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Are we all singing from the same song sheet? Standardizing terminology used in inter-professional telehealth education and practice: a mixed method study

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Abstract

Background Telehealth interventions have proven essential in maintaining healthcare delivery during the global pandemic. However, its broader adoption within different healthcare settings has been impacted by inconsistent and non-standardized terminology, which poses challenges to global implementation and stakeholder communication. This article addresses these barriers by analyzing telehealth-related terms and developing a detailed clinical guide to aid inter-professional health educators in adopting standardized terminology, improving clarity, and fostering collaboration.

Methods A mixed-methods approach was used, comprising four phases. Phase 1 included weekly online journal club sessions (February to August 2024) focused on digital health topics, where relevant terms were discussed and extracted. Phase 2 involved detailed transcription analysis to identify telehealth-related terms based on their frequency of use and relevance to digital health. Phase 3 was a systematic literature review to contextualize and refine the identified terms. Phase 4 entailed expert validation, where five digital health professionals reviewed the proposed terminology and provided refinements. Additionally, terms were cross-referenced with the Medical Subject Headings (MeSH) database to evaluate their existing definitions.

Results A total of 314 telehealth terms were identified through discussions in the International Journal Club in Digital Health (IJC DH) and a literature review. Approximately 90.44% of these terms were sourced from 12 journal club sessions, covering topics such as Digital Health, Digital Psychiatry, Neurorehabilitation, and Robotic Surgery. The literature review contributed 30 unique terms, with further analysis revealing that 73% of the terms were not defined in the MeSH database. This finding underscores the evolving nature of telehealth and the need for terminology standardization. Expert reviews validated most proposed definitions, though specific terms required additional discussion.

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Conclusions The resulting standardized terminology guide enhances inter-professional collaboration in telehealth by providing clear and consistent definitions. This guide reduces miscommunication, facilitates interdisciplinary research and practice, and can be integrated into educational curricula to prepare future healthcare professionals for the complexities of digital health. By addressing terminology gaps, this study supports the advancement of telehealth education and improves patient care outcomes.

Keywords Definition, Digital health, Inter-professional collaboration, Medical education, Medical practice, Telemedicine, Terminology

Background

Telehealth refers to the use of electronic information and telecommunication technologies to support long-distance clinical healthcare, patient and professional health-related education, public health, and health administration. It encompasses a broad range of services, including remote consultations, monitoring, and education, and is distinct from telemedicine, which focuses specifically on clinical services [1, 2]. This definition highlights the comprehensive scope of telehealth, and its critical role in modern healthcare systems.

The surge in telehealth usage during the COVID-19 pandemic has been widely documented, with numerous studies highlighting its benefits in maintaining healthcare services and reducing the risk of virus transmission [3, 4]. However, the global implementation and scaling of e-health solutions depend heavily on clear communication, standardized principles, and shared understanding among all stakeholders [5]. The absence of universally accepted terminology often results in confusion and miscommunication, which undermines the global applicability and effectiveness of telehealth practices [6]. This underscores the need for developing and adopting standardized terminology to enhance the efficiency and consistency of telehealth implementation worldwide [7].

Efforts have been made to develop telehealth taxonomies, yet none have achieved universal adoption. These initiatives include categorizing telehealth based on interaction types, location of medical authority, urgency of care, and timing of communication [8, 9]. This lack of standardization results in significant variations in how telehealth is integrated into healthcare curricula and implemented across systems, further limiting opportunities for effective collaboration and consistent application [10]. These disparities highlight the necessity for a robust taxonomy that not only provides conceptual clarity but also fosters knowledge sharing, enhances education, conceptual clarity, and guides policy development [9].

