A Webinar Training on Digitally Transforming the Future of Global Public Health

Priyakanta Nayak[1], Anil Purohit[2], Ayushi Shrivastava[3], Mathew Samuel[4], Jagdish Harsh[5], Rahul Singhi[6]

[1]Associate Professor, [2]Founder & Chairperson, [3]Intern, [4]Visiting Professor, [5]Associate Professor, Jodhpur School of Public Health (JSPH), [6]Co-founder, Poornima University, Jaipur, Rajasthan

Abstract

Background : Poornima University, in collaboration with Jodhpur School of Public Health, hosted an insightful and interactive live global webinar on the topic of "Digitally Transforming the Future of Global Public Health" on July 20, 2020.

Findings: This report gives a brief awareness on the global public health transformation to digital platforms and understand the technical uses of artificial intelligence (AI). During COVID-19, use of Telemedicine has increased, as a tool that reaches patient's home. In the current situation, where social distancing and quarantine have been adopted as effective method to reduce the spread of COVID, telemedicine and virtual software platforms gained more importance to provide health service.

Conclusion: The findings show that telemedicine and virtual software will minimize emergency department visits, protect healthcare resources and reduce the spread of COVID-19 by remotely treating patients during and after the COVID-19 pandemic. Telemedicine has continued to increase in uptake and shows tremendous promise in expanding access to health care, promoting patient disease management, and facilitating in-between health care visit monitoring. Although the future is bright, more research is needed to determine optimal ways to integrate telemedicine, especially remote monitoringinto routine clinical care.

Key words: *Artificial Intelligence, Digital Health, Telemedicine*

Introduction

Digital transformation (DT) refers to "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies". The COVID-19 pandemic has demonstrated the strong potential of various digital health solutions that have been tested during the crisis. Since February 2020, telemedicine grew from less than 1% of primary care visits to nearly 43.5% in April 2020. With telemedicine's current trajectory and rapid adoption rate, it has the potential to disrupt and redefine the way health systems operate, deliver care and manage costs, setting the stage for a vastly different healthcare experience in the future.

Overview and Findings

As COVID 19 continues to spread across the countries, the need for innovative measures to provide high-quality patient care and manage its spread has become more important. Software-based systems such as medical software applications could provide valuable suggestion on health-related information to physicians towards improving quality of life, especially for outpatients. Digital health has a transformative impact on health services, changing the balance of power between provider and patient, encourages new modes of treatment, and moves the focus of health systems to client-centered health[1]. Even though many of these changes are just being felt due to resistance by organizations and individuals reluctant to change the status quo, the explosive growth of digital technology

globally means that these changes are inevitable.

Healthcare organizations aim to deliver better care through a combination of medical, operational and institutional methods, sometimes encouraged and often induced by emerging technology. Important improvements have been made considering tightening budget restrictions and rising operating demand. A range of effects can be observed at several levels and with intended and unintended benefits and consequences. During 2020, the world had to face a global health crisis, a pandemic related with COVID-19. The COVID crisis has pushed even more healthcare ecosystems around the globe to reconsider their global strategies, moving from resilience to anti-fragility. The unpredictable and rapid adoption of digital technology will help the response and management of global health challenges and, at the same time, build new strategic and innovation frameworks for the healthcare ecosystem.

For instance, telemedicine leading to a better outcome for all the stakeholders, from the patient to the operator (surgeon), from the hospital or clinic to the whole society[2]. Due to COVID about 76% of consumers are now interested in using telehealth going forward. When looking at data from a leading hospital in Bangalore, it is seen many cancer patients were spending an average of 12 hours of travel time since many were coming from rural parts of India.

Increased use of telemedicine for remote diagnostics and treatment, protocol-driven healthcare to increase quality of care, and increased access to products and services through improvements in the organisation of transport and delivery services[3,4]. Data will become central to health systems. This will include big data and artificial intelligence tools for surveillance, planning, and management or "personalized data" in the form of universal electronic record systems and customized treatment protocols. As with any disruptive innovation, the growth of digital health will also bring new challenges, including who owns, controls, and manages the data being collected and how to maintain privacy and confidentiality in this data-rich world[5].

Telemedicine also proves useful, to help conserve personal protective equipment and provide isolated patients connection to friends and family. Accordingly, few medical centers have resorted adopting virtual software platforms such as Microsoft Teams, Zoom, Google Hangouts, Skype, Facebook Messenger, Apple Facetime, and others to facilitate telemedicine care during the pandemic[6]. This increase use of telemedicine results in the following:

· Decrease the time required to get diagnosis and initiate treatment, stabilize, or quarantine a patient.

· Facilitates close follow-up with patients. Also, the patients can be monitored from their home by doctors to avoid oversaturation of health facilities.

· Reducing the movement of patients and minimizing the risk of infection which they can get from hospitals.

