Telehealth as a means of enabling health equity

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Summary

Objective

The goal of this paper is to provide a consensus review on telehealth delivery prior to and during the COVID-19 pandemic to develop a set of recommendations for designing telehealth services and tools that contribute to system resilience and equitable health.

Methods

The IMIA Telehealth WG members conducted a two-step approach to understand the role of telehealth in enabling global health equity. We first conducted a consensus review on the topic followed by a modified Delphi process to respond to four questions related to the role telehealth can play in developing a resilient and equitable health system.

Results

Fifteen WG members from 11 countries participated in the Delphi process to share their views. The experts agreed that while telehealth services before and during COVID-19 pandemic have enhanced the delivery of and access to healthcare services, they were also concerned that global telehealth delivery has not been equal for everyone. The group came to a consensus that health system concepts including technology, financing, access to medical supplies and equipment, and governance capacity can all impact the delivery of telehealth services.

Conclusion

Telehealth services became a big part of ability to deliver healthcare services during the pandemic. However, telehealth services have also led to unintended consequences (UICs) including inequity issues and an increase in the digital divide. Telehealth practitioners and professionals therefore need to purposely design for inclusivity as part of broader health system goals.

Keywords:
telehealth, equity, resilience, health systems, unintended consequences

Introduction

Telehealth – the use of technology to deliver healthcare services across the spectrum of care over distance, has globally improved access to healthcare services. Telehealth services can include assessment, diagnosis, and management of patients [1]. Telehealth has been particularly beneficial for remote populations or those who cannot easily access healthcare services, such as the elderly with chronic diseases, and those in geographically isolated locations with limited access to specialist and generalist care [2,3].

The COVID-19 pandemic was the “nudge” for enabling and “fast-tracking” technological innovation and adoption in several fields including retail and commerce, education, and healthcare [4]. COVID-19 resulted in a substantial increase in telehealth delivery worldwide as patients and providers sought to maintain continuity of care to overcome effects of lockdowns, and service delivery and supply chain issues [5–7]. Aside from support for clinical care, telehealth also supported a broader range of health system tasks including patient education and supply chain management. Preliminary studies have been favorable for the role that telemedicine played in pandemic response including supporting care delivery through video and audio visits [8,9].

Evaluation of telehealth service delivery during the pandemic has also highlighted unintended consequences (UICs) including equity, literacy, and other issues [10–12]. We use the term UIC, drawing on previous medical informatics literature that specifies that UICs are outcomes that have not been anticipated, and that these outcomes can be desirable or undesirable and positive or negative [18]. For this paper, we focus on negative undesirable UICs. Several types of these UICs have been reported during the COVID-19 pandemic. Racial and ethnic minorities and social socially disadvantaged groups have experienced more UICs related to access to care (including access to digital care), and also experienced poorer health outcomes during the COVID-19 pandemic [13,14]. Some UICs are clinical in nature, an example being healthcare processes not transitioning well to digital format, other UICs are financial or regulatory, while others are due to the complexity of patient conditions such as patients with comorbid conditions [15]. A widening of the digital divide has been a significant UIC from virtual care delivery during the COVID-19 pandemic [16,17].

UICs from telehealth delivery could be expected as they are known to occur while implementing complex technology into complex and diverse settings and processes [18,19]. However, we often manage UICs in a way that is reactive rather than proactive. Proactive management requires us to consider the broader system where HIT is used. UICs that arose from COVID-19 mediated telehealth usage were not a direct result of the pandemic itself, but rather they were a consequence of telehealth interacting with various health system concepts where the various telehealth tools were used [20]. Accepting that one cannot completely eliminate the occurrence of UICs from HIT implementation, we propose instead that we must better understand the

context in which UICs occur so that we can purposely design health systems that allow us to better manage UICs [19,21]. Technology alone cannot transform healthcare delivery into a resilient and equitable system and it is myopic to focus on technology without considering other system concepts that influence healthcare delivery [5,22]. Systems function as designed, and health or social systems are no different in that regard. Coiera (2004) argued that policies and innovations have political, social, cultural, and other implications [23] and because of this, addressing UICs such as system inequity cannot happen by addressing individual parts of a system, but require a systems-based approach that supports proactive solutions to UICs and other system issues.

