RAZMEJITEV IN OPREDELITEV POJMOV TELEZDRAVJE, EZDRAVJE, TELEMEDICINA IN DIGITALNO ZDRAVJE

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Povzetek Izrazi telezdravje, e-zdravje, telemedicina in digitalno zdravje se pogosto uporabljajo izmenično. Odločili smo se, da preučimo pojavljanje vsake besedne zveze z uporabo baze podatkov Scopus, da bi s tem prispevali k definiciji konceptov teh storitev. Odločili smo se, da bodo drugi podobni izrazi ali pod izrazi predmet nadaljnjih študij. Skupaj 95.884 dokumentov je vsebovalo enega od štirih izrazov v naslovu, povzetku ali ključni besedi. Telemedicina je bila najpogostejši izraz, saj se nanjo nanaša 64.149 dokumentov, sledi e-zdravje s 23.754 in nato telezdravje z 22.387 ter digitalno zdravje z 8.599 primeri. Članki so bili najpogostejša vrsta dokumentov za vse štiri ključne izraze, sledili so pregledni članki in prispevki s konferenc. Razlike v stopnji sprejemanja štirih izrazov kažejo na dvoumnost v njihovi opredelitvi in pomanjkanje jasnosti v konceptih, na katere se nanašajo.

Ključne besede: telezdravje, eZdravje, telemedicina, digitalno zdravje

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Demarcation and Usage of the Terms Telehealth, eHealth, Telemedicine and Digital Health

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Abstract The terms telehealth, e-health, telemedicine and digital health frequently used reciprocally or interchangeably. We decided to examine the occurrence of each phrase using the Scopus database in pursuit to add to the definition of the concepts of these services. We decided that other similar terms or sub-terms will be a subject of further studies.[1] A total of 95,884 documents contained one of the four terms in the title, abstract or keyword. Telemedicine was the most common term, with 64,149 documents referring to it, followed by e-health by 23,754 and then telehealth with 22,387 and Digital health with 8,599 documents. Articles were the most common type for the four key terms, followed by review articles and conference papers . We note that the diversity in the use of the four concepts indicates the vagueness of the concepts and the need for a more precise definition of services and the establishment of certain definitions.

Keywords: telehealth, eHealth, telemedicine, digital health

[1] Such as mobile health, mHealth, e-care, Minimally Invasive Surgery (MIS) and Highly Active Antiretroviral Therapy (HAART) ICT health, Predictive, Preventive and Personalized Medicine.

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1 Introduction

Standards of telehealth services are not yet set in national, EU and international strategies. The stages of implementation, if any, should be investigated and researched. Analysis and anticipated steps toward solutions should be proposed. Even before that and due to the novelty of telehealth and related areas or sub-areas, the meaning of the term 'telehealth service' itself should be defined as it can carry different orientations or emphases in different settings among developers and providers of services. The same applies to other related terms.

In this paper we will briefly introduce the terms and then present trends of usage through the occurrence of these terms with literature review.

2 Introduction of terms

2.1 Telehealth

Telehealth is a broad term that refers to the provision of healthcare services using telecommunications and digital technologies. It encompasses a wide range of services, including teleconsultation, telemonitoring, and teletriage. Telehealth is patient-centric and aims to provide healthcare services remotely. It is used to diagnose, treat, and prevent diseases, as well as manage chronic conditions. Telehealth services can be delivered in real-time, such as video consultations, or store-and-forward, such as sending patient data to healthcare professionals for review. Telehealth provides many benefits to both healthcare providers and patients. For providers, it enhances access to patients and reduces the cost of delivering healthcare services. Patients, on the other hand, benefit from reduced travel time, convenience, and improved health outcomes. Telehealth is particularly useful for patients living in rural or remote areas, where access to healthcare services is limited.[1]

2.2 E-Health

E-health refers to the use of electronic technologies to improve healthcare services. It involves the application of information and communication technologies (ICTs)

[1] Rudel D., Fisk M. (2012), Rudel D., Fisk M. (2011).

