FINDING THE RIGHT TERM: FROM TELEMEDICINE TO DIGITAL HEALTH

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Abstract: Digital technology broke the barriers between citizens and healthcare professionals making the access to medical care easier. New terms as telemedicine, eHealth, telecare, etc. emerged.
It appears that different meaning is assigned to one and the same term, so it is not amazing that a confusion has arisen. The authors try to answer the question: What is the correct terminology?
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ОТ ТЕЛЕМЕДИЦИНА ДО ДИГИТАЛНО ЗДРАВЕ - ПРАВИЛНАТА ТЕРМИНОЛОГИЯ

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Ключови думи: Телемедицина, електронно здравеопазване, дигитално здраве, терминология

Резюме: Дигиталните технологии преодоляха бариерите между гражданите и здравните специалисти, улеснявайки достъпа до медицинска помощ. Появиха се нови термини като телемедицина, електронно здравеопазване, дигитално здраве и др.
Изглежда, че на едно и също понятие се придава различно значение, така че не е удивително, че възниква объркване. Авторите се опитват да отговорят на въпроса: Каква е правилната терминология?

Introduction

Terminologies are medical terms and concepts used to describe, classify, and code various elements as well as to describe the relationships among them. With the wide application of information and communication technology (ICT) in healthcare, using a structured and standard terminology (nomenclature) becomes essential. More than 150 years ago the famous epidemiologist William Farr wrote:

"the nomenclature is of as much importance in this department (medical, the authors) as weights and measures in the physical sciences, and should be settled without a delay" [1].

This observation remains true today, as standard terminology is the main key to true interoperability between systems. Worldwide-accepted nomenclature ensures that shared data are interpreted correctly and can be reused. Standard terminology supports disease surveillance and cross-border healthcare services, facilitates decisions and global healthcare planning and assists patient care especially in cases when the treatment is complex and involves multiple stakeholders.

The unprecedented technological innovation that has characterized the last few decades, as well as the exponential increase of available data, have fostered the development of new terms. The World Health Organization estimates that several thousand new medical terms are created every year. This generates a huge challenge not only for the medical staff but also for all of us as patients and/or

citizens. The necessity of clear, widely agreed terminology is a must. The top reason for a standardized terminology is to speak a standardized language, as this will allow all medical professionals and citizens, all over the world to understand each other and communicate effectively. At least, until this becomes a reality, people must know what they are talking about. The need for guidance in the rapidly expanding terminology set is urgent.

This paper, as some previous publications [2, 3], provides a look at available terminology, its meaning and application in the point of intersection of healthcare and information technology.

Telemedicine and eHealth

Telemedicine encompasses diagnostic, treatment and prevention processes within the frame of modern health care services. The latter are carried out primarily by means of telecommunication and computer technologies.

Telemedicine history goes back to over 150 years [4, 5].

Many authors dated the origin of the term telemedicine to 1974, referring to the article of R. G. Mark [6], despite of the fact that the "telemedical technique/technology" was used by R. L. Murphy et al. in 1970 [7]. Further historical investigations have forced us to revise this. In 2014, while working with reference sources, we found that the term "telemedicine" was used as far back as 1927!

A column of the retrospective articles and letters to the editors were published on page 47 in the newspaper "Greeley Daily Tribune", Greely Town, Colorado, USA, on November 16, 1970. They cited the story of Geo W. Gale "Wants Plane to Change Weather Here". This information represented a rather doubtful discourse concerning meteorological changes that could be caused by planes. However, the last paragraph was of special interest as the author unexpectedly quotes the following: "If we have telephotography, why can't we have telemedicine, so that you could walk up to the radio machine, drop your dollar in the slot, take down the particular receiver required and apply it to that part of your anatomy where the pain is? (doctors, please snicker)" [8] (Fig. 1).

The cited article is from December 29, 1927. It is obvious that this material is not a scientific article. Nevertheless, we record that the term "telemedicine" was used for the first time in a publication in December 1927.
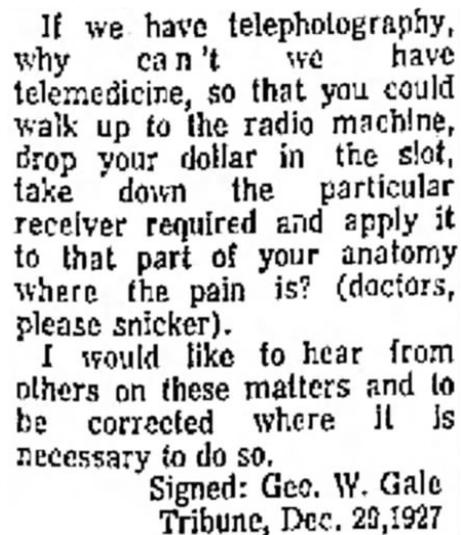
If we have telephotography, why can't we have telemedicine, so that you could walk up to the radio machine, drop your dollar in the slot, take down the particular receiver required and apply it to that part of your anatomy where the pain is? (doctors, please snicker).