We believe that health systems designers where telehealth is used must address system inequity that poses as a “ghost in the machine”. To do so, they must address two core issues. First, we need to proactively manage UICs as part of system planning and design using systems thinking approaches to account for the range of factors that can impact HIT implementation [24,25]. Second, they need to account for how technology such as telehealth influences and is influenced by the broader underpinnings of an equitable healthcare system, including consideration of the social determinants of health that will influence how an individual agent interacts with a health system and the tools, services, and resources within it.

This paper provides initial insight into the design of an equitable telehealth system. The IMIA-Telehealth WG members conducted a two-step approach to understand the role of telehealth in enabling health equity. We first conducted a consensus review on the topic followed by a modified Delphi technique to respond to four questions related to the role telehealth can play in developing a resilient and equitable health system.

Methods

We conducted a modified Delphi process to capture consensus across a subset of the IMIA telehealth WG members on how to reduce unintended consequences of telehealth implementation as part of developing resilient and equitable health systems. Fifteen WG members from 11 countries participated in the study. The Delphi method is an iterative process that allows a group of stakeholders to reach a structured consensus on a topic or question [26,27]. It is a suitable method for this study as the evidence base on the role telehealth can play in developing resilient and equitable health systems is very limited.

Our method also incorporates our previous IMIA YB article [28] that identified the need to for telehealth usage to balance multiple health system concepts including patient centered connected health needs and privacy and data standard requirements. We expand on our earlier work by conducting a multi-country comparison of how telehealth evolved before and during the COVID-19 pandemic in order to understand the issues facing practitioners, policy makers and researchers to achieving telehealth implementation. Our analysis provides insight on (a)

unintended consequences and (b) inequities fostered and mitigated by implementation of global telehealth services. The detailed steps we followed are as follows:

Step One. Develop a consensus review on telehealth as a means of enabling health equity

In the first step, we developed a set of consensus statements from a representative group of our international telehealth WG members. We convened an online discussion of WG members and invited everyone to freely contribute to a body of text that would enable a "systems thinking" approach to the questions of how telehealth field experience translates to address issues of equitable access to healthcare and resilient health systems. In initiating this discussion, our starting point were the three telehealth patterns we defined in our 2018 YB paper [26] and a summary of negative unintended consequences from telehealth delivery [20,29]. Fig. 1 shows the analytical framework used for the consensus review.

[insert figure 1 here]

Step Two: Use a modified Delphi process to develop consensus themes from different countries

Following the development of the consensus statements, the members of the telehealth WG electronically convened a discussion to formalize the findings from the consensus review. With the overarching question, "*How can telehealth help design resilient and equitable global health systems?",* we organized the discussion into four thematic questions derived from the consensus review:

1. What is the role of telehealth delivery in enabling health equity?
2. Which factors in a health system influence access to telehealth services?
3. What is the potential of standards/guidelines for promoting telehealth services?
4. What are negative unintended consequences of telehealth delivery and how can they be addressed?

For the discussion, we used a modified Delphi process to accommodate diverse opinions, experiences, and insights of the experts and their field notes. The experts in the Telehealth WG were from different countries, dispersed across time zones and thus much of the data collection was asynchronous. Data collection took place over one month between October and November 2021.

We then analyzed the narratives to generate themes related to each question. The names of the respondents are referred to here by their initials with abbreviations of their country names in parentheses. This was a consultation in a public domain document and all data is from co-authors of the paper. No human participants were involved, and ethics approval was not needed. The responses are paraphrased for brevity.

Results

WG member responses to the four questions are provided below. Each response is labeled with the initial and country of the WG member.

1. **What is the role of telehealth delivery in enabling health equity?**

While there was broad agreement that telehealth services enable better access to care delivery and other healthcare services, several concerns were raised about inequity in the access to telehealth services. On one hand, telehealth plays a significant role in providing access to healthcare care services for those without direct access to them. This access is particularly important for people in remote or rural settings. SJ (India) noted that teleophthalmology provides comprehensive eye care and reduces the need for travel for patients from rural villages. VR (UK) cited a UK NHS technology enabled care program where telehealth technologies are transforming the way people control and engage with their own healthcare data and results, empowering people to manage their care in a way that is appropriate for their context. IH (NZ) also cited evidence from New Zealand on access to, and use of healthcare services, during the COVID-19 lockdown when telehealth was the first and main point of contact with health services.

