Universal Health Coverage through Digital Health: Principles, Partnerships, and Policy

Oommen John*

George Institute for Global Health, UNSW, New Delhi, India

Abstract

As nations around the world develop plans to achieve universal health coverage, assuring population coverage, service coverage, and financial protection calls for policies informed by evidence and the ability to implement such policies. The health systems around the world lack the necessary tools to accomplish these. The opportunity for redesigning healthcare systems and realigning the paradigm of healthcare delivery is provided by innovations and developing technologies, particularly digital health. Using information as a therapeutic tool in the context of redesigning health systems, novel models of care delivery, and contextualizing the recently released WHO Digital Health Guideline Recommendations for health systems strengthening enabler to achieve universal health coverage are just a few of the novel approaches described in this paper.

Keywords

Digital Health, Information Assymeteries, Disease Surveillance, Integrated Person Centred Health, Artificial Intelligence, Healthcare

Correspondence to:

Oommen John
George Institute for Global Health,
UNSW, New Delhi, India

Email:ojohn@georgeinstitute.org.in

1.   Introduction

As the World Health Organization (WHO) celebrates 73 years of its contribution to improving the health of people all over the world, it is timely that a renewed focus and passionate commitment is being garnered from all the key stakeholders towards achieving Universal Health Coverage (UHC). This commitment reflects in the WHOs 13th General Programme of Work (GPW13) that aims to achieve a triple-billion target: one billion more people benefiting from UHC, one billion more people protected from health emergencies and one billion more people enjoying better health and well-being. UHC would contribute to these three targets [1].

UHC has been defined as "the desired outcome of health system performance whereby all people who need health services receive them, without undue financial hardship [2]. The broad goals of Universal Health Coverage are around financial risk protection (preventing people from becoming impoverished due to a health-related event), ensuring access to quality essential healthcare services and access to safe, effective, quality and affordable essential medicines, diagnostics and vaccines. Achieving UHC means assuring that health systems make available the services namely prevention, promotion, treatment, rehabilitation, and palliation [3]. Achieving UHC requires mobilization of adequate resources and equitable, transparent and efficient allocation. Expanding the three dimensions of UHC; population coverage, service coverage and financial protection, requires evidence-informed policies and implementation capacities [4].

2.   Current Strategies for Universal Health Coverage

Most of the articulated strategies to achieve universal health coverage primarily focus on supply side interventions namely improving access, enhancing health workforce, health financing and strategic purchasing. If focuses of the health systems are Universality, then universal approaches rather than myopic quick fixes to overcome the current healthcare delivery constraints are necessary and perhaps hold the key to achieving long-term benefits of these strategies.

Even after 40 years of the Alma Ata Declaration, the market led healthcare delivery universe has evolved into disease centric, organ systems focused, diagnostics dependent, compartmentalized, specialist delivered care at costs that drive over a 100 million people every year into poverty. The "universe" therefore should include all the determinants that contribute to the demand side dynamics, and an effective UHC strategy should also warrant meticulous thought and concerted response to address the drivers of human behavior that determine the outcomes. In this context the *universality* of the information services and telecommunication channels that each citizen and the health delivery systems have access to perhaps, hold promising alternates for innovation that

could result in reversing the information asymmetries towards ensuring health for all.

3. Information Asymmetries and its Impact on Health Systems

The increasing burden of non-communicable diseases and complex chronic conditions including multiple morbidities pose a growing threat to the healthcare delivery systems capacity across the globe [5]. The lack of care coordination and disconnect between the end beneficiaries health aspirations *versus* what is delivered through the current health care delivery models are a testament of the collective healthcare market failures. Healthcare markets are driven by the quest for instant gratification, most centers of clinical excellence operate like fire stations that respond to episodic emergencies such as acute coronary events (heart attacks), stroke (paralysis) or for replacement of organs that have worn out. As health delivery systems are designed and equipped primarily to deliver diseases management services, the subliminal messaging at the population levels have been around approaching healthcare delivery systems when one's health needs to be fixed. This disconnect is fueled by health related misinformation and or complete lack of information dissemination between health systems and their end consumers.

