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## Digital health tools and technologies dimensions for equitable access to health, including Universal Health Coverage in developing economies

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### Abstract

This study sought to investigate digital health tools and technologies dimensions for equitable access to health, including Universal Health Coverage in developing economies. Universal Health Coverage (UHC) is a promise of accessible and high-quality healthcare, which addresses coverage of essential health services and catastrophic health spending, in line with goal 3 of the United Nations Sustainable Development Goals (SDGs). However, the problem of inequitable access to health, including UHC, continues to plague the entire endeavour, even with notable technological advancements among the population and within the health sector. This study uses a narrative literature review methodology to investigate the dimensions of digital health tools and technologies for equitable access to health, including UHC. The findings from this study identify internet access, availability of internet, availability of a smart device, and device access to digital content as key dimensions for equitable access to health, including UHC in developing economies, and in line with digital health tools and technologies. Considering these dimensions will ensure that developed and deployed interventions are available and accessible to the majority of the population. Ultimately promoting digital health and equitable access to health, as well as ensuring that key dimensions of digital health tools and technologies are not assumed.

**Key words:** Digital health, digital tools, equitable access, health, technologies, universal health coverage.



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## INTRODUCTION

Universal health coverage (UHC) was originally identified at the founding of the World Health Organization (WHO) in 1948 to guarantee the right to health care for all (Rodney & Hill, 2014; Dhimal et al., 2023). UHC proposed that health care, which covered the entire range of vital, high-quality healthcare services, was available to all people in a population without suffering financial hardship (Rodney & Hill, 2014; Muthuuri, 2020; Dhimal et al., 2023). However, the lack of universal health, including UHC, is still a global problem, with developing economies suffering the most from inequitable access to basic medical care (Ahmed et al., 2020). Further, developing economies' capabilities to address health issues are hampered by low per capita income, a restricted ability to mobilise domestic resources, and widespread health system bottlenecks (Oleribe et al., 2019).

On the other hand, digital health is the right use of technology to better the well-being and health of people both individually and as a population, and it encompasses eHealth, health informatics, telehealth, mHealth, health IT, and health technologies, as well as all cases where health is delivered and accessed electronically (Fatehi et al., 2020; D. Wilson et al., 2021). Moreover, digital health relies on digital health tools and technologies for the attainment of digital health interventions (Fatehi et al., 2020; D. Wilson et al., 2021). In previous studies, to achieve online consultations, for example, a variety of tools like smart devices, sensors, and cameras were deployed in addition to advanced technologies like blockchain, the Internet of Things (IoT), and analytics (Singh & Landry, 2019; Gómez-González & Gómez, 2020). Previous research has also pointed to the problem of access and availability of digital health tools and technologies to support fair healthcare (Bautista-Gomez & van Niekerk, 2022; Miller et al., 2023; Hadjiat, 2023). The study by Shaw et al. (2020) used digital tools and technologies as a variable and noted that access to technologies required enabled tools. Further, Richardson et al. (2022) described the digital world as being made possible by tools and technologies that were communicated via the internet or through other varied digital channels like mobile phone networks.

Therefore, the term “digital health tools and technologies” is used to imply that tools and

technologies are used together to attain an intervention in digital health (Fatehi et al., 2020; D. Wilson et al., 2021), which in this case, should be equally accessible, a forward move to improve the quality of life for all residents in a population (Logan & Guikema, 2020). This study isolates the varied digital health services, information systems, and programmes, only focusing on digital health tools and technologies. Therefore, the purpose of this study is to investigate digital health tools and technologies dimensions for equitable access to health, including UHC, in developing economies.

## LITERATURE REVIEW

Among the health system building blocks are technologies, that should be safe, of appropriate quality, have been procured at the best available prices, and usable in cost-effective ways to facilitate the attainment of the overall goal of a health system. Digital health technology adoption requires years of incremental work (Konduri et al., 2018). On the other hand, the integration of technology and healthcare enhances access to treatment while also raising the standard of care, but its application ought to be thoughtful, strategic, and aware of concerns about patient rights and privacy (Wilson et al., 2021). According to WHO's Thirteenth General Programme of Work (2019–2023), for a region to realise its own Flagship Priority Programmes, digital health tools and technologies are crucial enablers. Moreover, all health factors should be considered when calculating UHC since they are important and have a big impact on systemic health and health equity (Wang et al., 2020).

