessels in the brain to dilate and to increase Oxygen intake during sleep. To a nerve cell, caffeine appears like adenosine and caffeine binds to adenosine receptors. Unlike adenosine, caffeine speeds up cellular activity. It also blocks adenosine's ability to open up the brain's blood vessels, causing them to constrict, thus leading to elevation of blood pressure. Frequent consumption of energy drinks in high volume when the dose of caffeine far exceeds 400 mg, may result in adverse cardiovascular effects

like elevation of blood pressure, heart rhythm problems (Arrhythmia) and in rare cases cardiac arrest.

Globally, energy drinks are typically attractive to young people. Too much of anything is potentially dangerous. Hence, moderation is recommended when consuming energy drinks as well. For those with normal blood pressure, this is not a concern. Individuals with already elevated blood pressure could be placing themselves at risk for stroke and other health problems. It is noted that excessive or repeated consumption of B-vitamins (Niacin or Pyridoxine), an ingredient of energy drink may increase the risk for nerve or liver injury.

According to *Fletcher et al*, caffeine content in the energy drink was not the only factor; cocktail of other ingredients in energy drinks made them more dangerous than drinks whose only stimulant was caffeine. The study noted that more research is needed on the effects of individual ingredients. Energy drinks are heavily sweetened and easy to drink. Energy drinks are thus a great concern because of the ease of access to these for the youngsters.

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PROMOTING HEALTHY HEARTS: CONSIDERING 'CARDIO' IN YOUR DIET

KG. Aghila Rani

Eat better, drink less, exercise more and sleep enough: these have been considered as the universal mantra for a healthy heart. Developing or maintaining a healthy lifestyle with a variety of foods at each meal, exercising regularly and maintaining an ideal weight can aid in managing high blood pressure and diabetes, the common risk factors for cardiovascular diseases. Although we know that eating certain foods can increase the risk for heart diseases, many at times, it is not easy to change our eating habits. Majority of the Indian population have years of unhealthy eating habits and kicking off the burden is often regarded as a tough task. Once we are aware and know which foods to eat more and which foods to limit, we are on our way toward a heart-healthy diet. Small changes could make a significant difference. There are simple ways to bring about favorable changes in your diet. Some of the ways to plan your diet are listed here. Control the portion size of your food, eat more vegetables and fruits, choose for fiber rich whole grains over white refined flour, limit unhealthy fats (butter, margarine, red meat, cookies, crackers, fried chips etc), opt for protein rich diet (lentils, lean meat/poultry, fish), reduce the amount of sodium (avoid table salt, canned food, ready to eat meals) and most importantly, plan a healthy daily menu for every day. With proper planning, a

heart healthy diet becomes easy to follow and enjoyable. Thus one can eat with your heart in mind.

A major cause for cardiovascular disease is smoking. Smoking, both active and passive, speeds up clogging and damage of vessels carrying blood to the heart muscles. Tobacco consumption is directly linked to the severity of heart damage and smokers have 6 times more risk to get a heart attack. According to the World Heart Federation, six million people who die because of heart ailments are direct or second-hand smokers. This number is expected to rise to eight million by 2030. Alarmingly, tobacco kills approximately one person every six seconds accounting for one in ten adult deaths. It is important for our youth to know that within one day of quitting smoking, there will be a decline in the heart rate, a drop in blood pressure, and oxygen levels increase in the blood. By about three months, significant improvement can be noticed in smell and taste abilities. Lungs regain their ability to clean themselves and blood circulation throughout the body becomes better. Within one year of quitting smoking, risk for heart attack is greatly reduced, and by about 6 years, your heart's health returns to a level similar to that of a non-smoker. On World Heart Day, which falls on the last Sunday of September every year, cardiologists and healthcare practitioners across the globe advocate the importance of lifestyle management and tobacco cessation among the youth. It has been estimated that by curbing tobacco use, unhealthy diet and physical inactivity, approximately 80 % of premature deaths from heart disease and stroke can be avoided.

