

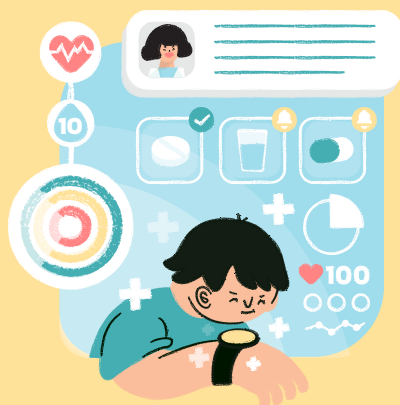


Unpacking Digital Health: A breakdown of concepts and definitions

Highlight

- Digital health is an umbrella term that includes all healthcare services that are provided by ICT. From one's personal wearable devices to the use of big data and AI in healthcare come under digital health.
- Under the umbrella of digital health technology, various sub-groups such as electronic health (e-health), mobile health (m-health), telehealth, and telemedicine are often cited.
- Electronic health, popularly known as e-health, can be considered similar to digital health. Thus, often times, e-health and digital health are aptly used interchangeably.

Background



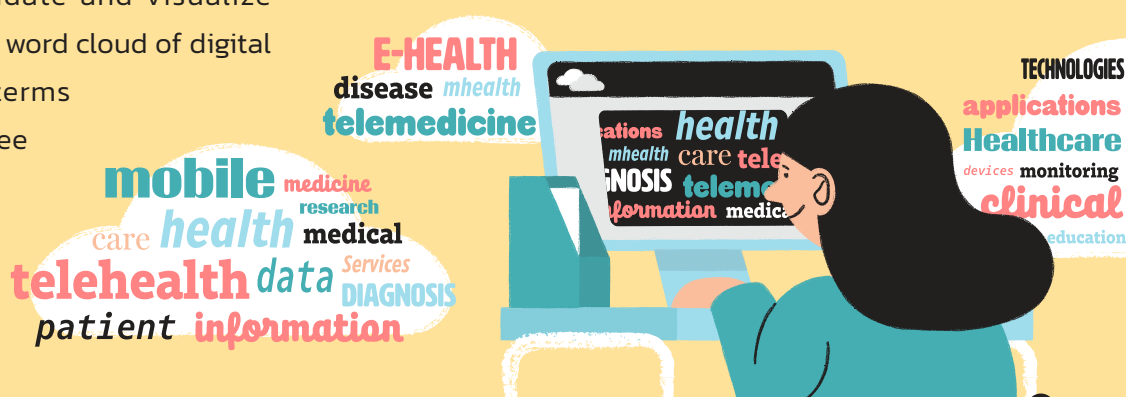
Information and communication technologies (ICT) play a significant role in the socioeconomic development of modern society.¹ ICT reduces the barriers to communication and improves access to information. With the advancements in ICT came its rapid use in the healthcare sector. Such an intersection between ICT and healthcare is referred to as digital health. The World Health Organization (WHO) defined digital health as the use of ICT to support health and health-related fields.² A wide range of these digital technologies, including mobile apps, wearables, artificial intelligence (AI), and big data, have been deployed to increase the speed, efficiency, and cost-effectiveness of public health services.³

Rationale of conceptualizing digital health terminologies

Under the umbrella of digital health technology, various sub-groups such as electronic health (e-health), mobile health (m-health), telehealth, and telemedicine are often cited.⁴ However, these terms are used interchangeably with no international consensus about their definitions. Integration of digital technologies in the health system requires the coordination of multiple stakeholders such as digital technology experts, engineers, software developers, health system managers, health care providers, and funders. Thus, to establish an efficient cross-disciplinary coordination and communication between different stakeholders, a clear conceptual definition of these terms is crucial. Additionally, universal definitions for these terms are inevitable for assessing the outcomes of such technologies, for monitoring, evaluation, implementation, and reimbursement purposes.



clouds.com/⁵



Furthermore, upon reviewing multiple literature we concluded that electronic health, popularly known as e-health, can be considered similar to digital health. Thus, often times, e-health and digital health are aptly used interchangeably.



Figure 1: Word cloud of digital health and associated terms

Telehealth and Telemedicine: What's in a name?

Telehealth, a term that gained momentum following the current COVID-19 pandemic, is a sub-set of the broader umbrella term "digital health". Telehealth can be considered as a branch of digital health that employs ICT for the delivery of clinical, non-clinical and educational services from one location to another remote location⁶.