CK (Can) provided an example from Canada that also described how telehealth played a key role in enabling care access across different patient groups, disease types and neighborhood income groups [30]. MI (Brazil) noted that telehealth could increase communication and facilitation of coordination between patients with chronic conditions and their caregivers to support collaboration between them. JGU (India) stated that digital telepsychiatry services are appropriate for patients during and potentially post-pandemic as it can decrease the inflow of regular outpatient consultations, minimizing exposure to COVID-19 and eliminating transportation and logistics costs for patients and caregivers [31]. The consensus of the WG was that Telehealth enables communication and coordination between stakeholders across time and space because it is possible to interact with everyone at any time, bringing more equity by providing appropriate timely patient-centered care to everyone.

However, WG members provided several examples of UICs where telehealth access was not equitable for everyone. VR (UK) noted that inequitable access can result in groups receiving less care relative to their needs, or inappropriate or sub-optimal care, than others, leading to poorer experiences, outcomes, and health status. SBG (India) cited a publication by the IMIA Telehealth WG published in 2016 that described telehealth as a “cause of health inequity”. To establish the argument about how telehealth can be an impeding factor to equity, SBG referred to an example of telecare from the city of Chennai in India which experienced floods in 2015. Following the flood, those citizens who had better access to smart mobile phones managed to get help earlier than those without. They stated that the discrepancy in access to help was due ti penetration of the Internet through cell-phones and broadband access. People who lived

remotely were more likely to be poor and most affected by the digital divide. It was “ironic” that the areas that needed help most were those who struggled the most to get access to help in the initial response phase after the floods.

JGU (India) noted that people with inadequate access to Information Communication & Technology (ICT) tools, and unfamiliarity or discomfort in using them may be disadvantaged in benefitting from telehealth services. Planners and providers of telehealth services need to proactively ensure that certain population groups such as migrants, refugees, senior citizens, people with disabilities and rural populations who may not be sufficiently equipped with technical devices or skills are not “left behind" in accessing the telehealth services.

AT (Australia) noted that available community infrastructure can pose challenges to equity of access to telehealth services. In rural and remote locations, digital bandwidth and connectivity infrastructure in general are less robust compared to urban locations. Investments of governments and local communities for types of business also exert influence here. IH (NZ) noted that in general underserved, also known as under-resourced, communities experience greater health inequities and greater barriers to access healthcare than the general population and provided insights in the context of New Zealand where such communities include rural communities and Māori (NZ indigenous population).

2. Which factors in a health system influence access to telehealth services?

AT (Australia) listed social determinants of health as a key health system influence on access to telehealth services stating that where a person is born, grows, lives and works can influence their access to healthcare services. AT also noted the role of community infrastructure and geographical variables (e.g., urban versus rural) as factors influencing equity. VR (UK) noted that adoption of telehealth reveals opportunities for identifying gaps to address health equity such as challenges to effective mobile working by community nurses in patient’s homes due to poor internet connectivity. As a result, when the nurse would be working in a patient's home that has poor connectivity to the Internet, the health provider cannot access digital documents such as electronic records. Other limitations identified by VR were limited or no training to use devices, mobile device not being compatible with other software, and uploading data into systems that do not talk to each other leading to interoperability issues.

IH (NZ) cited evidence from the seminal work by Piggot and Orkin (2018) that the root cause of health inequity is system failures in health care delivery [32]. IH noted that telehealth offers a way to remove some of these barriers to access by using digital technologies delivering ‘healthcare at a distance’ . IH noted several ways in which telehealth can be deemed to improve access to healthcare including reduction of waiting times, improve access to early treatment, reduction in travel time, travel expenses, less time off work, and development of culturally appropriate services. IH cited the NZ Ministry of Health (MoH) telehealth website stating that telehealth provides benefits for patients, district health boards, aged care workers/nurses,

general practice and allied health providers and that telehealth provides overall a “fairer health system”.