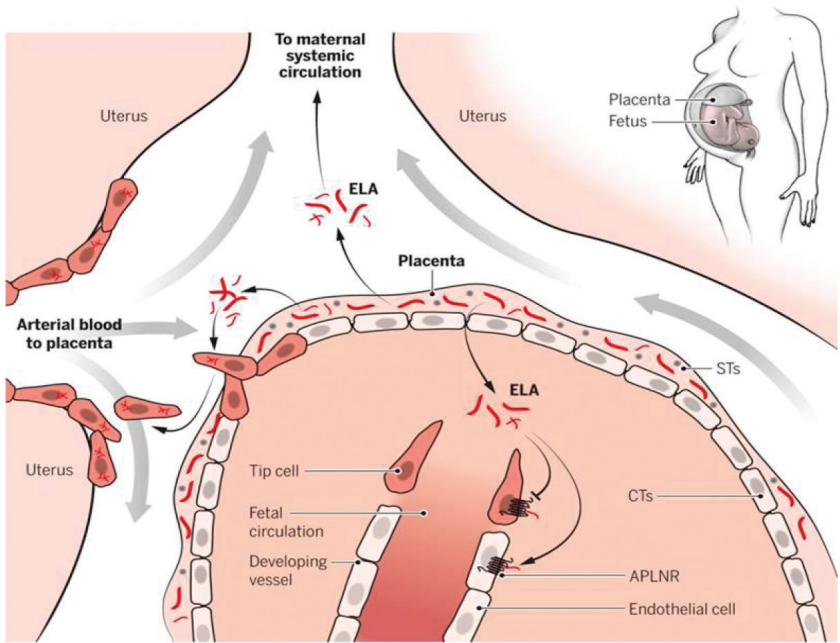
ELABELA, A PLACENTAL HORMONE IS ASSOCIATED WITH ADVERSE CARDIOVASCULAR EVENTS IN PREGNANT WOMEN

Vikas Kumar

Elevated blood pressure ($>140/90$ mmHg) and leakage of protein in the urine. This condition occurs in women between 2 and 8% of all pregnancies and occurs mostly after twenty weeks of pregnancy. The biological mechanism of this disease known as pre-eclampsia is marked by abnormal placenta (organ which connects developing fetus to the uterine wall of mother) formation and imbalance in factors which regulate blood vessel formation and degradation. Diagnosis of pre-eclampsia at early stages is very difficult due to similarity with other diseases such as chronic hypertension, chronic kidney disease, epilepsy and pre-existing hypertension in patients. Current quest is to improve the early diagnosis and detection methods using effective biomarkers of pre-eclampsia during pregnancy.

Recently, Ho and colleagues reported that placenta secretes a hormone called ELABELA (ELA) and this hormone is present in blood. Early developmental structures of embryo (pre-implantation human blastocysts) have ELA. In adults, ELA is seen only in placenta and kidney. When ELA is not present, mice have developmental defects in the heart. ELA deficient

pregnant mice also have elevated response to lack of oxygen and enriched expression of genes regulating growth of blood vessels from pre-existing blood vessel network. The hallmarks of pre-eclampsia such as elevated protein level in urine, high urine protein/creatinine ratio and hypertension were increased in ELA deficient pregnant mice. These pregnant mice had reduced fetus weight, swollen and occluded small blood vessels when compared with non pregnant ELA deficient mice.



The maternal-fetal interface in mammalian placenta

These findings of Ho and colleagues suggest that ELA is necessary for cardiovascular equilibrium and acts as a negative regulator of hypertension in pregnancy. They also showed that administration of synthetic ELA reduced symptoms of pre-eclampsia. Infusion of ELA in ELA deleted fetuses nearly normalized the weight of fetus and the function of small blood vessels in kidney.

ELA thus curbs inappropriate blood vessel formation and promotes normal blood vessel function. ELA enters circulation of the mother and improves heart and kidney functions. In summary, ELA is a hormone secreted by the mother placenta found in blood and maintains balance of both heart and blood vessel formation between mother and fetus during pregnancy.

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YO-YO DIETING INCREASES CARDIOVASCULAR RISK?

Sumi S

'Yo-yo dieting' also known as 'weight cycling', is a repeated cycle of losing and regaining weight during a period of time. Recent studies indicate that this type of dieting will double the risk of a heart attack and death in people who already have significant heart disease compared to those who have sustained overweight. Dr Sripal Bangalore and colleagues of NYU Langone Medical Center in New York City studied 9,509 people who were already at high risk for heart attack due to coronary artery disease. These patients were observed for over a period averaging 4.7 years. The conclusions of this study were recently published in *New England Journal of Medicine*. They report that people who had the greatest fluctuations in weight, *i.e.*, about 8.6 pounds, had double the risk of a heart attack, stroke or death, when compared with those who had weight fluctuations of less than 2 pounds. The risk for developing diabetes was also increased for people with the greatest variability in weight versus those with the lowest variability.