· Supports co-ordination of medical resources utilized in distant locations.

· Prevent the risk of infection from medical practitioner, who are the key asset.

· Aids in informing the general public

· Saves costs on disposable robes, gloves, antiseptic material etc.

· Allows clinicians and students to sharpen their clinical skills in patient interaction

Applications of Tele-medicine

1. Educational

· Tele-education: a flexible and engaging long-distance learning platform that offers easier training and updates on new developments in more precise and efficient treatment methods.

· Tele-Conferencing: Discussion and interaction between doctors during workshop, conferences, seminar or continual medical education programs in a virtual room environment.

2. Healthcare delivery

· School-Based Health Centers: Helps manage chronic conditions like bronchial asthma, diabetes and obesity. Telemedicine allows a school nurse, remote access to specialist medical opinion.

· Correctional Facilities: Cater to the healthcare needs of the inmates without the expense and dangers of inmate transportation or the need for a specialist doctor to enter.

· Mobile Health Clinics: Provides quick access to a remote physician or medical specialist.

· Shipping and Transportation: Helps avoid evacuations and unscheduled diversions during a medical emergency.

· Industrial Health: Provides medical management and triage advice on-site.

3. Healthcare management

· Tele-health care: Use of ICTs for preventive and promotive healthcare; it is further divided into teleconsultation and tele-follow up.

· Tele-home health care: Monitor patients from a central station (Remote patient monitoring) with the help of a Computer Telephone Integrated (CTI) system for 24-hour vitals monitoring.

· Specialties like tele-ophthalmology, tele-psychiatry, tele-cardiology, and tele-surgery.

· Diagnostic services like tele-radiology and tele-endoscopy.

4. Screening of diseases

· Diabetic screening project by MDRF: The Chunampet Rural Diabetes Prevention Project.

· Ophthalmology screening by Aravind Hospitals at Andipatti village.

5. Disaster management:

· A mobile and portable telemedicine system with satellite connectivity and customized telemedicine software is ideal for a disaster-stricken region where all other modes of connectivity are disrupted.

· NASA tele-medicine services provided during 1985 Mexico City earthquake and 1988 Soviet Armenia earthquake.

· Amrita hospital tele-medicine services provided during 2004 Tsunami disaster.

Challenges

Though the use of digital technology has the potential to transform and improve the delivery of health care in low-income countries, it also raises many concerns, including how individual privacy and confidentiality will be maintained, who will control both the technology and the data, who will pay for the technology, and how to deal with the inevitable resistance to the changes discussed by those who benefit from the status quo[7].

Any discussion of electronic health records quickly leads to a discussion of privacy and confidentiality[8]. Though this is not a new concern, because the same issues arise with paper records, the ease of analyzing and reproducing digital data is cause for concern. Recent data breaches by numerous commercial and government enterprises have made it clear that these concerns are real and that data breaches or abuses will become a reality of the digital age. Although we can wish to go back to an era or more privacy and confidentiality, the reality of surveillance cameras on each street corner, tracking location through mobile phone networks, and monitoring credit or debit card transactions has made it nearly impossible to maintain privacy[9]. And as the use of digital cash transfers and Internet purchases grows, control of privacy will become less possible and it is unlikely that we will ever again be able to protect all of our data as was done in the past.Benefits may serve as a basis to initiate the adoption of telemedicine practices in healthcare organization. However, individual hospitals and industry as a whole are facing certain challenges that inhibit the development process[10]. The major ones are:

· **Data privacy and interoperability rules compliance:** Telemedicine utilizes a lot of confidential

data of patient. As we're talking about collecting, storing, and transmitting the information, we also need to take into account specific requirements in this field.

· **Accessibility:**Telemedicine focuses on out-of-reach patients, the lack of internet connection in remote areas only aggravates the problem, as healthcare providers won't be able to transmit data. But the problem doesn't have a solution in sight since broadband coverage develops over years.

· **Training burden:**Any technology requires both clinicians and patients receive proper training on how to use it. Telemedicine devices and applications are no exception. This burden falls on the healthcare provider, as they will need to establish training and information broadcast for different groups of users, involving additional costs, excluding the telemedicine platform itself.

Conclusion

Telehealth provides an opportunity to provide care that is convenient, accessible and patient-centric, overcoming many of the barriers inherent in traditional health care delivery systems[11]. Although, widespread implementation will require attention to systems engineering approaches to health care design so that it can address incentives, technical and human requirements, work processes, and payment issues. To demonstrate and realize added value to health outcomes, telehealth implementation is not simply a feature to be added to existing health care delivery. It must be integrated into innovation at the system level. Integration involves examining the current flow of care for targeted subpopulations and revising the overall approach to care, integrating telehealth, and changing traditional elements. For example, using telehealth to manage chronic disease might incorporate interprofessional involvement, with nurses, pharmacists, or dietitians coaching the patient through telehealth between visits for primary care. Integration may require challenging adjustments in the current delivery of care. For example, the number of planned primary care visits may be reduced as telehealth is used to augment care.