Information Asymmetries exists across the entire healthcare delivery systems, while at the population level it is lack of awareness around health conditions, information were available are perhaps not authentic or validated. Patient–doctor encounters are now more permeable to influence from social networks and peer-to-peer communication networks [6]. While within the healthcare delivery systems and health governance frameworks information scarcity results in lacunae around actionable insights.

In most settings, the current health systems deliver tightly compartmentalized, vertically focused, gender or age group focused and disease centered health services namely, reproductive, maternal, child health, adolescent health, communicable diseases, non-communicable diseases. As a result, health systems while gathering a plethora of information through these duplicated efforts in vertical silos, rarely contribute subnational or national health data repositories that are interlinked. These information asymmetries within the health systems lead to inefficient decision making particularly around investments into improving health outcomes.

Solutions aimed at creating awareness in the populations through behavioral change communication strategies, improving health work force through capacity building and enhancing managerial decision support through mathematical modelling have only contributed to modest gains in terms of influencing outcomes. A large number of pilots of such interventions resulting in a novel health system condition - pilotitis, few have achieved national-level scale or become institutionalized as routine practice with the health systems [7].

4. Information as a Therapeutic Intervention for Achieving UHC

Digital health, the use of digital, mobile and wireless technologies for health [8], is being positioned as a transformative agent towards enhancing health services delivery, particularly in low-income and middle-income settings, where mobile connectivity has reached unprecedented penetration.

When health systems embark on this aspirational journey of implementing digital health interventions for health systems, perhaps the first step should be to consider "Information" as a "therapeutic agent" in the pursuit of health for all. However, in the current contexts, information exchange pertaining to the health related decisions by the citizens (end consumers) and the health systems are largely limited to verbal communications or at best pieces of paper as prescriptions or discharge summaries.

Majority of the information that contribute to the determinants of health outcomes are predominantly collected, collated and stored outside of the healthcare delivery systems such as the peer to peer messaging platforms or short messaging services through the telecommunication networks.

In the last decade, online health engagement platforms and mobile applications that facilitate interactions between the healthcare consumers and health care delivery systems have been collecting valuable data including sensitive personal health behavior, choices and financial information that relates to healthcare utilization. Despite their potential for harm, the regulatory frameworks around these interventions are still evolving in most settings [9]. Worse still, none of these health related data collected on these independent platforms or apps are available or used by the health systems for informed decision-making.

In the current digital economy, information has been leveraged as a powerful tool to influence human behavior right across the spectrum of decision making, particularly in the context of geopolitical determinants that results in electoral gains or as market driven interventions targeted at enhancing market share [10]. Since information is such a powerful tool, it might be appropriate that health systems classify and utilize health related information as therapeutic agent, and this be leveraged as an underpinning strategy to impact and improve health outcomes in the pursuit towards universal health coverage.

5. Digital Platforms as Enablers for Universal Participation

Conventionally health delivery systems operate with the healthcare providers at the center of its universe and the end healthcare consumers as passive recipients of the health services. However, with the rapid evolution of digital technologies the customer is already at the centre of the decision-making in most contexts. Health systems need to recognize the changing dynamics of the decision making power that the citizens have access to with the advent of the digital platforms and on demand service models. Universal Health Coverage presents

an unpreceded opportunity to democratize this approach and universalize peoples' participation in their health.

A robust digital health platform that is aimed at universalizing "information exchange" between all stakeholders across the healthcare ecosystem could be easily implemented leveraging the existing mobile communication networks and near universal access to mobile phones by most populations across the globe. This same digital health platform could serve as the first mile connection between the communities and the healthcare delivery systems, even in populations isolated through geographic terrains or those affected through humanitarian crises.

