Speaking for Myself

Healthcare innovation in India: Addressing challenges, understanding progress and offering opportunities

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AN OVERVIEW

Healthcare industry is one of the fastest growing sectors in India both in terms of revenue and employment. The overall health sector in India is valued at over US$ 200 billion, growing at a compound annual growth rate of 22.9%.[1] Healthcare delivery consisting of hospitals, diagnostic laboratories and pharma-ceutical companies make up over 65% of the market. Rising income level, increased job opportunities, access to international markets and rapid technological advancements have accelerated the growth of this industry.

Healthcare access in India suffers from the 70:70 paradox: 70% of healthcare expenditure is borne by people out of pockets, of which 70% is spent on medicines alone.[2] The public health expenditure in India stands at a meagre 1.2% of the gross domestic product, against the world average of 6%.[3] Healthcare expenditure in India is predominantly out-of-pocket, valued at 64.2% in 2013–2014.[4] The huge gap between availability, accessibility and affordability of healthcare services in India provides a big opportunity for socially conscious innovations focused on delivering economically feasible care through frugal technology.

Addressing complex challenges and understanding the need for innovation

India suffers from a double whammy of communicable diseases and exponentially rising non-communicable diseases (NCDs). A multitude of factors—ageing population, sedentary white-collar lifestyle, economic advances, rising disposable income and urban migration—put healthcare services in a crippling and challenging situation.[5] Out-of-pocket expenditure associated with the chronic nature of the treatment of NCDs puts an additional burden on the healthcare expenditure of households. The majority of expenditure associated with NCDs is on inpatient care, and mostly by the rich in private facilities.[6] This creates an opportunity for innovations to focus on the affordability of treatment related to NCDs.

Addressing healthcare challenges and offering innovative solutions requires a thorough understanding of the continuum of care. Healthcare offers three windows of opportunity for innovation at three different levels of care:[5]

1. *Prevention*: Screening for diseases, behaviour change communication, health awareness and education
2. *Provision*: Diagnostic and treatment services

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3. *Protection*: Long-term follow-ups, preventing relapses, monitoring patterns.

Innovation is also driven by external factors and stakeholders involved in the delivery of care. These stakeholders with their varied interests and responsibilities add to the complexity. This enormity and diversity of challenges faced by an equally diverse and non-uniform market calls for large-scale, all-encompassing, out-of-box, innovative approach to yield the desired results.

INNOVATION MODELS

An ideal innovation model should be holistic, cost-effective, affordable, accessible, qualitative and relevant. The sustain-ability and translation of an idea into a product or service depends on these qualities. Whatever be the innovation, it can be classified into one of the three categories: product, process and paradigm.[5]

Product innovation encompasses newer diagnostic tools, healthcare delivery, medical devices and alternative techno-logies. Successful product innovation must employ efficient delivery process and well-designed financial model that enables affordability and accessibility. India has seen an unprecedented rise of product innovation due to its immense technological skills and medical know-how. It includes:

1. mHealth and wearable health technologies such as those launched by government's mobile text messaging-based tobacco cessation programme (mCessation or QuitNow program) and mDiabetes initiative to improve health-seeking behaviour among people with diabetes.[7]
2. Point-of-care testing (POCT) services such as those by Biosense, a garage start-up from Mumbai. ToucHb and SuChek, both handheld, compact diagnostic devices, combating anaemia and diabetes, respectively, the major illnesses prevalent in India. It reduces diagnostic costs, improves access and relieves the burden from health professionals.[8]
3. Assistive technology such as Jaipur prosthetic foot; three-dimensional printed, low-cost, durable and personalized casts and screen readers for visually impaired people.
4. Ministry of Health and Family Welfare's 'Swasth Bharat' mobile application for A to Z information on diseases, symptoms, treatment, health alerts; 'Vaccine Tracker' for tracking immunization status of children; 'India Fights Dengue' to check dengue symptoms and 'MeraAspataal' mobile app to report pregnancy care-related information.[7]
5. Medical mobile units to increase accessibility in rural areas such as 'Akha Boat' clinics initiative in Assam and Piramal HMRI's mobile health vans in Andhra Pradesh.[5]

Process innovation, on the other hand, employs improvisation or disruption of internal processes, health resources and delivery systems. It helps healthcare organizations to raise their productivity, reach and affordability, while maintaining quality and profitability. Typical examples of process innovation in India include:

1. Using space technology to deliver health services by the establishment of SATCOM-based telemedicine nodes at remote, inaccessible and rural areas.[7]
2. National Medical College Network with the purpose of tele-education, e-learning and online medical consultation.[7]
3. Capacity building through e-learning platforms such as The Intel Skool Healthcare Education Platform and Medvarsity.[5]
4. Innovative business models such as those used by Aravind Eye Care System and Narayana Hrudayalaya (NH) focusing on driving hard bargains and negotiating creative partnership deals.[8]

Paradigm innovation relates to ideas that redefine the dominant paradigm of a sector. It could include a policy, a process or a product that influence the internal and external trends of the organization and refocuses towards a holistic goal. There are many examples of paradigm innovation in the Indian scenario, for example:

1. Social insurance schemes such as Rashtriya Swasthya Bima Yojana, Rashtriya Arogya Nidhi and Yeshasvini Health Insurance Scheme provide financial assistance to under-privileged population groups, poor families, women entrepreneurs and people below the poverty line suffering from major life-threatening illnesses, thus addressing the unaffordability of healthcare.
2. Public–private partnerships that integrate the expertise of the private sector with the reach of the public sector such as outsourcing emergency transport services, contracting management of primary healthcare centres and community health centres to non-governmental organizations and setting up of laboratory diagnostic services within tertiary centres.
3. Recommendation by the Government of India to create a new cadre of rural healthcare providers through BSc Family and Community Science programme, to address the acute shortage of doctors in rural areas.
4. The Ayushman Bharat initiative by the Government of India that aims to attain universal healthcare through its two flagship components: health and wellness centres, and the National Health Protection Scheme is a concurrent example of a paradigm innovation with potential to change the healthcare ecosystem in India.

India: The golden bird of frugal innovation

Frugal innovations are products and services that offer quality care at a much more affordable price by factoring in local parameters. India has always been familiar with the culture of frugal innovation—what is often called '*Jugaad* innovation'. Foreign companies have to factor in power outages, voltage fluctuations, high levels of dust and pollution and intensive equipment use to ensure the sustainability of their product.[8] With the 'Make in India' initiative, the focus has now shifted to building products locally from scratch, rather than improvising parts of a product. To ensure low cost, sustainability and affordability of a product in India, it needs to be adaptive to local needs, which are just as varied as the Indian terrain. Andhra Pradesh MedTech Zone (AMTZ), established as a medical equipment manufacturing and testing facility and incubation centre for MedTech start-up companies, offers a perfect environment for medical innovation to grow and prosper in India.

Frugal innovation may not necessarily mean delivering low-cost devices. It encompasses delivering low-cost, high-quality services. Aravind Eye Care System and NH are representative healthcare models of frugal innovation in the private sector. Both these institutions have attained delivery of high-quality, low-cost, high-volume healthcare services through cross-subsidization, economies of scale and lean manufacturing.[9,10]

Low public investment in preventive healthcare, poor health awareness and education, weak public healthcare infrastructure, lack of advanced laboratory facilities and equipment, low penetration of health insurance, unaffordability of treatment and an inadequate health workforce, along with a poor healthcare delivery mechanism, are some factors driving the healthcare ecosystem in India.[5]

Land of challenges or a sea of opportunities?

Social security and healthcare assurance should be the motto of any government aiming to provide safe, affordable and quality care. India with its 460 million daily internet users, 730 million mobile phone users and affordable mobile and data services provide a perfect opportunity to build sustainable and innovative healthcare solutions.[11] Medical tourism is another rapidly growing sector that has still not realized its full potential. Due to the relatively cheap healthcare expenditure while maintaining high-quality and international standards, Indian hospitals have become a hotbed of medical tourism. This offers a rare opportunity for India to provide accessible healthcare to patients from both high- and low-income countries outside the South Asia region.

