Editorial

Telemedicine: a unique, univocal, and shared definition for everyone

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Abstract

The text discusses the historical development of telemedicine and underscores its significance in clinical practice. It traces the concept back to 1910, specifically mentioning telecardiology's early use with a telephone-connected stethoscope. NASA contributed to telemedicine by remotely monitoring astronaut John Glenn's physiological parameters during his space flight in the 1960s. A notable achievement in 1965 involved performing an aortic valve operation in Houston, Texas, with real-time visual contact maintained via an intercontinental satellite to a university in Geneva, Switzerland. The introduction of telecommunication technologies in medicine gained momentum with widespread access to global teleinformatic networks, leading to advancements like surgical robots.

In 1995, Dr. Bashshur defined telemedicine as an integrated system utilizing telecommunications and computer technology to deliver healthcare remotely, substituting face-to-face interactions. Various subsequent definitions, including those by the EU and governments, emphasized distance in healthcare provision.

Concurrently, eHealth lacked a precise definition, contributing to linguistic confusion. The WHO, recognizing this, incorporated eHealth under the broader term "digital health", encompassing areas such as big data, genomics, and artificial intelligence. However, the lack of clarity persists, with ongoing debates reflecting the need for a unified understanding, as seen in recent dedicated volumes.

The term "telemedicine", derived from Greek roots meaning "far" or "distant", is considered overly restrictive and "medicine" in ancient Greece (ἰατρική), which was seen as a field of knowledge and practice dealing with diagnosing, treating, and preventing diseases. Presently, telemedicine transcends physical separation, emphasizing unique information flow features, revolutionizing medical thought. The existing definitions may no longer be applicable due to evolving clinical scenarios, prompting the proposal of a more inclusive and adaptable term.

Despite alternative suggestions, "telemedicine" remains widely recognized and ingrained in the collective consciousness. The proposed definition underscores its application using advanced technologies to address diverse healthcare needs in real time. This definition encompasses preventive, predictive, therapeutic, and rehabilitative aspects at both individual and community levels, emphasizing collaboration across disciplines and accountability to patients and communities.

In navigating the complex healthcare sector, an anticipatory governance approach is advocated to mitigate potential adverse effects and ensure informed decision-making. This approach involves creating plausible scenarios collaboratively with stakeholders, integrating tools and data for cooperative planning in healthcare's evolving landscape. The proposed definition and anticipatory governance approach aim to provide clarity, fostering understanding and facilitating effective utilization of telemedicine in the dynamic realm of healthcare delivery.

Telemedicine includes a variety of novel technologies and is becoming more and more essential in the clinical routine. The term telemedicine relates to the implementation of telecommunication technology in the context of medical care.

As early as 1910, telecardiology began to evolve with the introduction of a device that utilized the telephone to transmit sound recordings captured by the stethoscope. Furthermore, electrocardiogram records have been transmitted by means of the phone and other successive telecommunication techniques for many years[1-3].

Telemedical systems were prepared and first used by NASA. During the space flight of American astronaut John Glenn, physiological parameters were remotely monitored, and the results were transmitted to Earth[4-6].

In 1965, through an interactive connection using the intercontinental satellite Early Bird (TV link-up), M. DeBakey performed an aortic valve operation in Methodist Hospital (Houston, Texas, USA), maintaining constant visual contact with the university in Geneva, Switzerland[7].

Naturally, these pioneering experiences led to the introduction of various telecommunication technologies in medicine, which allowed indirect contact between doctor and patient. The significance and possibilities of telemedicine increased only with the advent of mass access to the global teleinformatic network. The possibility of remote operations was the main reason for the development of surgical robots. Clinically used surgical robots originated from the abandoned Star Wars program conducted in the 70s and 80s[8,9].

All manned flights since the 60s have been a great example of practical telemedicine[10,11].

In 1995, Bashshur[12] emphasized the need to "define and evaluate" telemedicine based on its effects on the healthcare system in terms of cost, quality, and accessibility. The fundamental concept was that telemedicine was considered an integrated system for delivering healthcare services using telecommunications and computer technology as a substitute for face-to-face interactions between healthcare providers and patients[12].

Subsequently, many definitions followed this approach, including those of the European Union (EU) Commission or Governments. Telemedicine was defined as "the provision of healthcare services at a distance"[13] or "telemedicine means a way of providing healthcare services... in situations where the health professional and the patient... are not in the same place"[14].

Several current literature articles, including narrative and systematic reviews, analyzed the characteristics of telemedicine, with a particular focus on its real-world application in different regions and areas, as well as the limits or barriers to its adoption[15]. This emphasis has been placed on understanding its practical implementation rather than strictly defining its theoretical characteristics.

Many papers have also addressed the definition of eHealth, which is often viewed in parallel with telemedicine as if there were an equivalence between medicine and health, corresponding to telemedicine and eHealth. Concerning eHealth, it has been noted that the term was quickly accepted and widely used but without a precise and clear definition[16].

The World Health Organization (WHO) guidelines incorporated eHealth under a broader umbrella term, digital health, which encompasses emerging areas such as advanced computer science in big data, genomics, and artificial intelligence[17]. According to Merriam-Webster, an umbrella term is something that covers or embraces a broad range of elements or factors[18].

This diversity in terminology and initiatives has led to linguistic confusion and hindered the development of a common understanding of the meaning of the term eHealth. This term is used in tens of thousands of scientific publications and millions of informative articles[19], making it important to establish a common understanding or identify areas of disagreement for evaluation or comparison of eHealth initiatives[16].