An integrated people centered healthcare delivery system is an opportunity to garner universal participation in health delivery programme design [11]. Incorporating mechanisms for user experiences being captured as a default mechanism throughout their health-seeking journey would provide insights to develop training curriculums for healthcare workforce towards delivering compassionate human centered care in addition to core technical capabilities.

6. Digital Health Platforms as Early Warning Systems in Health Emergencies

Globally Health Systems are at varying degrees of maturity. Universal Health Care ambitions cannot rely on strengthening the health systems through traditional approaches alone. The current models of health services delivery do not have the integral DNA that are necessary for an adaptive and learning health system, that can evolve to a capacity that is optimal for tackling the forthcoming epidemics or the tsunami of the complex chronic conditions and multiple morbidities that the health systems will encounter in the next decade and beyond. Emerging technologies, particularly those that leverage data science and adaptive digital health platforms offering plug and play service models might hold promising alternatives. The architecture of these digital health platforms could ensure inbuilt compliance to standards, ensuring seamless interoperability between different health systems components and extended across the entire ecosystem such as the social and other determinants of health.

During infectious epidemics driven global health crises, health systems are thrown into an overdrive mode. When a crisis like Ebola or Pandemic Influenza epidemics occur, all of the scare resources within the health systems are geared towards the firefighting [12]. The health systems perhaps could consider leveraging the digital technologies that currently exist or are eminently emerging to build futuristic health systems. For example, the time-lag between the onset of first symptoms of an infectious condition (that has pandemic potential) and the first contact with the health systems in most settings being significantly longer than the incubation period for most infectious threats, the disease transmission would reach epidemic potential before the health systems ever recognize the index case.

These inherent delays in information exchange between the first point of contact from the health systems at the population level and the primary healthcare delivery mechanisms and

thereafter cascading to the decision-making stakeholders perhaps contributes to delayed health system response. With the advent of mobile telephones and its unprecedented reach in the remotest of populations, these lags could be drastically eliminated by developing crowdsourcing platforms for common infectious conditions for example a self-reporting tool for acute febrile illness with a built in triage decision support to refer to the nearest available health facility [13].

Futuristic early warning systems for epidemics should leverage the capabilities offered by the telecommunication systems for development of bidirectional and multimodal platforms. These could serve both to provide appropriate information on the early signs and symptoms that reaches millions of subscribers in an instance as well as collect and process information that would be extremely valuable for the health-systems responses. Crowd sourcing of information leads from the citizens and frontline health workers that support early warning systems could perhaps hold a valuable opportunity in achieving health for all [14].

To achieve Universal Health Coverage, the universe as perceived by the health systems needs to extend beyond just health; digital networks are one such promising avenue to expand the ecosystem. Digital technologies provide opportunities to tackle health system challenges, and thereby offer the potential to enhance the coverage and quality of health practices and services. Digital health interventions when used appropriately, to facilitate targeted communications could generate demand and broaden access to health information. Digital health interventions could also be targeted to health care providers to give them more immediate access to clinical protocols through, for example, decision-support mechanisms or telemedicine consultations with other providers [15].

7. Digital Health Guidelines as a Framework for Futuristic Learning Health Systems

The recently launched WHO Guidelines recommendations on digital health for health systems strengthening recognizes a digital health intervention as a discrete functionality of digital technology that is applied to achieve health objectives and is implemented within software applications and ICT systems, including communication channels such as text messages.

The WHO Guideline recommendations provide a framework for key decision makers as well as all stakeholders with regard to selection, investing and implementation of digital health interventions within the health systems contexts. These recommendations examine the extent to which digital health interventions available *via* mobile devices are able to address health system challenges at different layers of coverage along the pathway to UHC.

By reviewing the evidence of different digital interventions, as well as assessing the risks against comparative options, the WHO digital health guidelines aim to equip health policy-makers and other stakeholders with recommendations and implementation considerations for making informed investments into digital health interventions.