According to the World Health Organization, digital transformation of healthcare can be disruptive but is important WHO (2021). Although digital health research in developing countries is under-explored (Kristjánsdóttir et al., 2023), the following are example cases where digital health tools and technologies are advancing equitable access to healthcare and UHC. First, tools for data capture, like in the case of Myanmar, a WHO South-East Asia Region nation, were tablets, whereby the health professionals could easily move around with the devices to reach patients for registration. These tablets were also useful for online learning, in addition to capturing data (Thorell et al., 2019; Singh & Landry, 2019).

Other tools and technologies in healthcare, according to Singh and Landry (2019), include digital therapeutics,

clinical trials, smart wearables, artificial intelligence, blockchain, Internet of Things, virtual care, remote monitoring, artificial intelligence, and big data analytics. For instance, Indonesia was using artificial intelligence in healthcare and getting ready for big data analytics through its massive data repository, with plans to utilise this data to forecast future illness load and to foresee demands nationally and on the health system (Singh & Landry, 2019). On the other hand, Thailand was advanced in the use and application of medical robots in surgery, diagnostics, rehabilitation, and other healthcare services. The award-winning Khon Kaen City smart health project in Thailand also featured wearable technology for preventative healthcare, a smart ambulance, and the development of a platform for exchanging medical data using big data analytics and blockchain (Singh & Landry, 2019).

Tools and technologies in health, when available and accessible, create a continuum of care and improve medical diagnosis and treatment decisions based on data (Sieck et al., 2021). They also increase the amount of evidence-based knowledge, skills, and competence that professionals need to support healthcare, WHO (2021), as well as support in the deployment of applications that are safe for use by the young generation (Holland et al., 2023). However, device availability and ownership, technical expertise, and societal knowledge of health needs and disparities have an impact on access to digital health tools and technologies (Ahmed et al., 2020).

### METHODOLOGY

To provide a synthesis of the study objective while advancing and interpreting related literature, this research study employs a narrative literature review methodology. This methodology was used to investigate digital health tools and technologies dimensions for equitable access to health, including UHC. Several scholarly databases, including PubMed, Scopus, IEEE Xplore, and Google Scholar, were thoroughly searched in order to find pertinent conference papers and peer-reviewed publications. Studies released no later than 2018 were taken into consideration to ensure relevance. Furthermore, to guarantee a comprehensive yet targeted retrieval of relevant literature, a variety of keyword combinations were used, including "digital health", "universal health coverage", "equitable access", "developing economies", "digital health tools and technologies", "eHealth", "health informatics",

"telehealth", "mHealth", "health IT", and "health technologies". The inclusion criteria were designed to screen out studies that did not include issues pertinent to developing economies and to specifically address equitable access to health, including UHC and digital health tools and technologies. Ultimately, the findings from all included articles were reviewed to inform this study.

### RESULTS AND DISCUSSION

Following the review, digital platforms and applications informed digital health tools and technologies, where varied smart devices, informed the tools and technologies used to deploy varied interventions (Bloom et al., 2023; Chattu et al., 2021; Yao et al., 2022). From the review, digital interventions included mHealth, telemedicine (telehealth), the use of smartphone applications, and phone consultations (Bloom et al., 2023; Chattu et al., 2021; Yao et al., 2022). There were also mobile health wallet applications (Meessen, 2018), online software platforms (Meessen, 2018), and online medical support (Hadjiat, 2023).

In addition, eLearning platforms (Bundi et al., 2020) and the use of SMS-based health programs (Wilson et al., 2023) were other digital platforms and applications in use in digital health. The study by Pritchett et al. (2023) reported that despite digital tools having the potential to reduce inequalities when used properly in digital health, there existed ignorance of the constraints imposed by digital technologies on their ability to work, be accessed, and be easily used once they were implemented. Further, inequitable access to available digital tools and technologies called for creative strategies in the health sector, in cooperation with other sectors, disciplines, and systems, to achieve equitable access to health, including UHC (Bautista-Gomez & van Niekerk, 2022; Allen et al., 2023). For instance, a smart device was required to facilitate smart technology. Moreover, the device was smart in that it was a digital tool running a smart technology, hence a smart device (Singh & Landry, 2019; El-Hajj et al., 2019; Gómez-González & Gómez, 2020; Pritchett et al., 2023). For digital health and any other smart technology, the internet was not only required to be available but also accessible (Azzopardi-Muscat & Sørensen, 2019).