Dr. Somwail Rasla from Memorial Hospital of Rhode Island

earlier presented similar findings at American Heart Association's 2016 Scientific Sessions. They examined the weight history of 158,063 postmenopausal women and followed the woman up to 11.4 years. The study participants were classified as those maintaining stable body weight, those who had steady gain of body weight, those who had weight loss and those who did yo-yo dieting. Researchers found that the women who did 'yo-yo dieting' were three-and-a-half times more likely to die of sudden cardiac death than those who had stable body weight. Weight cycling in women who had normal body weight were also found to have a 66 percent increased risk for death from coronary heart disease.

Strict diets make dieters fall into 'yo-yo dieting'. When calories are limited, levels of cortisol, the stress hormone, increases. Too much cortisol over a period of time can raise your risk for chronic conditions such as heart disease and cancer, particularly among dieters whose weight cycle more than 5 times in their lives. Weight gain is known to increase blood cholesterol levels and body fat as well as blood pressure. These levels drop in the weight-loss phase, but not to a healthy baseline because the 'normal stat' is exceeded in the weight-gain phase. The more gain-loss cycle a person has, the more detrimental it is to health, even if the person has a healthy weight.

This phenomenon is not gender-specific. Dr. Somwail Rasla reports that 10-20% of men admit to 'yo-yo dieting' compared to 20-55% of women. The message from these studies is that if you succeed in losing weight, then you should continue your lifestyle regimen to see that the body weight remains steady.

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THE POWER OF COLOUR

Dhanya Rajendran



Can coloring pigments protect our heart? The answer is likely to be a big 'No'. This answer could be wrong.

A recent report by researchers at Linköping University, Sweden published in *Atherosclerosis*, suggests that yellow and green coloured vegetables can protect our heart. The study included 59 patients with acute coronary syndrome and 134 patients with stable angina or discomfort in the chest. Blood samples were analyzed for inflammation markers, and the levels of six coloring pigment (carotenoid) lutein, zeaxanthin, alpha and beta carotene, lycopene and beta-cryptoxanthin. Patients were receiving the best possible treatment for their disease but even then, many of them had a persistent

inflammation which is a key factor in many heart diseases. The patients had lower levels of lutein, a carotenoid. This finding led the researchers to investigate whether lutein can influence the cells in the blood. They collected the cells of the immune system of blood from patients with coronary artery disease, a condition that restricts blood flow to the heart and thus causes heart attack. They found that the inflammatory activity of the cells became significantly lower when they were treated with lutein. “Yellow and dark-green vegetables, are particularly rich in lutein food rich in lutein can have a positive effect on the immune system in patients with coronary artery disease” says Rosanna Chung, the first author of the report.

It is possibly time to train those of the new generation to sensitize their taste buds to rainbow dishes. This may ensure good health and longevity.

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CHILD IS THE FATHER OF MAN

Jaya Mary Thomas

It is known that our childhood experiences affect our behavior and personality in adulthood. Adults with all of their behavior and personality traits are just extensions of their childhood experiences they have been through long ago. Thus a good or bad experience we had in our childhood may be extended to our adulthood. Apart from the influence on adult behavior and personality traits, our childhood experiences have surprisingly an influence on our adulthood cardiovascular health. This observation is by a group of researchers who have published their study in *Circulation*. Children and teens who are abused, witness of domestic violence, and have faced other adversities are more likely to develop cardiovascular diseases in adulthood. These risk factors raise the likelihood of developing heart and blood vessel diseases and conditions in adulthood, including coronary artery disease, heart attacks, strokes, high blood pressure, obesity and type 2 diabetes. “We are talking about children and teens experiencing physical and sexual abuse and witnessing violence. Sadly, the negative consequences of experiencing these events does not end when the experience ends, it lasts many years after exposure,” states Shakira Suglia, the chair of the writing group and an Associate Professor of Epidemiology at Emory University in Atlanta, Georgia. The researchers remark that the adverse events can

be of any type such as emotional, physical or sexual abuse, neglect, violence at home, parental divorce, separation or death, parental substance abuse, living in a neighborhood with high crime rates, homelessness, discrimination, poverty and the loss of a relative or another loved one. All these conditions can lead to increased stress which in turn leads to depression, anxiety and mood disorders, resulting in unhealthy behaviors that often lead to cardiovascular and metabolic illnesses. Hence we should try to avoid all forms of stress conditions for children and provide them a pleasant and happy childhood with the intention to raise them to healthy adults.

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ACTIVITIES OF ACADEMY OF CARDIOVASCULAR SCIENCES

PRO♥C in Kendriya Vidyalaya and SMV School



Workshop on Techniques in Cardiovascular Biology

