



Interview

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Global leadership in paediatric and congenital cardiac care: education and empowerment to improve outcomes in low- and middle-income countries – an interview with Krishna Kumar, MD, DM FAHA

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Abstract

Dr Krishna Kumar is the focus of our sixth in a series of interviews in *Cardiology in the Young* entitled, “Global Leadership in Paediatric and Congenital Cardiac Care.” Dr Kumar was born in Raurkela, India. He attended medical school at Maulana Azad Medical College in New Delhi, graduating in 1984. Dr Kumar then went on to complete internal medicine, emergency medicine, and adult cardiology training at All India Institute of Medical Sciences in 1988, 1989, and 1990, respectively. He then pursued paediatric cardiology training at Harvard Medical School in Boston, MA, USA. Dr Kumar began his clinical position as a paediatric cardiologist at Amrita Institute of Medical Sciences in Kochi, Kerala, India.

During his impressive career, Dr Kumar has made significant contributions to educational advancement, research and innovation, public health advocacy, and clinical care. Dr Kumar is credited for distinguishing paediatric cardiology as a distinct subspecialty in India. He was a founding member of the Pediatric Cardiology Society of India and the original editor of the society’s academic journal. Recognising the deficit of paediatric cardiology-trained physicians in low- and middle-income countries, Dr Kumar helped establish formal structured training programmes for paediatric cardiology in India. More recently, he established the Children’s HeartLink Fellowships in paediatric cardiac sciences at Amrita Institute of Medical Sciences in Kochi and Institut Jantung Negara in Malaysia. Through educational programmes, Dr Kumar has taught countless caregivers and paediatricians, in India and neighbouring countries, the early identification and management of children with CHD. Dr Kumar has established a premier paediatric heart programme at Amrita Institute of Medical Sciences. As department Chief, he emphasises the importance of teamwork, advocacy, and continuous quality improvement. He has developed numerous low-cost strategies for the management of CHD. He has established large community-based studies on rheumatic heart disease and CHD in South India. Dr Kumar’s focus on advocacy and policy change in India has made a substantial impact on early identification and treatment of CHD in the subcontinent. He has made a global impact on the care of paediatric cardiology patients through his educational programmes, research and innovation, large-scale research registries, and advocacy for public health policy changes. He is an incredibly humble and generous leader, and his patients and community are the source of his unending motivation.

We are very pleased that Dr Krishna Kumar (Fig. 1) is the focus of our sixth in a series of interviews in *Cardiology in the Young* entitled, “Global Leadership in Paediatric and Congenital Cardiac Care.”^{1–5} Dr Kumar was born and raised in Raurkela, India. He attended medical school at Maulana Azad Medical College in New Delhi, graduating in 1984. Dr Kumar pursued internal medicine training at All India Institute of Medical Sciences (1988). After completion of his adult cardiology fellowship (1990), he identified his passion for paediatric and CHD and pursued additional training in paediatric cardiology at Harvard Medical School in Boston, MA, USA. He began his career with his first clinical position at Amrita Institute of Medical Sciences in Kochi, Kerala, India. He has served as the department chief and helped establish a premier paediatric heart programme in South India. He developed numerous low-cost strategies for the management of CHD and established large community-based studies on rheumatic heart disease and CHD. Throughout Dr Kumar’s career, he has focused on advocacy and policy



Figure 1. Krishna Kumar, MD, DM FAHA.

change. By doing so, he has made a substantial impact on early identification and treatment of CHD in India.

Additionally, Dr Kumar has made significant contribution to distinguishing paediatric cardiology as a distinct subspecialty in India. He was a founding member of the Pediatric Cardiology Society of India and the original editor of the society's academic journal. He laid the framework for the first dedicated paediatric cardiology fellowship programmes in India. This has enabled training of over 200 paediatric cardiologists. Recognising the deficit of paediatric cardiology-trained physicians in low- and middle-income countries, Dr Kumar in conjunction with Children's HeartLink established training fellowships at Amrita Institute of Medical Sciences in Kochi and Institut Jantung Negara in Malaysia. Through extensive educational outreach programmes, Dr Kumar has taught countless caregivers and paediatricians in India and neighbouring countries, the early identification and management of children with CHD.

Dr Kumar has made a global impact on the care of paediatric cardiology patients through his educational programmes, research and innovation, large-scale research registries, and advocacy for public health policy changes. He is an incredibly humble and generous leader and exemplifies patient and community-centred care.

Dr Marshall

Tell us about your upbringing, role models, or pivotal events which led to your pursuit of medicine and specifically to the field of paediatric cardiology?

Dr Kumar

My grandfather was the only doctor in the family. He was a role model, and he served in the British Army in the First World War. I believe I was four when I expressed the desire to do medicine, I took a needle and stuck it into my grandmother's shoulder! Jokes apart, I didn't think of any other profession.