Therefore, from the review, internet access, device access to digital content, availability of smart devices,

and availability of the internet are highlighted as key requirements in line with digital health tools and technologies. Considering societal, and digital health tools and technologies inefficiencies on equity, access, adoption, use, and affordability, especially in remote settings (Bautista-Gomez & van Niekerk, 2022; Miller et al., 2023; Hadjiat, 2023), as well as among groups such as people with low-income levels, people who are geographically isolated, and older adults (Dassah et al., 2018; Miller et al., 2023), these highlighted dimensions should be factored in for impact in digital health.

### Discussion

Following the review, among the tools and technologies for equitable access to health, including UHC, were smart gadgets and installations, among them tablets, smartphones, smart wearables, and smart ambulances. Key technologies in use included big data analytics technology, blockchain technology, artificial intelligence (AI), remote monitoring and forecasting, as well as Internet of Things (IoT) (El-Hajj et al., 2019; Singh & Landry, 2019).

From the review, the device was smart in that it was a digital tool running a smart technology, hence a smart device (Singh & Landry, 2019; El-Hajj et al., 2019; Gómez-González & Gómez, 2020; Pritchett et al., 2023), and it required internet availability and accessibility (Azzopardi-Muscat & Sørensen, 2019). Further, equitable access to health, including UHC, requires that the interventions be available and accessible to the target population (Miller et al., 2023). The study by Dassah et al. (2018) highlighted the need to explore access problems, especially in rural settings, when developing digital health interventions. Miller et al. (2023) emphasised access and availability of digital health for all in a population to eliminate health disparities that affected technology access, adoption, and use. Further, the study by Bautista-Gomez and van Niekerk (2022) reported that creative strategies, including access, were required to ensure digital health covered all in a population, including the vulnerable population.

To add to this, Allen et al. (2023) emphasised on coverage and the consideration of marginalised populations to minimise healthcare disparities, whereas Hadjiat (2023) proposed consideration of access, affordability and coverage as key factors in delivering digital health interventions. Hence, access and

availability were key dimensions, considering that digital health was impacted by both social and technical characteristics. Therefore, the key findings were that internet access, availability of smart devices, device access to digital content, and availability of the internet were key digital tools and technology dimensions for equitable access to health, including UHC.

### CONCLUSION AND RECOMMENDATION

**Conclusion:** This study is a specific follow-up on target 3.8 on achieving universal health coverage and is tied to SDG3 on ensuring healthy lives and promoting well-being for all. All factors considered, this study adds to the knowledge and practice in the field of health. Advances in digital technology, including the use of artificial intelligence, more accommodating political environments, and an increasing amount of data proving the efficacy of these technologies, are making digital health an essential part of healthcare delivery. Health systems have been proactive in creating ways to help patients obtain digital health care when access to in-person therapy is not possible. In some cases, these systems remain unsuitable and inaccessible, particularly to people in disadvantaged locations, unless the relevant aspects have been considered.

Equitable access to health, including UHC, requires that digital health tools and technologies work to minimise exclusions resulting from access and availability. To start with, target tools and technologies to support digital health in a given population are required to be available and accessible for optimal use and impact. Ensuring access and availability of the internet and smart devices and considering device access to targeted digital content will facilitate the use of digital health services, various online information systems within the health sector, as well as online access to available digital health programmes.

**Recommendation:** Considering that economies are governed through policies and regulations, government policies and regulations in developing economies need to be aligned to consider technological advancements and to facilitate the availability and access of digital health interventions to the population. In doing this, an economy is clear on the services that are required by its people and how access and availability of key devices, digital innovations and interventions reach its population. Moreover, a consideration that the internet is not only available but accessible, that required smart

devices are available, and that the devices can access digital content should be prioritised. Finally, developing economies subsidies, where available, in line with digital health tools and technologies, should also be distributed for equitable access to health, including UHC.

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