For telehealth to be fully integrated into global health systems, a number of items that support system transformation will be needed. Given that telehealth often includes patient-generated data, significant changes will be needed to insure accurate, efficient, and timely monitoring of health parameters that are useful for guiding clinical decision making[12]. Integration and interpretation of these data are essential to optimizing telehealth, yet many EHR systems do not have the capacity to incorporate patient-generated data nor are they not able to make it available in a time-sensitive fashion. Similarly, new competencies will be required for health care professionals in telehealth and systems engineering to improve health. Finally, telehealth research needs to promote approaches to care that are amenable for adoption in practice. The age-old challenge is to translate research findings into practice to facilitate adoption of new knowledge to telehealth. The challenges are to reinforce the urgency with which evidence is needed to drive policy and provide greater incentive for researchers and practitioners to collaborate.

Ethical Clearance: Taken from institutional Ethics Committee of Poornima University

Source of Funding: Self-Funded

Conflict of Interest: Nil

References

1. Diagnostic technologies | VTT [Internet]. [cited 2021 Mar 23]. Available from: https://www.vttresearch.com/en/ourservices/diagnostic-technologies?gclid=Cj0KCQjwo-aCBhC-ARIsAAkNQitc6kFUFNhDNVup75O1TXxhOcVKz0iOeayby3pjXNwZvpUUCr8eXpwaArZ-EALw_wcB
2. 2010 Opportunities and developments Report on the second global survey on eHealth Global Observatory for eHealth series-Volume 2 TELEMEDICINE in Member States. 2010.
3. Kichloo A, Albosta M, Dettloff K, Wani F, El-Amir Z, Singh J, et al. Telemedicine, the current COVID-19 pandemic and the future: a narrative review and perspectives moving forward in the USA [Internet]. Vol. 8, Family medicine and community health. NLM (Medline); 2020 [cited

2021 Mar 23]. Available from: https://pubmed.ncbi.nlm.nih.gov/32816942/

4. Edge C, George J, Black G, Gallagher M, Ala A, Patel S, et al. Using telemedicine to improve access, cost and quality of secondary care for people in prison in England: A hybrid type 2 implementation effectiveness study. BMJ Open [Internet]. 2020 Feb 18 [cited 2021 Mar 23];10(2):e035837. Available from: http://bmjopen.bmj.com/
5. Health Systems | Lirio | The Leader In Behavior Change AI [Internet]. [cited 2021 Mar 23]. Available from: https://lirio.com/health-systems/?utm_source=google&utm_medium=cpc&utm_campaign=Brand-Awareness-Health-Systems-GS-2020&utm_term=health and technology&gclid=Cj0KCQjwo-aCBhC-ARIsAAkNQit5dUC6cobuWNRmrZeKxf12_PIVsDjrnS-4z6t_qLeIkI_9XKqXJNAaAin-EALw_wcB
6. Bokolo AJ. Exploring the adoption of telemedicine and virtual software for care of outpatients during and after COVID-19 pandemic [Internet]. Vol. 190, Irish Journal of Medical Science. Springer Science and Business Media Deutschland GmbH; 2021 [cited 2021 Mar 23]. p. 1. Available from: /pmc/articles/PMC7340859/
7. Mitchell M, Kan L. Digital Technology and the Future of Health Systems [Internet]. Vol. 5, Health Systems and Reform. Taylor and Francis Inc.; 2019 [cited 2021 Mar 23]. p. 113–20. Available from: https://doi.org/10.1080/23288604.2019.1583040
8. Harman LB, Flite CA, Bond K. Electronic health records: Privacy, confidentiality, and security. Virtual Mentor. 2012;14(9):712–9.
9. (PDF) Ensuring the Privacy and Confidentiality of Electronic Health Records [Internet]. [cited 2021 Mar 23]. Available from: https://www.researchgate.net/publication/50519915_Ensuring_the_Privacy_and_Confidentiality_of_Electronic_Health_Records
10. Schuster MA, McGlynn EA, Brook RH. How Good Is the Quality of Health Care in the United States? Milbank Q [Internet]. 1998 [cited 2021 Mar 23];76(4):517–63. Available from: https://pubmed.ncbi.nlm.nih.gov/9879302/
11. Dinesen B, Nonnecke B, Lindeman D, Toft E, Kidholm K, Jethwani K, et al. Personalized telehealth in the future: A global research agenda. Vol. 18, Journal of Medical Internet Research. JMIR Publications Inc.; 2016.
12. Kruse CS, Krowski N, Rodriguez B, Tran L, Vela J, Brooks M. Telehealth and patient satisfaction: A systematic review and narrative analysis. Vol. 7, BMJ Open. BMJ Publishing Group; 2017.