I actually ended up in paediatric cardiology by accident. I wanted to do surgery after medical school, but I couldn't qualify for surgery. I qualified in internal medicine and then decided I wanted to do cardiology. I trained at All India Institute, where there were lots of very accomplished cardiologists that I admired. The



Figure 2. Professor Raj Tandon. Master clinician, teacher, mentor, and role model for many generations of cardiologists in India.

real twist happened when I decided to do paediatric cardiology. That was because of a role model, but it was also a passion. My mentor, Dr Raj Tandon (Fig. 2), who I greatly admired because he was an outstanding clinician.⁶ He was a paediatric cardiologist who also did some adult cardiology. He was exceptional at the bedside, incredibly honest, humble, had a great sense of humour, and was absolutely brilliant. I sort of flocked to him because he loved teaching. I told him I wanted to do paediatric cardiology and he said "but you don't have Paediatrics training" and I said "Yeah, I'll figure out a way." At that point, there was no one in the country with specialised paediatric cardiology training, for almost a billion population. It was daunting, but Dr Tandon said "great, if you want to do it, I'll write to Children's Boston and you should do it nowhere else!" because he was trained there.

He wrote to Mike Freed, who was the programme director. Children's Boston made several exceptions to take me as a fellow, someone who had not done Paediatrics training, who was from overseas, who had not done any residency in the United States of America, and who couldn't afford to fly for an interview, so I did a telephone interview. It took 4 years after my residency to actually get to Boston because there were a lot of steps/exams. When I finally reached Boston, I remember Mike Freed took me to his office and told me "You might be wondering how we picked you amongst so many people in the United States?" He pulled out his drawer and showed me the letter that was written by Dr Tandon. It just said, "Mike, you must take him." So that to me said a lot. I was very lucky in finding one of the most extraordinary mentors so that's essentially what got me to paediatric cardiology.

Dr Marshall

Wow, that's such a great story. From stabbing your grandma with a needle to a journey of passion and fate that led you to paediatric cardiology.

More on the theme of mentorship. You are credited for establishing India's first paediatric cardiology fellowship training programmes. Further, you recognised the deficit of paediatric cardiology-trained physicians in low- and middle-income countries and established Children's HeartLink Fellowships in Amrita Institute of Medical Sciences in Kochi and Institut Jantung Negara in Malaysia. You have personally trained and mentored 55

paediatric cardiologists. Can you speak about the Children's HeartLink community and the fellowship programmes for those not familiar? Do you have any advice about how to be a great mentor or mentee?

Dr Krishna Kumar

I came back to India and there was nothing in terms of proper training for paediatric cardiology. People were doing adult cardiology and then transitioning to paediatric cardiology. I thought that was just not going to be good enough to take care of children. So, I set up the training programmes and wrote to the government. We started in eight hospitals and it's grown to about 14 hospitals.⁷⁻⁹ We've trained 150–200 paediatric cardiologists.

The Children's HeartLink Fellowship is an unusual fellowship because it's a fellowship for candidates in low- and middle-income countries. India has a structure – it has a fellowship programme in paediatric cardiology. Believe me, the vast majority of low- and middle-income countries have no structure. They don't have any kind of training programme in paediatric cardiology. I have been working with Children's HeartLink, an organisation and NGO in Minneapolis, for the last 20 years. I said we must create a template for low- and middle-income countries in paediatric cardiac science, including cardiology, intensive care, and surgery.

We train people from low- and middle-income countries at two sites, Amrita and Institut Jantung Negara in Malaysia. They spend a year in each of these two sites and train in one of these three areas and go back to their home countries. It's been just the beginning, but we've had some exceptional people come through this process. We just trained an outstanding intensivist from Uganda and cardiologists and cardiac surgeons from Vietnam and Nepal. I think it's a model that hasn't been tried anywhere else before, let's see if we can grow this programme and if it fills a gap.

About being a good mentor, I learned about the skill of being a good mentor from Jane Newburger.¹ Jane Newburger was my mentor at Harvard. I had lots of people at Boston Children's who were phenomenal mentors, but Jane took a special interest and what distinguished her as a mentor was this lifelong interest in the career of the mentee. It's been 26 years since I left Boston, and we still exchange emails on a regular basis. The longevity of the relationship made her very special. It speaks of a very deep-rooted, genuine desire and interest on the part of the mentor in the career of the mentee. That is a very essential attribute that mentors need to have, a very genuine interest in the lifelong career development of the mentee. I have used Dr Newburger and Dr Tandon's examples to be like them when I have tried to mentor others.

Dr Marshall

It sounds like you have had incredible mentors and you have been able to pass that experience along to so many trainees.