One prominent approach is the taxonomy proposed by the Center for Information Technology Leadership (CITL), which categorizes telehealth based on four key factors: type of interaction, location of the medical authority, urgency of care, and timing of communication. Some investigators have also explored taxonomies derived from the etymology of terms like telemedicine, telehealth, telecare, and telecure to improve understanding and classification [11]. Several studies emphasize the evolving nature of telehealth terminology [12, 13, 14], yet a significant gap remains in the standardization of these terms, particularly in the context of inter-professional practice. Larger-scale studies and implementation science methods are recommended to balance rigor with practical applicability, thereby reducing delays in the adoption of research findings [8, 9, 10]. A standardized taxonomy would facilitate better knowledge sharing, research, and policy initiatives [7].

To our knowledge, no systematic efforts have been undertaken to assess the importance of defining telehealth terminology comprehensively. Therefore, this study analyzed data collected over a specific period to identify commonly used telehealth terms. Reviewers assessed the importance of terminology, rated terminology utilization, and selected terms deemed most relevant for telehealth practice. By addressing this gap, we aim to provide a detailed guide on the terminology used in inter-professional telehealth practice, offering standardized definitions that can enhance communication, ensure consistency in education and practice, and improve collaboration across healthcare disciplines. Ultimately, these efforts will support the advancement of telehealth research, education, and practice, contributing to improved patient care and outcomes. We conducted this study to explore the following research questions:

1. How do inter-professional health providers and educators define and apply telehealth terminology in their daily practice?
2. What are the perceived challenges and benefits of using standardized telehealth terminology among inter-professional health providers/educators?

Methods

This study utilized a mixed-methods approach to explore and define telehealth terminology for inter-professional practice. In this study, we conducted a one hour weekly online journal club for discussing a novel or recent digital health issues that has been published and also digital health technology that has been developed. The International Journal Club in Digital Health (IJC-DH) is a virtual forum established to facilitate interdisciplinary

Table 1 International journal club in digital health (IJC DH) topic and Speaker's profession

Session	Gender	Speaker's Profession	Topic of Discussion	Ref.
1st	Male	Assistant Professor in Dept. of Digital Health	Artificial intelligence and digital health in global eye health: opportunities and challenges	[17]
2nd	Female	Attendant Professor in Dept. of Digital Health	Integration of personalized drug delivery systems into digital health	[18]
3rd	Male	Assistant Professor in Dept. of Digital Health	Effectiveness of an intensive, functional, and gamified rehabilitation program on upper limb function in people with stroke (EnteRtain): a multicenter randomized clinical trial	[19]
4th	Female	Professor in Reproductive Health	Telehealth use in maternity care during a pandemic: a lot of bad, some good and possibility	[20]
5th	Male	Assistant Professor in Faculty of Medicine	A proposed model for drug demand forecasting and ordering inventory system for dengue endemic	[21]
6th	Male	MSc Candidate in Telehealth	Exploring the potential of gamification strategies for cognitive stimulation and engagement in individuals with dementia	-
7th	Male	Assistant Professor in Psychiatry	The growing field of digital psychiatry: current evidence and the future of apps, social media, chatbots, and virtual reality	[22]
8th	Male	Assistant Professor in Neurology	Neurorehabilitation from a distance: can intelligent technology support decentralized access to quality therapy?	[23]
9th	Female	Associate Professor in Nursing Education	Can a validated website help improve university students' e-health literacy?	[24]
10th	Female	MSc Candidate in Telehealth	History of telesurgery: its implementation in extreme healthcare	[25]
11th	Male	Company CEO	Telesurgery in telerobotics and medical innovators	-
12th	Male	Robotic Surgeon	Robotic telesurgery training center	-

discussions and knowledge-sharing in the field of digital health. It is hosted collaboratively by Tehran University of Medical Sciences (TUMS), Iran, and Universitas Muhammadiyah Surabaya (UMSurabaya), Indonesia, with participation open to international healthcare professionals, researchers, and academicians interested in digital health advancements. The study was conducted in four main.

