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AI-powered neonatal technologies help reduce under-5 mortality in India

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India has a major opportunity to serve as a leader in the AI-enabled child healthcare landscape



Over the past decade, there have been tremendous improvements in maternal and child healthcare, which has helped in reducing under-five mortality and continue to be a public health priority for India. The country has observed remarkable progress in lowering child deaths with the help of immunisation, institutional deliveries and strengthened newborn care programmes. Yet, the preventable causes like birth asphyxia, neonatal sepsis, pneumonia, prematurity, and congenital disorders still account for the death of thousands of children annually, mainly in resource-constrained settings.

Artificial Intelligence (AI) has now emerged as a major transformative force that is capable of addressing several of these longstanding challenges. Instead of just replacing clinicians, AI has been augmenting clinical decision making, but enabling earlier diagnosis, continuous monitoring, predictive analytics and more equitable access to quality healthcare. For a country as vast and diverse as India, where specialist neonatal expertise is unevenly distributed, AI-powered technologies have a huge potential to bridge critical gaps in child healthcare delivery and increase the progress towards achieving Sustainable Development Goal (SDG) targets for child survival.

Strengthening Neonatal Care Through Early Detection

The first 28 days of life, which are referred to as the neonatal period, are the most valuable stage of a child's life and account for a majority of under-five deaths. Several neonatal emergencies rapidly develop, leaving clinicians with a narrow scope for intervention. In such cases, AI-driven monitoring systems are useful for identifying the subtle physiological changes before they become clinically detectable.

Modern neonatal intensive care units (NICUs) increasingly generate large volumes of data through continuous monitoring of heart rate, respiratory rate, oxygen saturation, temperature, and blood pressure. AI algorithms help in examining these data streams in real time and identifying the abnormal trends that may indicate impending sepsis, respiratory deterioration, or cardiovascular instability. Early detection helps the healthcare teams to be more proactive and often before any irreversible complications arise.

These kinds of predictive abilities are vital In busy NICU where clinicians need to handle several critically ill infants at the same time. AI can be an intelligent clinical support system that might help in prioritising patients who need immediate attention and lessen the chances of missed warning signs.

Bridging India's Rural–Urban Healthcare Divide with AI

One of the most important challenges that India's healthcare system is currently facing is the severe lack and unequal distribution of doctors. Especially in rural India, the estimated doctor-to-population ratio ranges between 1:10,189 and 1:25,000 for government practitioners, which is far below the WHO-recommended ratio of 1:1,000.

While rural areas account for about 60–70% of India's population, they are served by only around 30% of the country's doctors, whereas 70–80% of physicians are concentrated in urban centres. Rural India has approximately 3 doctors per 10,000 people compared to 13 per 10,000 in cities. The deficit of specialist doctors at Community Health Centres (CHCs)—including paediatricians, surgeons, physicians, and gynaecologists—can be as high as 70%. As a result, even basic services like immunisation tracking and child growth monitoring are often performed by frontline workers such as Anganwadi workers.

This major gap in healthcare shows us the importance of AI-driven support systems that can work beyond just specialist expertise for underserved areas. AI-powered tools help in assisting frontline workers by examining neonatal anomalies through imaging and point-of-care tests, accurately monitoring and securely recording child growth parameters, detecting developmental disorders such as autism at an earlier stage, tracking missed or delayed vaccinations with automated reminders, and using digital questionnaires to screen for milestone delays. Together, these AI solutions—both software- and hardware-based—can serve as clinical force multipliers in rural settings, helping overcome specialist shortages and enabling timely diagnosis and intervention.

Improving Diagnosis in Resource-Limited Settings

One of the biggest challenges for healthcare in India has been to ensure that children from rural and underserved areas are diagnosed in time. What makes identifying the serious illnesses early, is the lack of paediatric specialists in primary health centres.

AI-powered diagnostic platforms have significantly helped in bridging this gap. Smartphone-based clinic diagnosis assists frontline workers in identifying the danger signs associated with neonatal infections, pneumonia, malnutrition, or congenital abnormalities. Image-based AI applications can help in analysing photographs of skin lesions, retinal abnormalities, or chest X-rays with increasing accuracy, supporting early referrals when specialist consultation is unavailable.

Similarly, AI-assisted interpretation of foetal monitoring during labour is likely to help detect foetal distress earlier, enabling timely obstetric intervention and reducing birth-related complications that contribute significantly to neonatal mortality.

Expanding Access Through Telemedicine

For the integration of AI with telemedicine services, India's rapidly developing digital health ecosystem can offer an ideal foundation. Remote consultations, which are supported by AI, can be connected with district hospitals, community health centres, and tertiary care institutions, allowing specialists to guide management even from hundreds of kilometres away.

During virtual examinations, AI can help in quickly summarising the patient records, flagging abnormal laboratory results, prioritising high-risk cases and assisting physicians in neonatal and paediatric care. This duo improves efficiency while ensuring that the children in remote communities receive specialist-informed care without any unnecessary delay.

With the expansion of telemedicine under national digital health initiatives, AI is likely to become an increasingly valuable tool for strengthening referral networks and improving continuity of care across different levels of the healthcare system.

Supporting Preventive Child Healthcare

Reducing under-five mortality is not just about treating critically ill children, but majorly depends on the prevention of the illness before it occurs. AI has been playing a crucial role in preventive healthcare by examining population-level health data to detect children at a higher risk of disease.

The development of predictive models can help in identifying infants who are at a higher risk for malnutrition, missed vaccinations, developmental delays or recurrent infections using factors like their demographics, nutrition and clinical examinations. So health systems need to be more proactive in their interventions rather than reactive after the complications have developed.

AI can also play a significant role in improving immunisation coverage by addressing children who have missed their scheduled vaccinations, generating reminders, and helping public health officials optimise outreach efforts. Such targeted

interventions are particularly valuable in geographically dispersed populations where healthcare resources must be deployed strategically.

Enhancing Clinical Decision-Making for Better Child Health

Even though AI has been significantly improving neonatal and paediatric care, it has been designed to support and not replace clinical expertise. Even the most developed AI applications work as clinical decision-support tools while helping healthcare professionals in detecting complications earlier, reducing diagnostic variability, and making informed treatment decisions. However, the human aspects of medicine like empathy, ethical judgement, and family-centred care, remain quite important. Equally important is making sure that the AI systems have been trained on a range of Indian datasets and are supported by robust regulatory frameworks, data privacy safeguards, and transparent validation to build trust and improve accuracy.

India has a major opportunity to serve as a leader in the AI-enabled child healthcare landscape, with the integration of the above-mentioned technologies into the digital health ecosystem. Technological advancements can't solely reduce under-five mortality. It is important for AI developments to function well with investments in healthcare infrastructure, training the workforce and equitable access. When AI, expert clinicians and strong public health systems start working together, they can offer early diagnosis, better preventative care, and improve survival rates significantly, so more children will not just survive but will also thrive.

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