You have made significant contributions to education, research and innovation, public health advocacy, and clinical care. I wanted to ask about your role in distinguishing paediatric cardiology as a subspecialty in India. You helped create the first Pediatric Cardiac Society of India, served as the society's first secretary, and later as the president. You were also one of the founding editors of the official journal of the Pediatric Cardiac Society of India. Can you provide some historical context, and discuss what motivated this work, what were some of the barriers you faced, and how this

collaboration impacted India's paediatric cardiac care at a large scale?

Dr Kumar

It's been a very significant story. There were seven of us who came together and formed the Pediatric Cardiac Society of India. We were at the home of late Professor Savitri Shrivastava, one of my mentors in Delhi. We sat together and said we need to carve a special identity for this specialty because at that time we were essentially subsidiaries of adult cardiology. We put together the Pediatric Cardiac Society of India and over the years the society has grown from six members to close to a thousand members now. That has contributed tremendously to giving paediatric cardiology an identity. It's unique because it has surgeons, intensivists, and cardiologists all within the same society. We call it the Pediatric Cardiac Society of India. The journal has contributed to its identity, but I think it's also the fellowship programmes that we developed that has trained so many paediatric cardiologists and that has also contributed to the growth and development. There was a lot of advocacy for the cause of children with heart disease in the country that has also sort of brought attention from the government on the need to give specialised attention to these children. All this has been responsible for us to have an identity, but I think we have a very long way to go before we can make a significant impact.

Dr Marshall

I love that it all started in your mentor's living room. It sounds like a lovely conversation where you were dreaming up this future for paediatric cardiology in India, and then watching it come to fruition was probably incredible.

Dr Kumar

Yes, over cups of tea. What was unique was that everybody was incredibly unselfish. The group of us were very motivated to do something for the cause, so we worked very hard to try and do whatever was necessary for bringing up the society.

Dr Marshall

Truly a team effort. Let's transition to your work with the Indian Academy of Pediatrics. You have spent considerable time educating regional paediatricians and caregivers. How have your efforts impacted timely cardiac diagnosis and care? Do you have any advice on how educational outreach can impact community health?

Dr Kumar

It's been very impactful in the region I am in. I started in the state of Kerala in 1998, and we had significant issues with the older children with advanced CHD, babies were dying, and newborns were not being identified. The profile clearly reflected the fact that there was a lot of late presentation with tremendous damages in the form of Eisenmenger syndrome.

We clearly identified the need for early recognition of CHD. We started to conduct educational programmes. A lot of those programmes were in partnership with Children's HeartLink. It took time before we came up with a good model, and we used to do programmes and ask for feedback from the paediatricians. Finally,

we came up with a model that was case/scenario based, and we replicated that model in several programmes. I've probably done more than 300–400 programmes in the region. Without question, it impacted outcomes. Straight away, it resulted in babies presenting and being referred earlier. It laid the foundation for universal pulse ox screening in the state because people realised you still lose a lot of babies in the first week of life. Pulse ox screening was adopted and has made a dramatic impact on infant mortality. Up until ~ 2015, we had infant mortality of 12%, and the dream for the state of Kerala was to get a single-digit infant mortality. The programme for CHD was introduced in 2015 with universal pulse ox screening and guaranteed care for every single baby with significant heart disease. We've had a 40% reduction in congenital heart mortality and a 21% reduction in infant mortality, which is down substantially between 6 and 7% when we last measured it.

This has been embraced by the Indian Academy of Pediatrics. We work very closely with them, and all our teaching programmes are in association with them. It's a very powerful story here in the state of Kerala, which a lot of people want to emulate.

Dr Marshall

When you start to do the math of how many children were impacted, it's probably staggering numbers of lives you've touched through your interventions. One of the things I find so unique about your story is that you trained at Boston Children's Hospital, one of the highest-volume, resource-rich environments in the world. You are a prolific author and editor of numerous texts including Anderson's Pediatric Cardiology textbook.¹⁰ You went on to develop a state-of-the-art paediatric and congenital heart programme and a globally recognised academic training centre in a resource-limited environment. You also played an instrumental role in creating content specifically aimed at educating providers in low-resource settings for the online educational platform Heart University (www.heartuniversity.org), often with minimal access to training resources.^{11,12} Can you speak to how your vast experience in a wide spectrum of clinical and training settings has framed your perspective on education in congenital cardiac care? What can those practicing in resource-rich settings learn from those in resource-limited settings, and vice versa?

Dr Kumar

While we talk of Boston as a resource-rich centre, what I learned from Boston is how to make the most out of what you have. Some elements of the care in Boston were easy to reproduce and did not require many resources. Those elements were nurse empowerment, for example. The excellence in ICU outcomes have a direct relationship with the degree of empowerment of your bedside nurses. Nursing empowerment impacts infection rates, detection, and anticipation of major ICU events and will translate into vastly improved care. That doesn't cost as much as you think and can be accomplished in any part of the world.

