Indian doctors explore disruptive technologies

Live Mint, Tuesday, 23rd September 2014

Three Indian doctors have presented innovations in areas of emergency services, neglected tropical disease kala-azar and blindness caused by cataract

Healthcare bills continue to account for one the highest out-of-pocket expenses for India's poor. And yet, quality healthcare remains a distant dream. According to the Healthcare and Equity in India, 2011, report by The Lancet, expenditure on drugs represents 70-80% of out-of-pocket expenditure for outpatients in India. This has been increasing at a rate which is at least twice as fast as that of the general price increase. Around 39 million Indians fall below poverty line every year due to healthcare expenses. This makes access to healthcare one of the most critical challenges facing the country today. Technology is one of the solutions to this challenge, three Indian doctors presenting their innovations at the recently-held BMJ Awards will have you believe. The doctors who were final nominees in the "Innovation in Healthcare" category addressed three critical areas—medical emergency services, neglected tropical disease kala-azar and blindness caused by cataract. "Cataract is a curable disease and yet contributes to 62.6% of blindness in India. Cost is an important reason for this huge backlog of cases," said Dr Suven Bhattacharjee who invented a new kind of ring that fits in the eye for patients who need a mechanical pupil expansion before a cataract surgery. At present, a Malyugin ring, which costs around Rs.8,500 and adds to the cost of an already expensive surgery, is used for the purpose. While affordability is an important issue, these innovators have not compromised on quality. Intraosseous (which means inside bones) is a device invented by Dr Sandeep Singh, a cardiologist at the All India Institute of Medical Sciences (AIIMS), New Delhi, to help doctors administer intravenous injections inside the long bones of patients whose nerves are at risk of collapsing. This device, which Singh has made in collaboration with product designer Jayant Karve, is cheaper to manufacture than others while superior in quality. Dr Sarman Singh, head of clinical microbiology at AIIMS said: "We prepared a recombinant antigen and molecular test for leishmaniasis or kala-azar. Our rapid test kit was taken up by ministry of health and family affairs for national kala-azar elimination programme in 2011-12. This has saved several millions of dollars of government of India and helped make accurate and rapid diagnosis of this highly fatal disease at very affordable price." The award was a tie between Sandeep Singh and Sarman Singh. MEDICAL CHALLENGES Cataract: A common eye disease, that can lead to blindness. It is caused by clouding of the lens in the eye through which light passes onto the retina. In 2001, there were 7.75 million people in India whose blindness could be attributed to cataract and the number is likely to rise to 8.25 million by 2020, according to a paper in the 'Indian Journal of Ophthalmology'. Kala-azar: A chronic and potentially fatal disease caused by 'Leishmania donovani', a parasite that is transmitted by sandfly bites. It affects and spreads to internal organs like liver, spleen, bone marrow and lymph nodes. Around 147 million people

in Bangladesh, India and Nepal are at risk of kala-azar, according to World Health Organization figures for 2006. Injecting fluids into the long bone of patients vulnerable to nerve collapse: This process remains a challenge in India. Intraosseous devices are uncommon in India, and are mainly used for children. If injected incorrectly, it can lead to complications.

THE BHATTACHARJEE PUPIL EXPANSION RING

When the pupil cannot be dilated with medicated eye drops for cataract surgery, it needs to be expanded with a mechanical device. The process is expensive as it requires a Malyugin ring, which is made in the US and costs around Rs.8,500. Iris hooks are a cheaper alternative, but require four additional incisions, increasing the risk of infection. The Bhattacharjee ring is easier and safer to use than the Malyugin ring. It is also more versatile and can be used for operations like the advanced femtosecond laser cataract surgery, unlike the other rings. It is still undergoing clinical trials and will cost less than one-fourth of the Malyugin ring. IO DEVICE FOR EMERGENCIES

Around 10-40% emergency cases lead to further complications when doctors are unable to administer drugs intravenously. The veins can collapse in patients with low blood pressure, burn injuries, cardiac arrest, severe dehydration and trauma among other conditions. “In emergency cases, time is extremely critical and you cannot waste it by looking long for a vein,” said Dr Sandeep Singh, a cardiologist at AIIMS. To counter this issue, doctors inject the drugs in the patient’s long bone (lower leg bone-tibia), which are full of blood vessels. This process is done through an intraosseous (IO) device, which is rare in India and can only be conducted by a trained professional. Dr Singh, in collaboration with product designer Jayant Karve, has made an injection-moulding device, which is accurate, safe and easy to use. The device injects fluid (medicine, for example) inside the long bone of a patient. The device will be much cheaper than what is available in the market.

KIT TO DIAGNOSE KALA-AZAR

Kala-azar (scientific name, ‘leishmaniasis’) is widely considered as the second largest parasitic killer in the world after malaria. India is one of the six countries that record the highest number of patients suffering from this disease, according to Dr Sarman Singh, head of clinical microbiology at AIIMS. “Earlier tests to diagnose kala-azar were done by collecting sample either through puncture of bone-marrow or spleen, which is dangerous and extremely painful,” he said. To overcome this problem, Dr Singh invented a diagnostic kit that uses a simple blood test. The kit was commercially launched in 2006 by Surat-based Span Diagnostics Ltd, which manufactures ready-made diagnostic products under the brand name “Signal-KA”. The kit is available at Rs. 40 per test.