Phase 1: participants, recruitment, and online journal club sessions

Participants and recruitment

The inclusion criteria for the study required participants to be healthcare professionals, researchers, or academicians actively working in or studying digital health. They were expected to have professional or academic experience in interdisciplinary health-related domains such as telehealth, artificial intelligence in healthcare, or e-health literacy, with availability to participate in at least 50% of the scheduled sessions during the journal club timeline (February to August 2024). Participants were excluded if they lacked prior background or had minimal exposure to digital health practices or research, were unable to attend over 50% of the sessions due to scheduling conflicts, or were not affiliated with academic or professional organizations related to health sciences or digital health.

Participants for IJC DH were recruited globally using various online platforms to promote interdisciplinary engagement. Invitations were distributed through professional networks like LinkedIn, targeting digital health professionals, and academic lists of universities and medical organizations. Social media platforms were leveraged with relevant hashtags to expand reach. Additionally, announcements were made at webinars and virtual conferences focused on digital health, attracting professionals actively contributing to the field. This comprehensive approach ensured international representation and diverse expertise, creating a rich environment for collaborative and engaging discussions. Specific clinical backgrounds and experience of participants is highlighted below in Results: Phase 1.

We then recruited speakers for 12 sessions of IJC DH. The speakers were professionals with diverse background that actively exposed with digital health practice. Every topic of discussion was selected from published academic paper or original presentation by the speakers. To ensure the relevance, novelty, and appropriateness of the topics, each session's theme was reviewed and approved by the relevant academic committee from Department of Digital Health (DDH) at TUMS. This approval process ensured that the topics were aligned with current trends and research in digital health (shown in Table 1). All IJC DH sessions were recorded, and each session had a participation rate of over 50% of the total members,

highlighting the active engagement of the international digital health community.

Online journal club sessions

We organized a weekly one-hour online journal club from February 2024 to August 2024, focusing on contemporary digital health topics. Each session encouraged discussions on emerging trends, innovative technologies, and pressing challenges in the field. The IJC DH featured speakers from diverse professional backgrounds, encompassing academia, clinical practice, and healthcare industries. Studies selected for discussion adhered to systematic criteria, ensuring high-quality and impactful content. These criteria included relevance to digital health, focusing on telehealth implementation, artificial intelligence, and e-health literacy. Selected studies were required to come from highly cited, peer-reviewed publications. Preference was given to research introducing innovative technologies or methodologies, with a diverse range of topics covering clinical, educational, and policy aspects of digital health.

Phase 2: data analyzing

Qualitative phase

The qualitative phase of data analysis involved transcribing all recordings and categorizing the data to identify commonly used telehealth-related terms. Recordings and transcripts from 12 journal club sessions, as well as extracted articles, were analyzed using a conventional content analysis approach. This method, as described by Hsieh and Shannon (2005), follows an inductive process, allowing codes and categories to emerge organically from the data without relying on preconceived frameworks. To facilitate efficient organization and categorization, all recordings were transcribed and analyzed using Excel.

Three researchers, [L.R], [S.SA], and [A.SH], independently conducted the analyses to ensure robustness and minimize bias. Each researcher thoroughly reviewed the transcripts, highlighting key terms and categorizing them based on their relevance to telehealth practices, methodologies, or technologies. To determine the inclusion of terms in the draft terminology list, specific criteria were applied.

First, a term needed to appear in at least 50% (6 out of 12) of the journal club session transcripts to demonstrate consistent discussion and broad relevance within the digital health community. Second, researchers evaluated the contextual significance of each term, focusing on those that contributed meaningfully to discussions about telehealth. Peripheral or tangential terms were excluded to maintain the list's focus on impactful and relevant terminology. Lastly, identified terms were cross-checked during discussion meetings to resolve any inconsistencies. Only terms that were unanimously agreed upon by all three researchers, following rigorous review, were included in the draft list.

This structured and collaborative approach ensured that the qualitative phase captured terms with both frequency and contextual importance, providing a strong foundation for the subsequent quantitative and validation phases.