The other thing I found tremendous about Boston is that they have a big team, but they work as a team. There is excellent communication, great planning of surgical cases, and systematic thought at every level. I brought those two concepts back to Amrita. I set up a system by which we work as an incredibly close knit and cohesive team. We keep team goals as the most important driver and try to minimise conflict, and we work toward the

empowerment of nurses. It's a work in progress, but reproducing those two elements made a big, big difference in our own centre.

Yes, it's possible to come very close to resource-intensive centres which have abundant human and material resources. We cannot get absolutely there because every step that you take beyond ~ 2% surgical mortality involves an exponential requirement of resources. Major interventions are not bringing in more resources, but philosophic or cultural changes.

Dr Marshall

How do institutions like Boston learn from other programmes in the world?

Dr Kumar

We have shown one way to do things. I've written down the principles of working with low resources and some of those principles are universal.^{6,9,13–19} There are about 5–6 essential points that you need to be mindful of. One is that you need to really understand where your patient comes from, what resources are going to the care of the patient, what the patient spends out of pocket, what they do, and what it means to them. Getting a really deep understanding of the patient's background is very important. Then you can do a host of innovations that can reduce cost, so we've written and published a number of innovations that have enabled cost reductions and highly efficient cardiac catheterisation procedures, interventions, etc.^{20–22} Some of which have resonated and found applications elsewhere. We've had a lot of exchange faculties where residents have come and spent some time here, and maybe they've gone back with a few ideas. I'll be very honest, I don't think we are at the point where the West is going to start learning from what we do and adapt their practices. That may take a little time. A few innovations that have been very spectacular in my own department, for example, my colleague Mahesh has used gaming software to generate virtual reality images using 3D datasets of cardiac anatomy. What he's done has people completely awestruck. We had visitors from Stanford come in and say I don't think we have access to this technology. It was very simple what he did, sitting in a room with a gaming laptop, he managed to adapt that software and produce something spectacular. That requires a very involved and deep exchange between institutions.

Dr Marshall

You hit on some really important topics. In terms of having a deep understanding of the patient population and the community has driven a lot of your actions. That is something providers sometimes miss, where we often will try to make the patient fit into our model rather than vice versa. Care is not always very patient-centred. It is a really important point to emphasise the patient's background and the impact of interventions on the patient.

As a clinical researcher and innovator, you have been celebrated in the top 2% of global researchers by Stanford University. I get the feeling that research and innovation were not pursued to advance your career development, but out of necessity to enable strategies for affordable paediatric cardiac care and to better delineate the epidemiology of cardiac disease. Can you speak about how these motivations help frame impactful research? Further, can you elaborate on some of your most impactful findings that led to the improvement of paediatric cardiac care in global communities?

How did you develop your research questions and identify strategies to answer your questions?

Dr Kumar

It's true, until recently, there was really no motivation to publish in my institution in the sense that my career growth within the institution would have been no different if I had not published as much. Publication, writing down, and documenting what we did were very important because it brings a lot of rigor and a process of peer review. That strengthens your cause, and it makes you much more solid and more convicted in your practices. For that reason, it was very important to publish. It is also important to publish to set an example to my junior staff and my residents. To tell them it's essential to write and document, and be peer-reviewed and published. The entire process is incredibly educative because it helps strengthen the science behind what you're doing. This is another lesson I learned from Boston, and even before my training in All India Institute, there was a lot of focus on writing up our research. My research is entirely contextual, and it was entirely driven by challenges and questions that emerged out of our patients. Every single significant paper I have written has been the result of a challenge I faced in managing a patient or a set of patients. So much of our major challenge was nutrition. There was a problem of children presenting with large left right shunts at a very young age with tremendous malnutrition, and nobody seemed to know how to manage them. There was reluctance to operate because there were weight thresholds. When we had a baby that was really under nourished, there was tremendous reluctance to operate. There were attempts at banding them with not so good results. We took the risk and started to operate on these babies and demonstrated in a series of studies that weight under nutritional status has absolutely no bearing on outcomes in simple CHD.^{23–28} I think that is our most important contribution. It's become common practice. We defined certain criteria as the "window of opportunity." We've done 200 babies with virtually no mortality. It's a very powerful way of bringing about a change in practice regionally because there is nothing published from the West that you can use, because they don't have this problem. Similarly, there are questions relating to managing babies with pulmonary hypertension.^{29–31} Over the last 20 years, each of those elements we've tested them through systematic studies and that's been very gratifying.

It's interesting, when I published for the first 10 years, I hardly had citations. I would publish in a good journal and I would be proud of the study, but nobody would quote that study. It's only in the last 10 years that the citations have started to grow, and that's the reason behind the top 2%. It takes a long time for people to figure out and accept what you do.