OJ (India) shared experiences of telehealth supported continuum of care for persons with noncommunicable diseases during the COVID-19 pandemic among a rural population in Andhra Pradesh, India. A key factor identified by the patients was health systems responsiveness using automated call back for follow up by specialists where care escalation was recommended during the first contact. OJ also gave examples of doorstep delivery of medicines and facilitation of diagnostics at home through frontline healthcare workers as examples of providing appropriate healthcare services to a rural population [33].

AT (Aust) observed that telehealth services are dependent on information and communications technology and mobile medical apps (‘software as a medical device’) and that they must fully align or comply with medical device standards. AT noted that mobile medical apps provide less guarantees for patient safety compared with other medical device standards and such lack of alignment across ISO/IEC standards makes it confusing for app developers and users of mobile medical devices alike, which in turn impedes compliance-based confidence in telehealth.

KA (Brazil) noted that people in the high vulnerability spectrum of society, like people who are homeless and people in overcrowded prisons are historically exposed to difficulties in accessing health services. During the pandemic, these populations, in addition to the usual challenges, had to deal with difficulties in maintaining social isolation and lacked equal offers of solutions for psychological and health support due to the lack of meaningful universal healthcare access in their locations.

A member of the group from India noted the need to consider the costs of setting up a telepresence and to compare such costs with actual care delivery, given that costs rise exponentially when the type of care provisions rises from preventive to tertiary levels. According to this participant, telehealth costs would rise to support more complex care delivery patterns and health systems must ensure they have the financial and other resources to sustain telehealth delivery beyond pilot stages of telehealth delivery offerings.

3. **What is the potential of standards/guidelines for enabling equitable telehealth services?**

JGU (India) noted that the planners and providers of telehealth services need to consider measures that ensure certain population groups such as migrants, refugees, elderly people, and those in rural areas who may not be sufficiently equipped with devices or skills and those with disabilities are not “left behind" in accessing the telehealth services.

VR (UK) noted that a strategic approach to digital health delivery has the potential to enable health equity; citing the context of the UK National Health Services “The Technology Enabled Care Services (TECS)” where they developed resources named “Resource for Commissioners” with a focus on delivering set of practical tools and resources to address the demand from

health and social care professionals for support and guidance on how to commission, procure, implement and evaluate so as to maximize the value of these types of solutions and services. The tools include a 'TECS evidence database' showing the impact of telehealth on patient outcomes and cost effectiveness such as diabetes and chronic obstructive pulmonary disease (COPD).

MN (Brazil) observed that tele-homecare applications would be expected to expand in developing countries with limited accessibility and availability of traditional healthcare services and high hospital acquired infections. MN noted the importance and necessity of clear guidelines and protocols for training of care providers to ensure quality of care, where tele-homecare would be deemed as an alternative or supplement to care delivered face to face ("traditional care").

AT (Aust) observed that a barrier to telehealth implementation is reluctance of physicians to adopt telehealth, due to concerns about quality of care and privacy issues WM and AT noted that this can be alleviated by demonstrating compliance with globally accepted international standards ISO/IEC-standards where these standards govern telehealth services and aspects of technology including information management. They further observed that quality of telehealth services is covered by ISO 13131:2021 and that experts from the Telehealth WG have contributed to this recent version of the standard. The standard describes quality requirements for a wide variety of use cases, including scenarios of (home-based) telehealth services in remote areas and consumer engagement with telehealth.

WM and AT argued that two circumstances confound the widespread and flexible delivery of telehealth services: lack of standards supporting integration of data collection components in a broader system, and lack of a universal framework for development of the underlying analytic and logic software, in a critical system setting.

4. **What are unintended negative consequences of telehealth delivery and how can we address them?**

CK (Can) noted that while telehealth has improved care delivery, it has introduced UICs in the form of the digital divide. One significant challenge in Canada was that once COVID-19 induced lockdowns began to be lifted, some practitioners continued providing virtual care delivery rather than providing any in-person care delivery (https://www.cbc.ca/news/canada/toronto/patients-frustrated-concerned-as-some-ontario-doctors-slow-to-return-to-in-person-appointments-1.6160171). This decision has created some issues where patients have been misdiagnosed or not received an appropriate level of care through virtual means. Telehealth delivery is not meant to be a direct replacement for in-person care delivery but rather a patient's specific context and needs must determine the modality of care delivery.