to support health services, such as electronic health records, health information exchange, and patient portals. E-health is not limited to patient care but also includes the administration and management of healthcare services. It enables the efficient and effective delivery of healthcare services, resulting in improved health outcomes. E-health has several advantages, including improved accuracy and accessibility of medical information, reduced medical errors, and improved communication between healthcare professionals. E-health is particularly useful in the management of chronic conditions, such as diabetes, where patients can monitor their health status and communicate with healthcare professionals remotely. E-health also facilitates research and analysis of health data, leading to improved health policies and decision-making.[2]

2.3 Telemedicine

Telemedicine is a subset of telehealth that involves the use of telecommunications and digital technologies to provide clinical healthcare services. It involves the remote diagnosis, treatment, and monitoring of patients. Telemedicine includes the use of video consultations, remote monitoring devices, and mobile health (mHealth) applications. Telemedicine is used to provide primary and specialist care services, such as mental health, cardiology, and dermatology. Telemedicine has several benefits, including improved access to healthcare services, reduced healthcare costs, and improved patient outcomes. It is particularly useful in the management of chronic conditions, such as hypertension and diabetes, where patients can monitor their health status and communicate with healthcare professionals remotely. Telemedicine also reduces the need for hospitalization, resulting in reduced healthcare costs.[3]

2.4 Digital Health

Digital health is a broad term that refers to the use of digital technologies in healthcare. It encompasses telehealth, e-health, and telemedicine. Digital health includes the use of mobile health (mHealth) applications, wearable devices, and health informatics. Digital health aims to improve health outcomes, enhance patient

[2] Rudel, D., Fisk M. (2018).

[3] Samar Brenčič et al., (2020).

experience, and reduce the cost of delivering healthcare services. Digital health also facilitates the collection and analysis of health data, leading to improved health policies and decision-making.[4]

Figure 1: Scheme of demarcation of terms
(Rudel, 2020)

3 Methods

To retrieve all publications referring to the terms 'telehealth' or 'e-health', 'telemedicine' and 'digital health', the Scopus electronic database was searched. We decided to use the respected database due to a wide range of sources, offering advanced search facilities which also provide an analysis of results feature. The search was conducted in February 2023. The terms were used to search the title, abstract and keywords, taking into account also spelling variants such as 'telehealth' and 'tele-health'; 'tele-medicine' and 'telemedicine'; e-health and eHealth and one variant for 'digital health' using the OR option.

The following query method was used to retrieve data for all four terms respectively:

- TITLE ((ehealth) OR (e-health))
- ABS ((ehealth) OR (e-health))
- KEY ((ehealth) OR (e-health))

[4] Thiel T. et al. (2018)

- (TITLE ((ehealth) OR (e-health))) OR (ABS ((ehealth) OR (e-health)) OR (KEY((ehealth) OR (e-health)))

In the search were included all journal categories, all languages and dates of the publication to the exception of the year 2023 for accurate statistics.

The distribution over time, by document type and by country was provided by Scopus functionalities.

4 Results

4.1 Occurrence in number and language

The terms Telehealth, eHealth, Telemedicine and Digital health occurred in the title, abstract or keyword of 95,884 documents in total. Telemedicine was the most common term, with 64,149 documents referring to it, followed by eHealth (23,754), closely behind was telehealth with 22,387 and then Digital health with 8,599 documents.

In Table 1 we can see the number of documents referring to each term and their combinations in title, abstract and keyword. The majority of these articles (95%) were in English, (see Table 2) and 10 articles were also written in Slovenian language.