I would like to hear from others on these matters and to be corrected where it is necessary to do so.

Signed: Geo. W. Gale
Tribune, Dec. 29,1927

Fig. 1. Fragment of the note with the term "telemedicine" dated 29.12.1927

For decades, there was no internationally accepted definition of telemedicine. A study published in 2007 found 104 peer-reviewed definitions of the telemedicine [9]. Recognizing this, the World Health Organization (WHO) [10–11] adopted the following broad description of telemedicine according which telemedicine is:

"*The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities*".

In sum, WHO has underlined that telemedicine includes four interrelated elements: (1) clinical support; (2) usage of various types of information technology thus leading to the (3) improvement of health outcomes and (4) overcoming the geographical barriers, connecting users.

With more involvement of the electronic communication systems, the major international organizations, European Union (EU), International Telecommunication Union (ITU) and European Space Agency (ESA) have officially adopted the denomination "eHealth".

"*eHealth refers to the use of modern information and communication technologies to meet the needs of citizens, patients, healthcare professionals, healthcare providers, as well as policy makers*" [12].

Ehealth provides a new method for using health resources such as information, money, and clinical services. With the time, it should help to improve the efficient use of these resources. The Internet also provides a new medium for information dissemination and for interaction and collaboration among institutions, health professionals, health providers and the public. That is why WHO underlines that eHealth is "the transfer of health resources and health care by electronic means" and incorporates three main areas:

- The delivery of health information, for health professionals and health consumers;
- The use of IT and e-commerce to improve public health services, through the education and training of health workers;
- The use of e-commerce and e-business practices in health systems management.

In 2005, the World Health Assembly recognized eHealth as the way to achieve cost-effective and secure healthcare and urged its Member States to consider drawing up long-term strategic plans for developing and implementing eHealth services and infrastructure in their health sectors.

It is necessary to mention one more term – mHealth. mHealth or "mobile health" is a component of eHealth. It involves the provision of health services and information via mobile technologies, such as mobile phones, tablet computers and Personal Digital Assistants.

Recently, the following two terms are also often used:

Telehealth & Telecare

Telehealth is the means by which technologies and related services, concerned with health and well-being, are accessed by people or provided for them, irrespective of their location [13].

Telehealth involves the use of telecommunications and virtual technology to deliver health care. The part of telehealth, requiring access only to telecommunications, is the most basic element of eHealth [14].

Is telehealth different from telemedicine? The answer is "Yes". The reason is that telehealth refers to a broader range of distant services as compared to telemedicine. Telemedicine focuses on clinical services, while telehealth may include lots of non-clinical services as for example administrative activities as meetings or management support, educational activities, training seminars, access to literature and medical knowledge, etc. Telehealth includes various forms of surveillance, health promotion and public health functions.

The second term is telecare. Telecare is the support and assistance provided at a distance using information and communication technology. This is an automatic, non-stop remote monitoring of users. It enables and supports citizens living in their own homes or in institutions. Telecare helps to minimizing risks. To fulfil its goals it relies on sensors. These sensors are either part of a telecare system and send the information to the monitoring service or a "stand along" devices that the user or the caregiver have. The latter are not connected to the community system. For example, sensors for smoke and gas or floods are part of telecare devices. In addition, telecare services may include reminders to take medicines on time, help in real time emergencies like falls, contacting help centers automatically, if and when needed; may organize quick contact with family members, doctors, emergency services, etc. It is also able to arrange home visit when needed, etc. Telecare systems are able to alarm the user for possible or emerging problems by sound alarm, flashing lights or vibration.

As the hype of telemedicine/eHealth was dying, new terms were required in order to maintain the interest in the field. Terms as pHealth (personal health) or uHealth (ubiquitous health) [15] were introduced.

Health Science Journal defines Personal Health as the ability to take care of your health by making conscious decisions to be healthy. It not only refers to the physical well being of an individual but it also comprises the wellness of emotional, intellect, social, economical, spiritual and other areas of life. Personal health care may also be provided to people those who are not able to take care of themselves such as mentally or physically disabled individuals.

