Commentary: Frugal innovations – Path to eye care for all

India is being considered to be the diabetes capital of the world with a diabetic population which is predicted to be 69.9 million by 2025.[1] Lots of innovation is needed to tackle the key challenges in diabetic retinopathy screening in India. One of the key challenges has been to provide a low-cost fundus camera for screening. The authors have made a simple fundus imaging device using the smartphone with a 20D lens and the available resources in our clinics.[2] Trash-to-treasure RetCam is a good example of a frugal innovation and we need similar execution for other ophthalmic devices as well.

Frugal innovations are needed in India as the medical service providers are not only inadequate but are also unevenly distributed across the rural and urban areas with majority of the population living in the rural areas and most of the qualified consulting doctors residing in the urban areas. Majority of healthcare expenditure in India is out of pocket (by the patients) 70%.[3]

Employing medical practitioners in the public healthcare delivery system, more specifically in the primary care and community-based domain has been a challenge. The government healthcare-related policy seeks to increase access and adoption, improve quality, and lower the healthcare delivery cost. As a first step for health systems to leverage new approaches to offset

escalating health expenditures and to improve health outcomes, the most relevant frugal innovations have to be found.[4]

India provides an enormous opportunity in terms of the large population, growing economic prosperity, and the disease burden. The medical device industry is currently valued at around 6 billion USD. Examples of frugal innovations on a large scale in healthcare in our country include the Narayana Healthcare and Aravind Eye Care System.[5]

How do we make innovative low cost devices and instruments? Buy components directly from the seller or factory (using the India Mart or Alibaba E-commerce sites). Reverse engineering – break open the devices to see the components and make it yourself. Use of three-dimensional (3D) printing to make the components. Use of smartphone based attachments and developing the technology around smartphones. Recycle components from our old ophthalmic machines which are non-functional. Use of instruments and devices from other subspecialities, finding new ways of using the existing instruments (phacoemulsification evolved from a dentist ultrasound device).

To accelerate the innovation process, we need to have innovation labs which could provide collaboration between doctors, engineers, 3D printing experts, virtual reality app developers, and data scientist. Next step would be providing sufficient funding. Many frugal innovations stay local, "below-the-radar" and rarely spread to others who might face similar challenges.

Ophthalmology is a branch where we depend a lot on machines and is the perfect subspeciality where there is maximum scope of innovations. We need to use the evolving technology to provide affordable eye care equipment at a fraction of the cost, of similar products marketed by major multinationals and improve its access to all.

With a view to delivering better health and at the same time bending the growth cost curve by learning from such examples of frugal innovations, the clinicians, policymakers, and entrepreneurs need to work together and learn about new innovations and practices.

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