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Harnessing Technology for Healthcare - No More A Baby Step

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Research and innovation in technologies like artificial intelligence and robotics is helping the domain of ophthalmology grow by leaps and bounds.



While the Indian healthcare sector is growing, it is still deprived of healthcare professionals, proper infrastructure and innovative research with efficient diagnostics and management for many diseases in patients. There is a significant lag in the field of research in our current medical landscape. However, investments in research, both capital and social will allow us to

discover new elements and better our existing procedures. It will allow us the freedom to explore new fields for growth and advancements in the healthcare sector. We need to balance innovative research and technological advancements so that, medical professionals are able to provide patients with accurate medical advice for efficient treatments.

While systemic disorders take precedence in research and care, ophthalmic disorders like cataract, diabetic retinopathy and wet ARMD in elderly are major arenas where research is gaining ground. Blindness is not limited to adults, as studies in India have shown that the major causes of blindness and eye diseases in children include paediatric cataract, retinopathy of prematurity and Vitamin-A deficiency. In India, approximately 3,59,100 preterm babies suffer from blindness at an early age in life which can be diagnosed and treated through improved neo-natal care. With our research "**Preventing ROP (Retinopathy of Prematurity) Blindness in Premature Infants Using Tele Screening in Neonatal Care Units**", we aim to tackle Retinopathy of Prematurity (ROP) in pre-term babies to decrease childhood blindness and improve quality of life in these children.

Research and innovation in technologies like artificial intelligence and robotics is helping the domain of ophthalmology grow by leaps and bounds. There has been a plateau in the traditional methods because of the increasing access to data and analytics. Data and analytics is what helped us design our research on ROP: and will enable us to screen around one thousand neonates over a period of one year i.e., 2018-19.

Studies in India show that about 38% of low birth weight babies i.e. weighing less than 1500gms, are prone to get affected by ROP. For preterm babies, ROP is caused when the normal retinal vessel growth may be disrupted, and abnormal vessels tend to develop, which is likely to cause bleeding and retinal detachment in the eye. The time frame when the ugly disease raises its head is short. So it often goes unnoticed in the early weeks of life, thus making interventions difficult, late and hence, ineffective in most cases. It is estimated that at least 20% of infants are at risk of developing visual impairment due to ROP. Results have shown that our current reach for diagnosis and treatment is as low as 30% of the desired outcome, which means that there is an urgent need to address the growing issue of ROP associated blindness.

Since blindness of preterm infants shows no signs or symptoms, the only way to detect ROP is through a regular eye examination of the retina by trained retina specialists. The estimated time for addressing this disease is very short - approximately four to six weeks. For better outcome, we aim to establish a regular screening programme for babies born prematurely during the said time frame. Through our programme, the photographs sent to the retinal specialist will define whether an infant requires a follow-up or immediate treatment. By this systematic screening, we are able to diagnose them in a controlled environment, in a way that prevents movement and travel for the infants which reduces their risk of acquiring infection or systemic deterioration. A regular screening process such as this, facilitates early diagnosis and treatment and will help reduce the burden of childhood blindness.

Another challenge in the treatment of ROP is the insufficiency of trained professionals (vitreoretinal surgeons/paediatric ophthalmologists trained in ROP screening.) So, the alternative of telemedicine with the involvement of non-ophthalmic personnel can presently address the lacunae in screening. The use of portable 3nethra Forus Neo Camera to screen preterm babies is a great step forward. An online screening process for diagnosis makes the process efficient. A regular monitoring process thus allows for comparing images, modulated treatment processes and decreases the measure of error. Additionally, with the Forus 3Nethra NeoRetCam imaging and tele screening, we expect to create a network to screen and prevent blindness related to ROP in areas that lack access to proper healthcare services.

The field of medical science is constantly evolving. We as medical practitioners aim to deliver premium quality services to our patients. With constant research and development, there will be better understanding of disease processes, pathology, evolution of diagnostic tools and treatment options for patients. Our research and support of innovation in tele-medicines for ROP related blindness can treat retinal disorders for infants. The efforts to sustain research and development is maybe tedious but is crucial to advancing knowledge and find better ways to treat and prevent new and existing diseases.

(Dr. Prerana Shah-Panoli, MBBS, DNB, FVRS, FICO, is one of the 12 clinicians who received a grant of \$50,000 as part of the Global Ophthalmology Awards Program (GOAP) - an initiative instituted by Bayer with the aim of funding research initiatives that advance the scientific understanding of ophthalmology.)