Closely related to both personal health, telehealth and telecare is the concept of Ambient Assisted Living (AAL). It is focused on aging citizens and its strategic goal is help them live as

independently as possible. The AAL combines all services and devices that support independent life. The Gabler Dictionary of Economics emphasizes that AAL technologies range from automatically switching off lights to monitoring vital parameters and notifying medical staff in case of emergency. No doubt AAL is offering an important service as the life expectancy is increasing and more and more countries are confronted with an ageing society. Yet, AAL is nothing new, except on the narrow focus on the aging population.

What is Ubiquitous Healthcare? The IGI Global, the leading international academic publisher's free online dictionary describes uHealth as a "healthcare to anyone, anytime, and anywhere by removing location, time and other restraints while increasing both the coverage and quality of healthcare".

In sum, both pHealth and uHealth did not contribute significantly to the better understanding of ICT applications in healthcare. They are not widely used.

Last but not least is the term smart health. It appeared recently within the concept for the smart city. According to Blue Stream Consultancy, "smart healthcare is defined by the technology that leads to better diagnostic tools, better treatment for patients, and devices that improve the quality of life for anyone and everyone." The key concept of smart health includes eHealth and smart home [16].

During last decade, the buzzword is Digital Health.

Digital Health

Is digital health something new? What is it? No doubt, digital healthcare technologies are leading the way and their implementation is increasing. However, defining digital health is not easy as there is no consensus on its definition.

Recently, the term digital health was introduced as "a broad umbrella term encompassing eHealth (which includes mHealth), as well as emerging areas, such as the use of advanced computing sciences in 'big data', genomics and artificial intelligence" [17].

The World Health Assembly Resolution on Digital Health approved by WHO Member States in May 2018 underlined the recognition of the value of digital technologies to contribute to advancing universal health coverage (UHC) and other health aims of the Sustainable Development Goals. This resolution urged all ministries of health "to assess their use of digital technologies for health and to prioritize, as appropriate, the development, evaluation, implementation, scale-up and greater use of digital technologies..." [17].

Recent studies revealed that Artificial Intelligence (AI) and Big Data techniques contribute significantly to digital health. Their successful application is due to up-to-date computer resources and the availability of massive datasets. Both AI and Big Data can improve the management of information therefore supporting a more precise and advanced patients' treatment and supervision.

Thus, we come across the next broadly used term, the universal health coverage.

Universal Health Coverage

What is it? The concept is that UHC has to ensure that all people can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user and the family to a financial hardship. As Dr. M. Chan, underlined, while addressing the 65th World Health Assembly, in May 2012, "Universal health coverage is the single most powerful concept that public health has to offer".

UHC is firmly based on the WHO constitution from 1948, on the Health for All agenda set by the Alma Ata declaration from 1978 and on the recent declaration that health is a fundamental human right. UHC embodies three related objectives [18]:

- Equity in access to health services, i.e. everyone who needs services should get them, not only those who can pay for them;
- The quality of health services should be good enough to improve the health of those receiving services and
- People should be protected against financial-risk, ensuring that the cost of using services does not put people at risk of financial harm.

The need of UHC is due to many facts, to cite some [19]:

- At least half of the world's population still do not have full coverage of essential health services;
- > 800 million people spent at least 10 % of their household budgets to pay for health care;
- At least a billion people suffer each year because they cannot receive the health services they need;

- Annually 100 million are pushed below the poverty line because of direct payments for health;
- Only in the European Region annually >19 million people still make out-of-pocket health payments that place an enormous burden on their household budgets;
- Globally, in the next twenty years, 40–50 million new health care workers must be trained and deployed to meet the needs of world population for decent healthcare service. This goal is impossible to achieve.

UHC is a global health priority and part of the Sustainable Development Goals under target 3.8. Expectations are high concerning the impact on the health of populations across the world. Yet, it is not a panacea. Many things are not part of it. The most important is that UHC does not mean providing all possible healthcare services free of charge to the population as there is no country that can afford this. Yet, it is essential to underline that UHC is not only about ensuring a minimum package of health services. It is also about progressive expansion of health services, includes population-based services as public health campaigns, etc.

The relation between UHC and telemedicine, eHealth and digital health is presented on Fig. 2.