A single biometric-enabled 'smartcard', specific to healthcare needs and issued to every person, provides a plausible option to integrate all healthcare services under a single entity, without deviating from the provision of personalized medicine. The features of Ayushman Bharat—National Health Protection Mission, resonates with that of the 'smartcard' features. It includes all private and public healthcare services under one umbrella, operationalizes a robust, modular, scalable and interoperable information technology platform; and delivers paperless and cashless benefits. It will provide a rare chance for us to universalize healthcare provision across India, without any added costs and still maintain our focus on personalized medicine. This 'smartcard' will contain immunization and delivery details for a newborn, antenatal check-ups, long-term treatment plans for people with NCDs, past medical and surgical history, schemes for which the beneficiary is eligible, and monitoring programmes such as Directly Observed Treatment Short-Course (DOTS). Specialized facilities such as AMTZ that can act as medical device manufacturing hub and incubation centres for start-ups working in healthcare are great initiatives that should be encouraged and replicated by every state government to encourage the development of low-cost, high-quality medical innovation.

The success of the Indian pharmaceutical industry is well known and often cited as an example of growth for other sectors. The industry has been at the forefront of healthcare innovation in India for its employment generation and massive ability to export. The specialty generic business and cost-competitive-

ness model of Indian pharmaceutical industry is the perfect case study on what, why and how to grow in a cut-throat and often hostile environment.

Opportunity for an innovative solution also lies in the supply and services of medical equipment to a low-resource setting. Simple and effective interventions will bring widely transmissible benefits. Methods to cut costs while maintaining quality include a hub-and-spoke delivery model, bundle pricing, task-shifting, telemedicine and focus on primary care. Multinational companies such as Amazon with their established sourcing and delivery model may offer opportunities for medical supply services, Apple can play a major role in remote patient monitoring, while Microsoft can help with clinical decision support. What we need to learn from global corporations is the need to provide a good consumer experience. Once we understand this, the quality of care will automatically improve.

Exponential growth in any sector comes with its fair share of regulatory framework involving checks and balances to discourage unethical practices. It has been a challenge in India to enforce a regulatory or quality assurance mechanism in healthcare. Roll-out of Medical Device Rules and modification of Bureau of Indian Standards to include medical devices ensures a uniform and evidence-based policy to regulate the development and marketing of medical devices. Strict and inflexible guidelines have been partly responsible for the slow growth in the medical device sector in India. The Central Drugs Standard Control Organisation, which regulates the quality of medical devices in India, has to balance its flexibility to encourage new developers while maintaining a strict control on the development of medical devices. Simultaneously, Indian regulatory and enforcement agencies need to create an ecosystem that encourages manufacturing of medical devices. India could thus provide a platform that offers opportunity for innovation in both manufacturing and servicing of medical devices.

Any big reform requires an equally big effort towards building it. The sustainability and scalability of healthcare innovation and translating ideas into action depends on an equally innovative teaching and training model. Healthcare providers in the future will face a painful transition if they are not adequately prepared for it. Bringing the benefits of innovative healthcare models and devices to the most vulnerable populations relies on the ability and expertise of providers. Physicians and managers of care must be well-versed not only in medical know-how, but also in the implementation of innovative and disruptive solutions in low-resource settings.

An innovative reform in medical education will produce future thought leaders. Inclusion of health policy, advocacy, diplomacy, management, leadership and innovation within the traditional education model will result in socially conscious and adaptive professionals. Many medical schools in the USA have included 'scholarly concentrations' such as global health, ethics and humanities; health policy and medical education into their curriculum. It has been shown to give students a solid foundation in critical thinking and problem-solving.[12] Medical Hackathons, popular in western countries, offer an opportunity for multidisciplinary collaborations, recognizing the unmet needs and quick development of low-cost, high-quality medical devices and services. Programmes such as ICMR-IIT KGP-IIMA Med Tech Internship Award and School of International Biodesign (previously Stanford-India Biodesign) programme encourage medical entrepreneurship through needs-based innovation process and bring the technology to masses. Institutions have to be trained in grant management, philanthropic fund-raising and endowments, intramural funding, mentorship training, career development and networking opportunities.

LOOKING FORWARD

The healthcare industry in India is witnessing a rapid pace of innovation, marked by an entry of foreign investors, disruptive healthcare models, frugal innovations, digital revolution and a shift from product innovation to process innovation. It is a collective challenge, and yet an opportunity, for us to embrace innovation and incorporate sound investment strategies, while prioritizing patients' experience. We need to look for patterns of failures and inefficiency, and then offer a solution. Those who do, are poised to create a revolution and challenge the notion of healthcare being an ostentatious field. Those who don't, will soon become obsolete.

Conflicts of interest. None declared

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