Dr Marshall

I'm sure it's frustrating with all that hard work, and not seeing the benefits until many years later. I wanted to talk a little bit about advocacy because that's an important part of your story. From reviewing your work, it's evident that advocacy and implementing positive change to public health policy are of the utmost importance to you. Your commitment to providing world-renowned paediatric cardiac care in low-resource environments is truly inspiring. What have been some of the benefits and challenges of working with governmental organisations? What

advice would you give in navigating these challenges to those who hope to pursue advocacy work?

Dr Kumar

If you have a cause that is really worthy, is impactful, and makes a difference to a lot of lives, then it is worth advocating for. The essential rule of advocacy is persistence and patience. You can't get frustrated if the ones you are advocating to don't listen. You have to be very, very persistent. That's been our story for everything we've done and advocated for; starting a fellowship programme was 2 years of advocacy, starting the public health programme in the state of Kerala was 4–5 years of persistent advocacy. Advocacy requires a certain change in your mindset. When you are trained as a paediatric cardiologist, you expect instant results and that makes you impatient. You have to be extremely patient and positive and never give up. Eventually somebody listens and the great thing is, once the changes start to happen, they become profoundly impactful. I've experienced this with the state of Kerala, where we've now got a programme that I'm very proud of and I'm extremely thankful that we've been able to put this together.

Dr Marshall

Patience and persistence, that's great advice. I find the strongest motivation often stems from my experience with particular patients or families I have cared for. Can you share a story about a memorable patient experience that impacted the work you have done to improve congenital cardiac care on a larger scale?

Dr Kumar

I will tell you two stories. There was a woman who was a widow who lived in the Southern neighbouring state. Her child was a 7-year-old who had a straightforward atrial septal defect that needed a device. At that time, device closure was very expensive and our programme couldn't afford devices at that point, so we used to offer free surgeries. Somehow the mother came to know about the fact that you could do an atrial septal defect closure using the device. The device cost was so much that she sold her home to buy that device. I didn't know that until after the procedure was over and I was crestfallen. I felt that we've done far more harm than good. In this particular child who had a relatively benign cardiac lesion which may not have impacted his health for maybe the next 40–50 years and had completely impoverished the family. Our care seemed meaningless, and it had a very devastating impact on me. I felt guilty for days on end. After that, I decided to very deeply investigate the financial background of every patient. Also, in parallel, I worked toward universal healthcare for paediatric heart disease. Today, that will never happen because every child is covered in the region.

Another story is related to a child with a large ventricular septal defect. The child was born about 3.5 kg, but by the time the child was 6 months old they were 2.5 kg and had multiple episodes of pneumonia. No one was willing to operate due to the child's malnutrition. This child's dad said "Listen, you have to fix it. I'm not going to take this baby back home. Come what may, just go ahead and do the surgery." We took the leap and fixed the ventricular septal defect and the baby did very well. That patient was transformational because they brought about a paradigm shift in the way we approached babies who are undernourished. Our

whole focus shifted toward early correction and the results have been phenomenal ever since.

Dr Marshall

Thank you for sharing those stories. They are very impactful, especially your first story about the woman selling her home to afford care for her child. We have all witnessed division develop within family units with the stress of a long hospitalisations. I'm particularly interested in how we can improve the patient and family experience through the care we deliver. Your stories are a great reminder that holistic care, including physical, emotional, and even financial health, is so vastly important. There isn't universal health care in the United States of America, so it's something that can greatly devastate a family in the here as well.

Dr Kumar

It definitely impacted the way we practiced after that and we now have a network of social workers within our department that deeply investigate every family's social background and we sometimes tailor our care to make sure that it doesn't disrupt their family situation. That takes a lot of discussion, but it's really worthwhile.

Dr Marshall

That's a powerful story. Thank you for sharing.

You have robust experience in nearly all areas of paediatric cardiology from intensive care, catheterisation, neurodevelopment, and preventative cardiology, as well as expertise in of wide age range. What are your impressions of the subspecialisation in adult and paediatric congenital cardiology? Can you elaborate on the specific challenges of caring for adult CHD patients in resource-limited settings?

Dr Kumar

For us, we have no choice but to multitask. It's just the nature of the job that we do. I think it depends entirely on the environment you're in. Subspecialisation is a dream here. We do have a very interesting model though. We have five faculty members in my department, each of whom has one pet area of interest, but they also do everything else. For instance, I have a colleague who's fantastic at foetal. He does foetal medicine and foetal cardiac care, but he also does catheterisations, manages the ICU, and does general imaging. That's the kind of model we've developed, where you have your area of focus and extra expertise, but you have to do be able to do everything else. It's really difficult in some areas, and we partner with Adult Electrophysiology in delivering electrophysiology-related services to our patients. That's the kind of model that is realistic in our part of the world.