Moving towards UHC is a continuous journey. There is no single model or any universal successful program yet. The transition depends on the characteristics of each country or community - economic growth, available resources, government's political will and implementation capacity, degree of solidarity in society and many more. The question is not whether to implement UHC but how. One of the answers is – by applying eHealth / digital health.
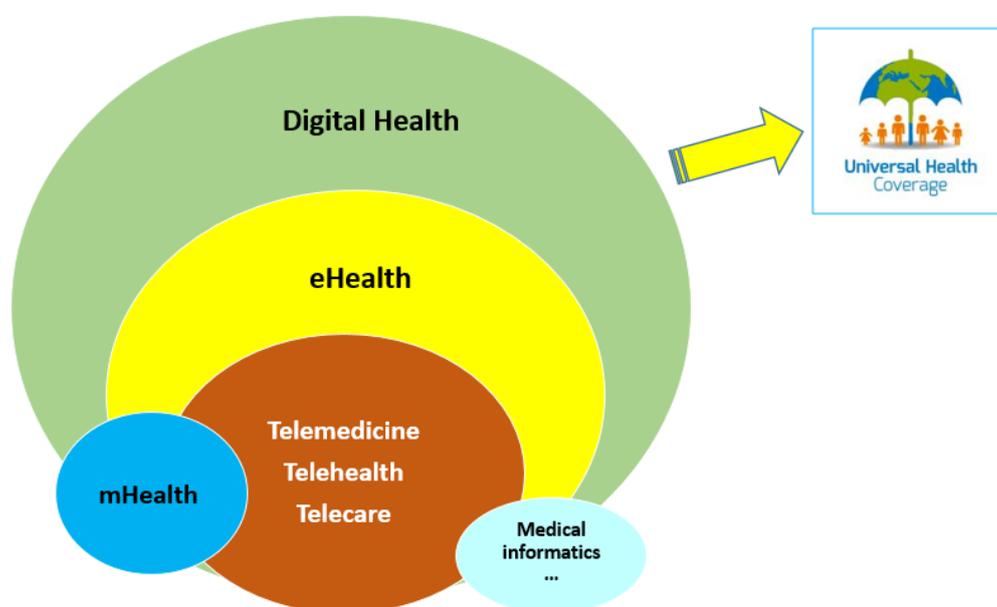

Fig. 2. Relation between terms

The Correct Terminology

What is the correct terminology? Which term to use – telemedicine or eHealth? Or, may be telehealth or digital health? To this very moment, the terminology has neither been agreed in Europe nor at worldwide level.

Paradoxically even between and within the countries from EU different terms are used to describe one and the same service. Positions differ and the preferences are usually influenced by individual experience, personal and professional viewpoints. Thus for some authors telemedicine and eHealth are synonyms. Others accept that eHealth is a broader term and includes telemedicine. A third group separate the terms, accepting that telemedicine incorporates telecardiology, teleradiology, telepathology, tele-ophthalmology, teledermatology, telesurgery, tele-nursing, etc., while eHealth comprises of e-Santé, Information and Communication Technologies in health (ICT-Health), all types of health communication services, PACS, patient information systems, e-education, e-prescription, etc.

Apart from personal preferences, there are geographical differences in the terminology use. The evolution of terms in different countries often differ. A term that is unused in one place may be ubiquitous in another. Let us cite two examples. In Europe, and especially in EU, the term eHealth is

the official one. It is part of the healthcare action plans such as the European Commission's eHealth Action Plans 2004 and 2012–2020. It is also included in number of other general legislations of the community as the EU Directive 2011/24 on Cross-border Health Care, Privacy protection Directive 95/46/EC, Arts. 8–12; eCommerce Directive; etc.

In the USA, the terms telemedicine and telehealth (recently) are predominantly used. Perhaps one of the reasons is that the American Telemedicine Association is the one that, for almost 3 decades, "coins" most of the federal and state policies. It sticks to telemedicine perhaps not only because this is the word that first appeared, but also as it is included in the name of the association.

What is the situation in WHO? Gradually, the organization is replacing telemedicine with eHealth or even digital health. The simple search at the beginning of November 2019 of WHO virtual database reveals that today eHealth is used 2.5 times more in WHO documents (356 documents) as compared to telemedicine (only 139 results).

Conclusion

Globalization and new technologies forces healthcare to enter in a period of rapid change. Although healthcare is a result of the decisions taken at the political, economic and social level, the health of the population is the pillar of development. Otherwise, social and economic improvements will not be sustainable. Health problems should be addressed and solved and innovative solutions as wide application of ICT must be explored no matter whether there is a consensus on standard terminology. Until worldwide agreement on terminology is reached, by staying abreast of new developments and coinciding terminology, people would be able to develop a nuanced understanding of the healthcare information and diminish mistakes in communication.

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