Ten recommendations are covered by these guidelines as outlined below:

- birth notification *via* mobile devices

- death notification *via* mobile devices

- stock notification and commodity management *via* mobile devices

- client-to-provider telemedicine

- targeted client communication *via* mobile devices (spread across five population groups)

- digital health record for tracking of patients'/clients' health status and services received *via* mobile devices

- health care provider decision support *via* mobile devices

- provider-to-provider telemedicine

- provision of training to health care providers *via* mobile devices (mLearning)

Digital health interventions are aimed to complement and enhance health system functions through mechanisms such as overcoming the information asymmetries and accelerate the exchange of information. However, these interventions cannot replace the fundamental components needed by health systems such as the health workforce, financing, leadership and governance, and access to essential medicines.

These guidelines recognize that the maturity of the health delivery ecosystem and the enabling environment are critical influences on the relevance of the different digital health interventions recommended in the WHO guidelines. It is therefore mandatory to assess the state and maturity of the ecosystem in a given context or country, reviewing health system needs and tailor the implementation framework and plans for adoption of the different interventions based on the enabling environment and ICT capabilities available within each of these settings [15].

8. Why Innovations do not Scale and the Way Forward

Quite often, innovators and founders of digital health platforms and mobile application based health solutions promote their interventions as a quick fix for an ailing healthcare delivery system, when these applications are implemented as standalone interventions outside the health systems contexts; they fail to deliver value or impact outcomes. These remain as pilots and do not necessarily integrate into the health systems or scale as national programmes. One of the primary reason for these failures are that these innovations discount the health systems constraints and are often designed and applied as digital band aids over fractured limbs of the health care delivery mechanisms. As in good clinical practice, a deep understanding of the pathology leads to a good diagnosis and thereby facilitating appropriate treatment interventions, digital health tools need to follow the same robust process of a clinical diagnosis and appropriate rational intervention approach that is evidence based.

In a recent systematic review of mhealth interventions in India, analysis of these interventions in the context of their relevance and applicability as per the WHO health system building blocks revealed that most of the m-health applications focus on service delivery and workforce strengthening, with relative neglect of health governance and health financing domains. A large majority of the reported mHealth interventions were implemented as standalone solutions often with no health systems integration strategy. To reap maximal benefits, mHealth innovations should function as integral tools that yield positive outcomes related to access, equity, quality, and responsiveness [16].

An understanding of what health system challenges can realistically be addressed by digital technologies, a detailed evaluation of the ecosystem's ability to absorb such digital interventions, is thus needed to inform investments in digital health. Despite the widespread perception that health care delivery capacity could be rapidly scaled up for achieving universal health coverage by leveraging the expanding mobile communications networks and availability of mobile phones, there are a number of systemic challenges that need to be addressed. Some of them being high cost of ownership of mobile devices particularly the smart phones, the fragmented nature of health services delivery, the multiple parallel reporting mechanisms, coupled with the fact that the quality of evidence for digital health interventions in improving outcomes remains suboptimal.

9. Conclusion

While emerging technologies and digital health provide a promise path to enhancing the ability of health systems to deliver care toward reaching universal health coverage. For determining whether digital health interventions are contextually and operationally relevant, robust scientific evaluation of effectiveness through suitably designed and sampled research based on health and economic outcomes and end points is essential.

The key to developing the appropriate strategies to use information as a therapeutic agent in the pursuit of Universal Health Coverage would be to recognise that Information Asymmetries play a pivotal role in the health seeking behaviour and its impact on financial risk associated with a health related event.

Although the WHO Guidelines on Digital Health offer a framework for selecting and putting into practise digital health interventions, the evidence about the impact of these interventions in terms of long-term health outcomes is still in its infancy in the majority of settings. To make the promise of universal health care a reality, the academic and research community should view this as an once-in-a-lifetime chance to design and assess the effectiveness of scalable digital health solutions. Evaluation of the health systems determinants that would be essential to their success and scaling up would be extremely beneficial for innovators who are just beginning to develop innovative solutions for the delivery of health care.

10.   References

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