Dr Marshall

In preparing for this interview, I was struck by the pervading themes of humanism and service to your community found in every aspect of your achievements. From advocating and establishing rural outreach programmes to ensuring timely diagnosis and treatment, to mentoring and training paediatricians and future congenital cardiac leaders, to your innovative research aimed at reducing the cost of congenital cardiac interventions and

surgeries, nearly every bullet point on your curriculum vitae seems to be founded in the common principle of providing high-quality, community-informed care. What are you most proud of? What do you anticipate the next 5–10 years of your career to look like?

Dr Kumar

I get asked this question very often. What am I most proud of? Firstly, I have to be very honest that even though this is my curriculum vitae, there are lots of people who have contributed. I'm just one part of a very big team of people, so I can't take all the credit for what we have been doing. It's very hard to feel proud of any one thing because it's a collective accomplishment. Every paper I've written has many other authors, everything I've done has had many other contributors, any procedure I've done has had people assisting me, so all throughout it's been a collective story. If I have to say, the one piece that I'm most proud of is that I've been able to bring about and develop a harmonious team. Which to me has been the reason why all this has happened. I've been blessed by an extraordinary group of colleagues in an incredible environment that I've been fortunate to be working in, that's the way I look at it. I don't think there's any one thing that I'm proud of really.

Dr Marshall

Your humility and focus on the ultimate goal and teamwork are very refreshing.

Dr Kumar

There's no other way we could have done this. I feel blessed that we just have such fantastic people. The team is really much bigger than just my colleagues who are physicians; it's every person who contributes – my secretary, social workers, even the person who cleans my office. Everybody has a role to play. My lesson is to learn to appreciate and be thankful for the people who work with you.

Dr Marshall

That is so true. I remember learning that lesson in residency. I was standing outside of a patient's room who had end-stage cystic fibrosis and was passing away. I watched as a trail of people came into this patient's room to pay their respects to the family and the patient. It was incredible to see people from all areas of the hospital, janitorial staff, people who deliver meal trays, language interpreters. All of these people had made such an impact and had an emotional connection with the family. As a physician, I might not have appreciated what a huge impact all these people made on the care of the patient.

Dr Kumar

Yes, absolutely. It's very, very important to recognise that. That's how I look back on my life so far.

Dr Marshall

My last question for you, tell me about some of your favourite pastimes when you're outside the office and hospital? How do you balance the demands of your impressive career?

Dr Kumar

Two things that keep me going are music and cooking. I'm passionate about Indian classical music. I spend a lot of time listening, it's very soothing and a big de-stressor. And, of course, I love cooking. These are the two things I do which are very relaxing. I think that's been very important to have these two little passions, which I think has made my life more worth living and it's definitely been very de-stressing in most situations.

Balance. I don't think we balance. I think we *blend*. Work blends into life, life blends into work. We don't make the distinction. We work at home a lot. We work 6 days a week here in India, we don't have a weekend concept of two days off. Long hours on Sundays are spent with papers that were meant to be written and the grants that have to be sent. There is a complete invasion of work at home. I'm lucky because I have my wife who is also in a very similar situation and my children have grown up.

Dr Marshall

I really like that quote, "We don't balance, we blend." It's really true in all areas of the world with a demanding career. As physicians, many people view their work as a vocation. It's more than just a job, it would be hard to leave that part of ourselves at the office. For a lot of caregivers, it's who we are. Do you have any other comments or topics you would like to talk about that we didn't touch on?

Dr Kumar

We have so many unresolved challenges, a lot has been accomplished, but in reality it's just a drop in the ocean. I'll give you an example. When I came back to India in 1998, I calculated that we were taking care of 1.3% of babies who needed care for CHD. Nearly 99% were dying or inoperable at the time of presentation. Today, that number may be 15%, but there's still so much to be done. Within the state of Kerala, we've really done exceptionally well, we've almost offered care for every baby that is born with CHD. But elsewhere in the country, there is so much to be done. We are facing some real challenges like multi-drug-resistant bacteria and a tremendous nursing shortfall post-COVID. There are many massive challenges in front of us.

Dr Marshall

I look forward to hearing about the next phase of your career and what your team will accomplish in the future.

Dr Kumar

What I've noticed in most medical journals is the complete lack of understanding of the problems of low- and middle-income countries. I don't think people realise 90% of the world's children are in places where there is very little paediatric cardiac care. Most of the babies in this world with CHD are dying without appropriate care, I think that's a powerful story. That's very important for people to recognise, and it needs a collective effort.

Dr Marshall

How can someone like myself help, who would love to make a positive impact on the world, not only my little slice of the world?

Dr Kumar

I think the fact that you've taken interest in doing this interview is a great first step and maybe for the future you can advocate for others to get interested in the problems of the world in a very deep way. Not just doing medical missions, but try partnering with institutions and finding ways to improve the quality and outcomes. If there were a greater number of people taking interest and trying to make a difference, then I think that would have an impact for sure.