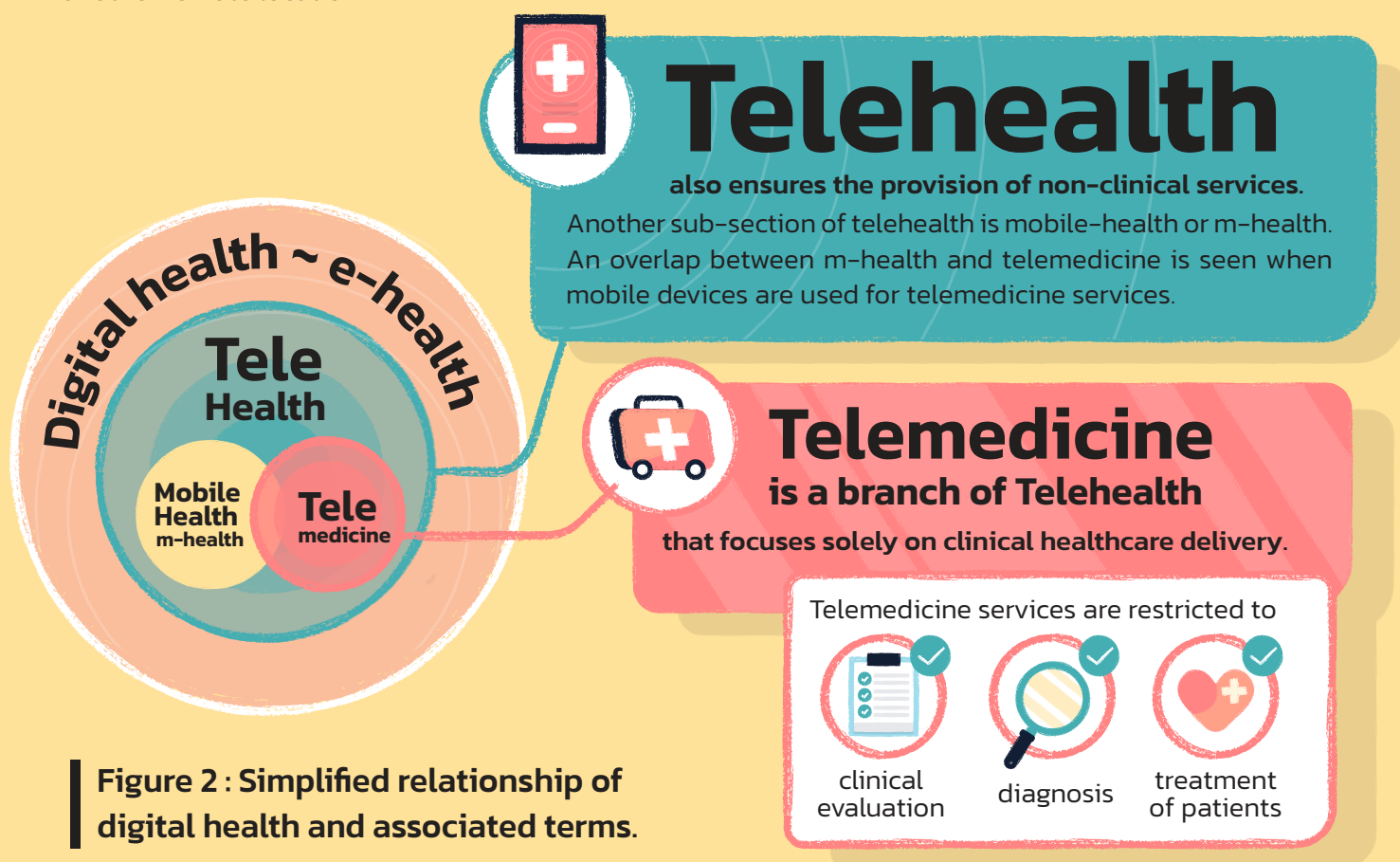


Figure 2 : Simplified relationship of digital health and associated terms.

However, personal wellness applications that do not require a healthcare provider come outside the scope of telemedicine but are still within the broader term go telehealth. Figure 2, to certain level, tries to summarize relationships across terms.

Discussion

The uniqueness between different applications and types of technology for digital health has created a substantial gap in having a consensus on how we define digital health. The common challenge with this comes specifically for the payers and governments that assess value of new technology to ensure equitable coverage. Taxonomy and an inclusive definition for the terms is significant because of the following reasons:



Taxonomy is vital to understand how the broader concepts involve multidisciplinary characters and whether these concepts are sustainable, equitable and inclusive for both the user and provider of services.



Clarifying the definition of digital health and developing fundamental concepts will have significant implications on ongoing research & development and will help lay out goals and operational strategies for successful implementation including monitoring and evaluation of such technologies.

Our work builds on existing evidence and tries to simplify the concepts of digital health for all^{4,6}. Our visualization of the digital health landscape can aid in providing a simplified understanding of the common terms discussed under digital health. This information can be especially useful for researchers, policy makers and public and private sector players when planning for monitoring, evaluation and implementation, including when making reimbursement decisions. However, this illustration is not without its limitations. A rapid scoping along with the use of snowballing technique to identify the relevant literature was used for the synthesis of this framework. Since the synthesis was not preceded by a robust systematic review, there are chances that the reviews might not have included some significant publications. In order to address these limitations and to accommodate the ever-growing nature of this field, we propose to constantly review and update this framework by the researcher to capture all the latest technology as well as their implications to the digital health service providers and recipients. Over the last two decades the development and acceleration of information technology has prompted the emergence of a fourth revolution and this has not left the health sector. Though a late adopter, the health sector quickly adjusted to the digital wave during the pandemic. Thus, this conceptualization of digital health can be a stepping stone to our inevitable transition to the era of digitalization of healthcare. In conclusion, borrowing the tweet by Dr. Tedros, Director General of WHO, "The future of health is #digital. It's a must that we embrace it"

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