Quantitative phase

For the *quantitative phase*, the frequency of identified terms was calculated to assess their prevalence and significance. Data from the qualitative phase were exported to Excel for further analysis. The occurrence of each term across the 12 sessions and extracted articles was tallied, and descriptive statistics such as percentages and proportions were used to highlight the most frequently used terms. For instance, terms like "Digital Health" and "Telemedicine" were identified in over 80% of the sessions, indicating their prominence. Additionally, the identified terms were cross-referenced with the Medical Subject Headings (MeSH) database to evaluate their official definitions.

Phase 3: literature review

A comprehensive scoping review was conducted to evaluate the definitions and applications of telehealth terminologies, adhering to PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) guidelines to ensure transparency and reproducibility. The process began with the development of a systematic search strategy, refining search strings iteratively to capture all relevant literature. Keywords like "telehealth," "telemedicine," "digital health," "terminology," and "inter-professional collaboration," combined with Boolean operators, were utilized in academic databases such as PubMed, Scopus, and Web of Science to ensure a thorough selection of peer-reviewed articles. Eligibility criteria were established, including articles published in English between 2010 and 2024, focused on telehealth terminology and its application in inter-professional contexts, and peer-reviewed. Studies were excluded if they were conference abstracts, editorials, or lacked sufficient methodological detail.

As shown in Fig. 1, the search initially yielded 1,245 articles, which were narrowed to 1,032 after duplicates were removed. Titles and abstracts of these articles were screened, resulting in 312 full-text reviews, and 30 articles were ultimately selected based on relevance and methodological rigor. Data were then extracted, encompassing definitions of telehealth terms, their applications, and usage contexts, and synthesized to identify terminology gaps and areas needing standardization. Terms were also cross-referenced with the Medical Subject Headings (MeSH) database to determine if they were officially