Dr Marshall

You have certainly made an impact on me. I will definitely be thinking about this interview and try to find ways to get more involved to serve the 90% of the world that we haven't been addressing. Thank you so much for your time today and for allowing me to probe into your career. Your immense humility, focus on empowerment and collaboration with others, and the holistic and patient-centred care you provide patients will definitely stick with me. I'll make sure this interview reflects the true spirit of your work.

Dr Kumar

Thank you so much, Mayme. I enjoyed the interview because it made me think about things that I hadn't thought about.

Dr Marshall

That's wonderful. I think reflective practice is an important thing for all of us to be forced into from time to time. It's not easy, so I appreciate you doing it.

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References

1. Tretter JT, Jacobs JP. Global leadership in paediatric and congenital cardiac care: "Following the 'Golden rule' in multicentre collaborations - an interview with Jane W. Newburger, MD". *Cardiol Young* 2020; 30: 1221–1225. DOI: [10.1017/S1047951120002267](https://doi.org/10.1017/S1047951120002267).
2. Tretter JT, Jacobs JP. Global leadership in paediatric and congenital cardiac care: "Using data to improve outcomes - an interview with Jennifer S. Li, MD, MHS". *Cardiol Young* 2020; 30: 1226–1230. DOI: [10.1017/S1047951120002875](https://doi.org/10.1017/S1047951120002875).
3. Tretter JT, Jacobs JP, F.R.C.P.C.H." *Cardiol Young* FRCP. Global leadership in paediatric and congenital cardiac care: "Coding our way to improved care: an interview with rodney C. G. *Cardiol Young* 2021; 31: 11–19. DOI: [10.1017/S104795112000476X](https://doi.org/10.1017/S104795112000476X).
4. Tretter JT, Jacobs JP. Global leadership in paediatric and congenital cardiac care: "Humility in leadership - an interview with Katarina Hanséus, MD, PhD, president of the association for european paediatric and congenital cardiology (AEPC). *Cardiol Young* 2021; 31: 689–695. DOI: [10.1017/S1047951121001669](https://doi.org/10.1017/S1047951121001669).
5. Tretter JT, Jacobs JP. Global leadership in paediatric and congenital cardiac care: "global health advocacy, lift as you rise - an interview with Liesl J.