Table 1: Number of documents with telehealth, e-health, telemedicine and digital health and their combinations in title, abstract and keyword for the period 1964 – 2022

	Title	Abstract	Keyword	Title or Abstract or Keyword
Telehealth	6,048	10,065	17,769	22,387
eHealth	7,310	13,724	15,476	23,754
Telemedicine	12,883	21,735	57,278	64,149
Digital health	2,509	4,619	4,553	8,599
Telehealth or eHealth or Telemedicine or Digital health	28,771	46,696	78,657	95,884

Source: Scopus

Table 2: The top three languages of the articles retrieved using the four search terms telehealth, e-health telemedicine and digital health in the title, abstract or keyword

	no.	%
English	91,601	95
German	1,592	1,6
French	985	1,02

Source: Scopus

4.2 Occurrence per year

First of the terms to be used in published documents was telemedicine. It appeared as early as 1964, within an article The uncontrolled variable by Aldous J.G. and the same year in The Journal of the American Medical Association, a letter by E. A. Gaston titled Telemedicine: Is Ben a Boon?

"The term telehealth appeared in the documents in 1978 and continued with less than four documents per year until 1996 when a steady growth started. Although articles containing the term e-health appeared later than the other two terms, the rate of increase was higher."[5]

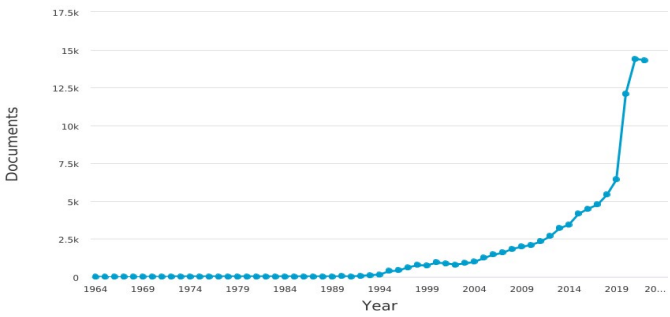

Figure 2: Number of documents per year total

[5] Fatehi F., Wootton R. (2018)

4.3 Document type

Articles (14,241) were the most common type for the four key terms, followed by review articles (3,267) and conference papers (1,700). (See table and figure 3)

Table 3: Numbers of top four different document types with telehealth, e-health, telemedicine and digital health in the title, abstract or keyword for the period 1964 to 2022

Document type	Total
Article	14,241
Review	3,267
Conference paper	1,700
Other	3,179

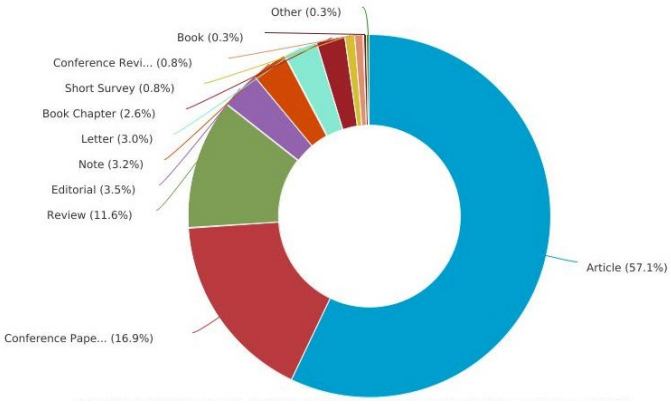

Figure 3: Percentage of different document types with telehealth, e-health, telemedicine and digital health in the title, abstract or keyword in total for the period 1964 to 2022

5 Conclusion

Telehealth, e-health, telemedicine, and digital health are concepts that have emerged due to advancements in technology in the last two decades and are still being defined.

Different levels of acceptance and use of the four terms points to the ambiguity in definition and in understanding specifics of each concept and the concrete service that is behind that particular concept. Telemedicine being the earliest and most

popular term is followed by the term telehealth and e-health, based on the number of publications in the Scopus database. Least used also due to its novelty is the term Digital health. The number of publications is steadily increasing for all of the four terms as it was also foreseen by the authors in the past decade.

While these terms are related, they have distinct differences that need to be understood. In order to reach such understanding the process of the service that is behind each term needs to be defined. Only then the process of standardization can begin as the proper terms will be used by practitioners, developers and financiers. The terms will be defined by the individual parts of the service that are characteristic of it and actually fall under a specific service title.

Further research will be needed in order to prepare a more precise demarcation of services. That might further serve the standardization of processes and also contribute to the rise of the quality of services.

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