A place for disruptive technology in India's health sector

Artificial intelligence, autonomous systems and data analytics have a defining role to play in shaping the medical sector

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As frontline warriors fighting COVID-19, the medical community has been selfless, but also losing a number of staff in the process. Nurses and attendants, on full-time duty, donning mainly masks and gloves as the only protective gear have been exposed to great risk. It is in such a situation that the relevance of disruptive technology and its applications comes into focus, potentially helping to reduce the chances of hospital staff contracting the infection.

There are reports in the global media of established innovative field hospitals using robots to care for COVID-19 affected patients. There are hospitals, in China, that use 5G-powered temperature measurement devices at the entrance to flag patients who have fever/fever-like symptoms. Other robots measure heart rates and blood oxygen levels through smart bracelets and rings that patients wear; they even sanitise wards. Last year, in India, the Sawai Man Singh government hospital in Jaipur held trials with a humanoid robot to deliver medicines and food to COVID-19 patients admitted there (https://bit.ly/3wLxtSQ).

The critical aspect is how new technologies can improve the welfare of societies and reduce the impact of communicable diseases, spotlighting the importance of technologies such as artificial intelligence (AI), autonomous systems, blockchain, cloud and quantum computing, data analytics, 5G. Blockchain technology can help in addressing the interoperability challenges that health information and technology systems face. The health blockchain would contain a complete indexed history of all medical data, including formal medical records and health data from mobile applications and wearable sensors. This can also be stored in a secure network and authenticated, besides helping in seamless medical attention.

Big data analytics can help improve patient-based services tremendously such as early disease detection. Even hospital healthcare facilities can be improved to a great extent. AI and the Internet of Medical Things, or IoMT (which is defined as a connected infrastructure of medical devices, software applications, and health systems and services) are shaping healthcare applications.

Medical autonomous systems can also improve health delivery to a great extent and their applications are focused on supporting medical care delivery in dispersed and complex environments with the help of futuristic technologies.

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This system may also include autonomous critical care system, autonomous intubation, autonomous cricothyrotomy and other autonomous interventional procedures. Cloud computing is another application facilitating collaboration and data exchanges between doctors, departments, and even institutions and medical providers to enable best treatment.

Furthering UHC

According to the World Health Organization (https://bit.ly/3gtHBtT), "Universal health coverage (UHC) is the single most powerful concept that public health has to offer. It is a powerful social equalizer and the ultimate expression of fairness." The question is about how UHC can be achieved through the application of digital technologies, led by a robust strategy integrating human, financial, organisational and technological resources. Studies by WHO show that weakly-coordinated steps may lead to standalone information and communication technology solutions, leading to a fragmentation of information and resulting in poor delivery of care. India needs to own its digital health strategy that works and leads towards universal health coverage and person-centred care. Such a strategy should emphasise the ethical appropriateness of digital technologies, cross the digital divide, and ensure inclusion across the economy. 'Ayushman Bharat' and tools such as Information and Communication Technology could be be fine-tuned with this strategy to promote ways to protect populations. Online consultation through video conferencing should be a key part of such a strategy, especially in times when there is transmission of communicable diseases.

Using local knowledge

In addition to effective national policies and robust health systems, an effective national response must also draw upon local knowledge. Community nurses, doctors, and health workers in developing countries do act as frontline sentinels. An example is the Ebola virus outbreak in Africa, where communities proactively helped curtail the spread much before government health teams arrived. Another example is from Indonesia, where the experience of backyard poultry farmers was used to tackle bird flu. Primary health centres in India could examine local/traditional knowledge and experience and then use it along with modern technology.

Possible challenges

In the developing world, and this includes India, initial efforts in this direction should involve synchronisation and integration, developing a template for sharing data, and reengineering many of the institutional and structural arrangements in the medical sector. Big data applications in the health sector should help hospitals provide the best facilities and at less cost, provide a level playing field for all sectors, and foster competition. The possible constraints in this effort are a standardisation of health data, organisational silos, data security and data privacy, and also high investments. However, there is no doubt that disruptive technology can play an important role in improving the health sector in general.

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