- Zühlke, MBChB, MPH, PhD". *Cardiol Young* 2021; 31: 1549–1556. DOI: [10.1017/S104795112100411X](https://doi.org/10.1017/S104795112100411X).
6. Kumar RK. Delivering pediatric cardiac care with limited resources. *Ann Pediatr Cardiol* 2014; 7: 163–166. DOI: [10.4103/0974-2069.140825](https://doi.org/10.4103/0974-2069.140825).
 7. Kumar RK. Training pediatric heart surgeons for the future: a global challenge. *Ann Pediatr Card* 2015; 8: 99–102.
 8. Bronicki R, Pollak U, Argent A, et al. Global perspective on training and staffing for paediatric cardiac critical care. *Cardiol Young* 2017; 27: S9–S13. DOI: [10.1017/S1047951117002566](https://doi.org/10.1017/S1047951117002566).
 9. McMahan CJ, Tretter JT, Redington AN, et al. Medical education and training within congenital cardiology: current global status and future directions in a post COVID-19 world. *Cardiol Young* 2021; 12: 1–13. DOI: [10.1017/S1047951121001645](https://doi.org/10.1017/S1047951121001645).
 10. Wernovsky G, Anderson RH, Kumar K, Mussatto KA, Redington AN, Tweddell JS. *Anderson's Pediatric Cardiology*. 4th edn. Elsevier, 2019.
 11. Tretter JT, Windram J, Faulkner T, et al. Heart university: a new online educational forum in paediatric and adult congenital cardiac care. the future of virtual learning in a post-pandemic world? *Cardiol Young* 2020; 30: 560–567. DOI: [10.1017/S1047951120000852](https://doi.org/10.1017/S1047951120000852).
 12. Tretter JT, Ramachandran P, Zheleva B, et al. Reply to letter “Leveraging e-learning for medical education in low- and middle-income countries. *Cardiol Young* 2020; 30: 905–906. DOI: [10.1017/S1047951120001213](https://doi.org/10.1017/S1047951120001213).
 13. Rahman S, Zheleva B, Cherian KM, et al. Linking world bank development indicators and outcomes of congenital heart surgery in low-income and middle-income countries: retrospective analysis of quality improvement data. *BMJ Open* 2019; 9: e028307.
 14. Schidlow DN, Gauvreau K, Cherian KM, et al. Single-ventricle palliation in low- and middle-income countries. *J Am Coll Cardiol* 2019; 74: 928–931.
 15. Karmegaraj B, Kappanayil M, Sudhakar A, Kumar R. Impact of transport on arrival status and outcomes in newborns with heart disease: a low-middle-income country perspective. *Cardiol Young* 2020; 30: 1–8. DOI: [10.1017/S1047951120001420](https://doi.org/10.1017/S1047951120001420).
 16. Balaji S, Kumar RK. Partnership in healthcare: what can the west learn from the delivery of pediatric cardiac care in low- and middle-income countries. *Ann Pediatr Card* 2015; 8: 1–3.
 17. Argent A, Balachandran R, Vaidyanathan B, Khan A, Kumar R. Management of undernutrition and failure to thrive in children with congenital heart disease in low- and middle-income countries. *Cardiol Young* 2017; 27: S22–S30. DOI: [10.1017/S104795111700258X](https://doi.org/10.1017/S104795111700258X).
 18. Hasan B, Hansmann G, Budts W, et al. European pediatric pulmonary vascular disease network (EPPVDN), endorsed by AEPCC, challenges and special aspects of pulmonary hypertension in middle- to low-income regions: JACC state-of-the-art review. *J Am Coll Cardiol* 2020; 75: 2463–2477. DOI: [10.1016/j.jacc.2020.03.047](https://doi.org/10.1016/j.jacc.2020.03.047).
 19. Hasan BS, Rasheed MA, Wahid A, Kumar RK, Zühlke L. Generating evidence from contextual clinical research in low- to middle income countries: a roadmap based on theory of change. *Front Pediatr* 2021; 9: 764239. DOI: [10.3389/fped.2021.764239](https://doi.org/10.3389/fped.2021.764239).
 20. Singh S, Kumar RK, Sundaram KR, Kanjilal B, Nair P. Improving outcomes and reducing costs by modular training in infection control in a resource limited setting. *Intl J Qual Health Care* 2012; 24: 641–648.
 21. Kumar RK, Krishnan MN, Venugopal K, Anil SR, Sivakumar K. Bioprobe-assisted simultaneous delivery of multiple coils for closure of the large PDA. *Catheter Cardio Inte* 2001; 54: 95–100.
 22. Nair SM, Zheleva B, Dobrzycka A, Hesslein P, Sadanandan R, Kumar RK. A population health approach to address the burden of congenital heart disease in Kerala, India. *Global Heart* 2021; 16: 71. DOI: [10.5334/gh.1034](https://doi.org/10.5334/gh.1034).
 23. Reddy SN, Kappanayil M, Balachandran R, et al. Preoperative determinants of outcomes of infant heart surgery in a limited-resource setting. *Semin Thorac Cardiovasc Surg* 2015; 27: 331–338.
 24. Bhatt M, Roth S, Kumar RK, et al. Management of infants with large, unrepaired left-to-right shunts and respiratory infection requiring mechanical ventilation. *J Thorac Cardiovasc Surg* 2004; 127: 1466–1473.
 25. Raj M, Paul M, Sudhakar A, et al. Micro-economic impact of congenital heart surgery: results of a prospective study from a limited-resource setting. *PLoS ONE* 2015; 10: e0131348. DOI: [10.1371/journal.pone.0131348](https://doi.org/10.1371/journal.pone.0131348).
 26. Sen AS, Morrow DF, Balachandran R, et al. Postoperative infection in developing world congenital heart surgery programs: data from the international quality improvement collaborative. *Circ Cardiovasc Qual Outcomes* 2017; 10: e002935. DOI: [10.1161/CIRCOUTCOMES.116.002935](https://doi.org/10.1161/CIRCOUTCOMES.116.002935).
 27. Raj M, Sudhakar A, Roy R, et al. Health-related quality of life (HRQOL) in children and adolescents with congenital heart disease: a cross-sectional survey from south India. *BMJ Paediatr Open* 2019; 3: e000377. DOI: [10.1136/bmjpo-2018-000377](https://doi.org/10.1136/bmjpo-2018-000377).
 28. Gunasekara CM, Moynihan K, Sudhakar A, et al. Neonatal cardiac surgery in low resource settings: implications of birth weight. *Arch Dis Child* 2020; 105: 1140–1145.
 29. Viswanathan S, Kumar RK. Assessment of operability in congenital cardiac shunts with increased pulmonary vascular resistance. *Cathet Cardiovasc Interv* 2008; 71: 665–670.
 30. Srinivas L, Singhi A, Kumar RK. Decline in arterial partial pressure of oxygen after exercise: a surrogate marker of pulmonary vascular obstructive disease in patients with atrial septal defect and severe pulmonary hypertension. *Cardiol Young* 2011; 2: 292–298.
 31. Harikrishnan S, Sanjay G, Ashishkumar M, Menon J, Rajesh G, Kumar RK. Pulmonary hypertension registry of Kerala, India (PROKERALA) – clinical characteristics and practice patterns. *Int J Cardiol* 2018; 265: 212–217.