The ongoing debate over eHealth is more vibrant than ever, as evidenced by a recent volume dedicated to eHealth[20].

In practical terms, telemedicine differs from eHealth as Ford T® from Tesla®. Both can be used to transport from place A to place B, but only Ford T® just that.

The initial definition of telemedicine, originating within the European Community, defined it as "the provision of healthcare services through the use of information and communication technology (ICT) in situations where the health professional and the patient (or two health professionals) are not in the same location. It involves secure transmission of medical data and information, through text, sound, images, or other forms needed for the prevention, diagnosis, treatment, and follow-up of patients"[13].

The European Community experts provided a more comprehensive definition, stating that "telemedicine is the integration, monitoring, and management of patients, as well as their education and that of healthcare staff, using systems that allow prompt access to the advice of experts and patient information, regardless of their location"[21].

This definition is closely aligned with what is known in the United States as "Telehealth", a broader concept encompassing not only remote patient assistance but also the reorganization and rationalization of the entire healthcare system[22].

These definitions are influenced by the etymology of the word "telemedicine", originating from the Greek words "τηλε-" and "τῆλε", meaning "far" or "distant" and "medicine" in ancient Greece (ἰατρική), which was seen as a field of knowledge and practice dealing with diagnosing, treating, and preventing diseases. The word "medicine" comes from Latin, more precisely from the Latin word "medicina", which means "the art of healing". The Latin word "medicina" derives from "medicus", meaning "doctor" or "healer". This is interesting because it shows how two cultures merge into one word.

A medieval example of telemedicine was represented by the xenodochi (in Latin: xenodochium, from the Greek "ξενοδοχεῖον", from "ξένος", guest, and "δέχομαι", "to welcome", "to host" or "to receive"), which referred to institutions or individuals who provided hospitality and assistance to foreigners or travelers in the Middle Ages, through structures used as a free hospice for pilgrims and foreigners[23]. Xenodochi and similar institutions were often organized into networks, especially if they were run by religious communities or monastic orders. These networks allowed for a more effective distribution of resources, manpower, and knowledge to support hospitality and care activities. For example, during the medieval period in Europe, monastic orders such as the Benedictines and the Knights Hospitaller were known to operate networks of xenodochi, hospices, and hospitals along pilgrimage routes and other strategic locations. These networks provided ongoing support for travelers and those in need of assistance[23].

The organization into networks made it possible to broaden the impact of reception activities and cover a wider geographical area. Furthermore, networks could share resources and experiences to improve the effectiveness of their operations.

At present, it is apparent that the literal translation of the term "telemedicine" is overly restrictive and inappropriate. This translation limits the application of telemedicine to an unspecified distance or to the condition of "not in the presence". It also fails to consider the essence of the term "medicine", which fundamentally refers to a science rather than a mere act, service, or provision.

The core element of telemedicine is not necessarily the separation between the primary actors (doctor and patient), but rather the unique features of information flow, extending beyond verbal communication between the doctor and patient (or written communication between experts). This information encompasses recording, transmission, modification, and interpretation, independent of distance. The key focus is on the results for the patient, their state of mind, and their life.

Therefore, telemedicine primarily represents an evolution of medical thought, driven by the collection and management of information in novel ways, not restricted to in-person interactions. The revolutionary aspect lies in how information is collected, shared, and understood, as it allows for measurements that are typically not detectable in traditional clinical examinations.

"Telemedicine is dead; long live telemedicines"[24]. This statement suggests that the definitions proposed earlier may no longer be applicable due to the continuum of real situations and the proliferation of clinical variations where it is no longer possible to distinguish between in-person and remote healthcare based on clinically relevant criteria.

It is essential to change the definition of telemedicine to address this evolving landscape. Otherwise, it will be challenging to assess its proper use and potential risks. Therefore, it is necessary to create a general term to encompass this expanding field of medical knowledge, with precise ethical, legal, clinical, and scientific implications. This term should be inclusive and adaptable to accommodate different variations of the concept.

The term "telemedicine" is suitable for this purpose, as it has become widely recognized and ingrained in the collective consciousness. This term, despite various alternatives proposed later, has not been replaced.

In our opinion, the most appropriate definition is as follows:

"Telemedicine is that component of medical science that, through the use of the most advanced technologies, including ICT and others, is systematically applied in real time and real life to address and fulfill the real and perceived needs of patients, healthcare personnel, and citizens. It also aims to advance research to enhance the utility and effectiveness of medicine in preventive, predictive, therapeutic, and rehabilitative fields, both from a clinical perspective at the individual level and in terms of public health for the community. Telemedicine strives to overcome distance-related challenges and further optimize care processes in terms of efficiency, appropriateness, and effectiveness".

This definition can encompass alternative definitions, especially regarding social, ethical, legal, clinical, and scientific implications and research orientation. It allows for collaboration across disciplines and emphasizes accountability to patients and the community.

To avoid potential adverse effects, limited perspectives within organizations, and unforeseen results that may arise in complex systems like the healthcare sector after implementing telemedicine, it is essential to establish an anticipatory governance approach. This approach involves creating plausible scenarios, not as predictions, but as potential future frameworks achieved through the collaboration of all stakeholders and the integration of tools and data. It enables better decision-making based on informed trends, facts, and evidence, and encourages cooperative planning for the healthcare landscape's future involving government officials and citizens[25,26].

DECLARATIONS

Ethical approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

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