In overcoming UICs such as the digital divide, AT (Aust) identified health and digital literacy as early challenges that telehealth must overcome. AT noted, as did JGU (India), that telehealth's potential for providing equitable access for everyone requires content to be adapted or tailored to the target audience. AT observed that artificial intelligence could play a role in overcoming UICs by allowing health professionals to understand the behavior and way of communication of diverse user groups to develop content and meet their needs in a specialized and personalized way.

AT also observed that the fact that telehealth care access and utilization allows for acceptance to the digital divide in healthcare is an unintentional consequence of telehealth, revealing income-based and regional health disparities. Those living in more affluent and urban areas where ICT infrastructure is common were more likely to have accessed telehealth during the pandemic than those in low-income or rural areas. AT noted because of these system factors that telehealth could ultimately worsen access to health services and thus increase health inequity.

JGU (India) noted that a virtual, indirect, and screen-mediated consultation, unlike a face-to-face meeting between a doctor and patient, makes relationship building a challenge. JGU noted that for new cases where the patients/caregivers are in contact with a stranger on a small screen, they may not like disclosing everything about their life, which could impact relationship building and the care provided to the patient [31]

Discussion

In this paper we build on earlier work by our international working group (WG) by conducting a consensus review and then using a modified Delphi approach to study the question "How can telehealth help design resilient and equitable global health systems?" Inclusive digital health and a resilient health system for all is a broad outcome and getting there requires a systems-based approach that develops telehealth capacity over time. Our earlier work developed a business model for patient-centred connected health via telehealth and different connected health patterns or delivering it [26]. In the current paper we expand upon our earlier work to contextualize the business model and patterns from the perspective of equity and development of a resilient health system. This paper presents a global perspective on telehealth design and service delivery to support inclusive and resilient health systems.

While our WG reached broad agreement that telehealth services pre and during the COVID-19 pandemic has enhanced the delivery of and access to healthcare services, they also emphasized that global telehealth delivery has not been equitable. Health system concepts such as technology, financing, access to medical supplies and equipment, and governance capacity will all impact the delivery of telehealth services. While technology is a key part of telehealth delivery, technology alone cannot create a resilient telehealth system, nor will it enable equitable access to the system. The challenges to developing resilient and equitable

health systems are multifactorial. In this study, we have identified several areas we need to focus on including health and digital literacy, how to digitally build meaningful patient-provider relationships, and ensuring that the social determinants of health such as someone's socioeconomic status or geographic location (e.g. rural settings) does not impact their ability to efficiently access any needed healthcare services.

While it is critical to identify barriers and UICs to developing resilient and equitable health systems it is equally important that we be proactive in generating evidence on solutions to reduce system wide barriers for access to telehealth so that underserved populations can take advantage of telehealth to improve access to healthcare services. The IMIA Telehealth WG has already initiated efforts to address several of the shortcomings identified in this paper. For example, we have started developing telehealth guidelines, including implementation of telehealth standards, with a focus on ISO 13131:2021. Our WG also continues to leverage the breadth of our international experience to understand telehealth delivery in different global health systems. Overall, as part of developing resilient and equitable health systems we must develop strategies for the design and evaluation of telehealth services that incorporate systems thinking [5].

As we continue to grow and expand telehealth delivery, a distinction needs to be made between a pattern of telehealth usage where a patient is just pulling information from sources (e.g. one way access/exchange) and a pattern of two-way communication between a patient and providers that occurs over time [26]. The former telehealth pattern is easier to implement and deliver but it provides a less substantial care delivery service than a pattern that involves ongoing two-way communication between a patient and a care delivery team. Scalability of telehealth tools and approaches is another area where future work is needed.

The main message from our WG is that a person's ability to access the level of telehealth services needed for their specific context should not depend on socioeconomic factors such as income, education, or place of residence. Our desire to build global digital health systems cannot lead to inequity where some populations have access to more robust or substantial telehealth delivery compared to other populations.