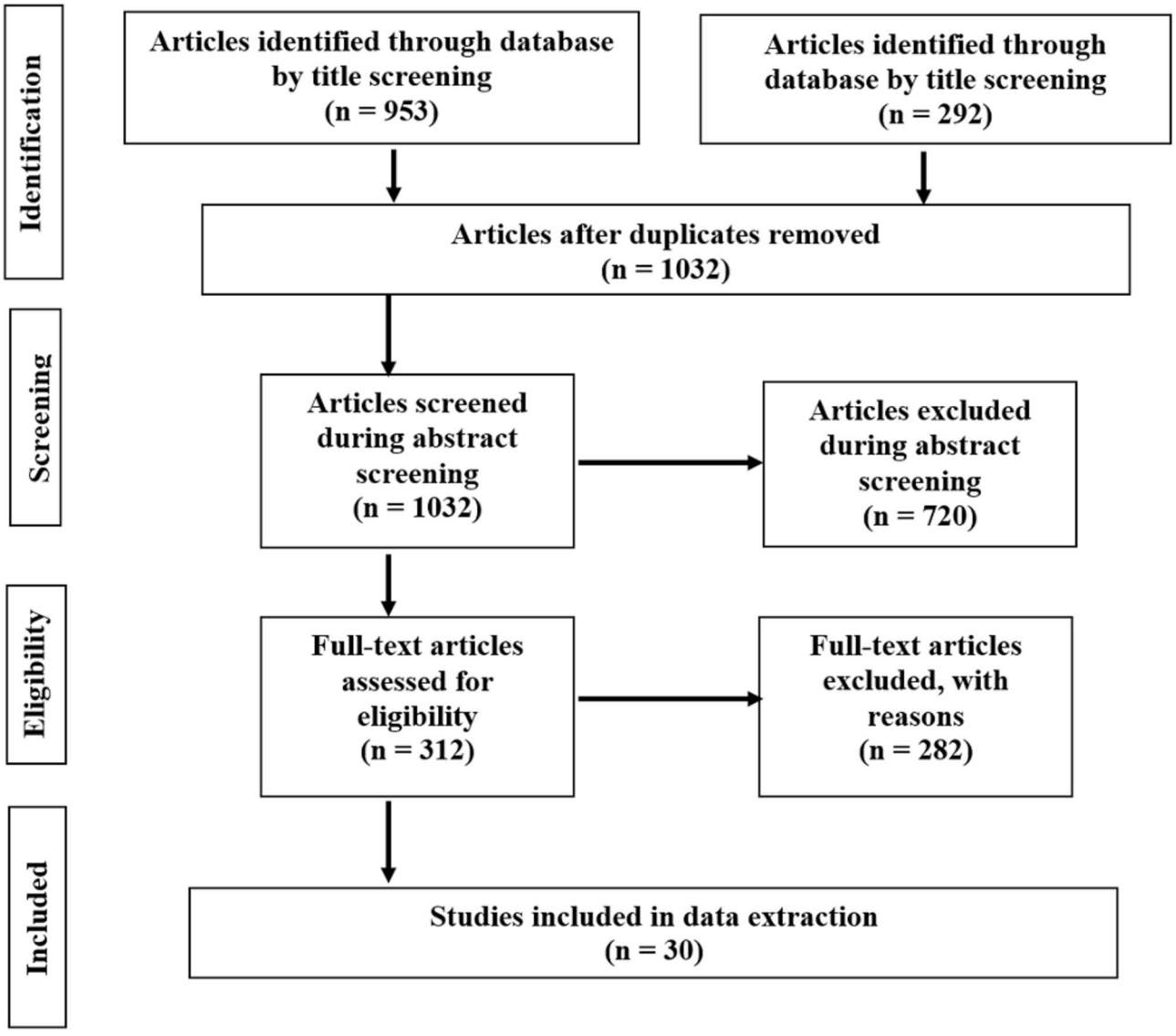

Fig. 1 PRISMA-ScR for Phase 3 Literature Review

defined, adding depth to the analysis and underscoring the evolving nature of telehealth terminology.

A term needed to be mentioned in at least 20% of the selected literature (6 out of 30 articles) to be included in the guide. This criterion balanced breadth and depth, ensuring that only widely acknowledged terms were incorporated. Terms were cross-referenced with the Medical Subject Headings (MeSH) database to evaluate their official definitions. Undefined terms in MeSH were prioritized for inclusion if they were identified as significant in both the journal club discussions and literature. The final list of terms, vetted during Phases 2 and 3, was reviewed and refined by five digital health experts in Phase 4 to ensure applicability, accuracy, and clarity in inter-professional contexts.

Phase 4: validation by experts

The proposed definitions and terminology guide were shared with five digital health professionals and educators for validation. For the purpose of this study, an expert was defined as a professional with extensive experience and recognized expertise in digital health, telehealth implementation, or related fields. These experts were selected based on specific criteria, including their academic qualifications, professional experience in telehealth, contributions to peer-reviewed publications, and active involvement in digital health education or practice. Characteristics of a telehealth expert include a deep understanding of telehealth technologies, practical experience in implementing telehealth solutions, and the ability to evaluate and refine digital health frameworks [15, 16].

Experts validated the terms through an evaluation process focused on accuracy, relevance, and clarity, employing global consensus-based judgment in the absence of formal guidelines. Independent assessments were followed by discussions to reach agreement on each term. A group of five experts reviewed the terminology guide, offering detailed feedback to refine definitions and ensure their applicability across inter-professional contexts. This number was chosen to achieve a balance between diverse perspectives and practical feasibility, enabling in-depth discussions and manageable coordination while representing a range of expertise. Such an approach reflects best practices in expert validation, where a focused group of specialists is often preferred to ensure quality and depth of feedback [16]. The final definition and terminology can be seen in Additional file 1.