Conclusion

Globally, telehealth continues to be a key enabler of health system transformation. The drivers for telehealth are both technological and non-technological. From a technology perspective, increased availability and capability of digital technologies have expanded our ability to provide care across time and space. This provides the structural aspects to deliver the necessary health services and care delivery for everyone. Non-technological drivers include a lack of access to timely health care services and a global health system with increasing chronic disease and an ageing population. The COVID-19 pandemic has further made the case that we need a resilient and sustainable digital health system that can deliver efficient, effective, and equitable care

during events like a global pandemic. Telehealth provides the means for a health system to be disrupted and rebuilt around the care needs of individuals and populations, empowering them to drive the delivery of their own health care independent of broader health system factors such as socioeconomic status.

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Figure

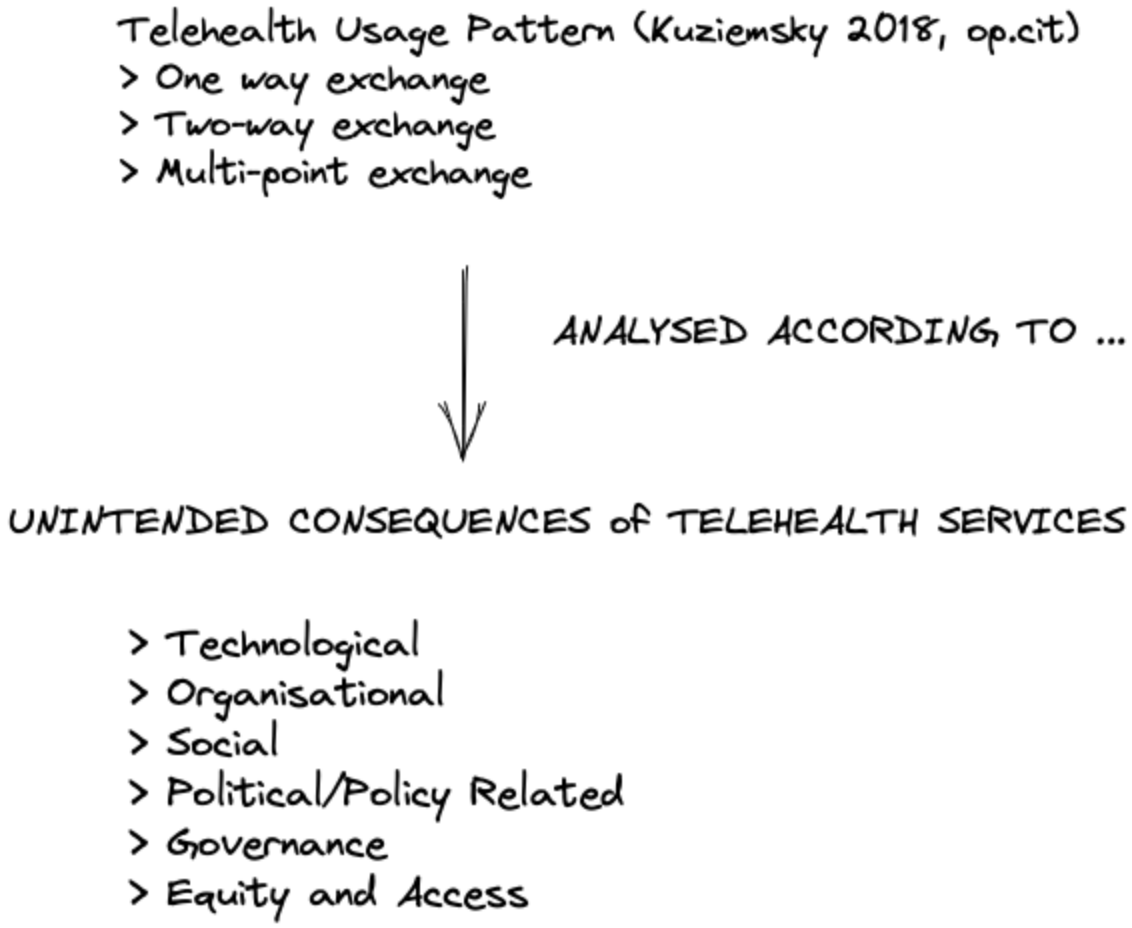

Figure 1. Integrated framework for system resilience and equity in telehealth services