Table 2 Demographic background of international journal club in digital health (IJC DH)

Demographic Data of IJC	*n* = 247	
	n	%
Gender		
Female	130	52,63
Male	117	47,36
Country		
1. Afghanistan	6	2,43
2. Armenia	3	1,21
3. Cuba	1	0,40
4. France	1	0,40
5. Germany	3	1,21
6. Indonesia	192	77,73
7. Iran	18	7,29
8. United States	1	0,40
9. United Kingdom	1	0,40
10. Taiwan	5	2,02
11. Thailand	1	0,40
12. Turkey	1	0,40
13. Nigeria	5	2,02
14. Pakistan	5	2,02
15. Lebanon	4	1,62
Last Degree		
1. BSc	18	7,29
2. MBBS	15	6,07
3. MD	38	15,38
4. MSc	25	10,12
5. Specialist	44	17,81
6. Fellow	4	1,62
7. PhD	21	8,50
8. Subspecialist	3	1,21
9. Other	79	31,98
Profession		
1. Anesthesiologist	2	0,81
2. Anatomy	1	0,40
3. Businessman	1	0,40
4. Cardiologist	1	0,40
5. Computer Science	6	2,43
6. Dentist	12	4,86
7. Dermatologist	4	1,62
8. Digital Health	17	6,88
9. Engineering	7	2,83
10. Dean	2	0,81
11. General Practitioner	29	11,74
12. Hospital Administration/Management	51	20,65
13. Religion	8	3,24
14. Researcher	15	6,07
15. Student	19	7,69
16. Surgeon	4	1,62
17. Others	68	27,53

This structured methodology ensured the integration of qualitative insights from discussions and quantitative analysis of term frequency and relevance, enabling the creation of a comprehensive and standardized telehealth terminology guide.

We collected all digital health terms identified from phase one, as well as the frequency used in each IJC DH session. Frequencies and percentage of the terms were tabulated. In phase two, the terms collected in phase one, were defined based on the literature review and presented in tabular form, then analyzed descriptively in phase three. In fourth phase, five experts from digital health backgrounds independently reviewed all defined terms using a constant comparative approach. We finalized terms definitions and we also identified key quotes.

Ethics

We received ethical approval to conduct the study from the Ethical Committee of Tehran University of Medical Sciences, under the ethical code IR.TUMS.MEDICINE.REC.1403.387.

Results

Phase 1: online international journal club sessions

The demographic analysis of the IJC DH in Table 2, reveals a highly diverse and international composition, with 247 participants from 15 countries, predominantly Indonesia (77.73%), followed by Iran (7.29%) and Afghanistan (2.43%). The gender distribution is relatively balanced, with 52.63% female and 47.36% male participants. In terms of educational background, a wide range of last degrees are represented, with a significant proportion holding "Other" degrees (31.98%), followed by specialists (17.81%) and MDs (15.38%). Professionally, the participants span 17 different fields, notably including hospital administration/management (20.65%), general practitioners (11.74%), and digital health experts (6.88%). This eclectic mix underscores the interdisciplinary nature of the journal club and its broad appeal across various regions and professional sectors within digital health.

IJC DH sessions highlighted a diverse array of topics and professional expertise, reflecting the breadth of digital health innovation and scholarship (Table 1). Male speakers, including assistant professors from various departments, a company CEO, and a robotic surgeon, addressed issues ranging from artificial intelligence in global eye health to telesurgery training centers. Female

speakers, comprising professors and associate professors from digital health, reproductive health, and nursing education, discussed topics such as personalized drug delivery, telehealth use in maternity care, and e-health literacy among university students. This mix of sessions and speaker professions underscored the critical multidisciplinary collaboration and the ongoing exchange of knowledge within the international digital health community.

Phase 2: data analyzing

The results illustrate a comprehensive overview of telehealth terminology collected from both IJC DH sessions and a literature review. An additional file described more detail about the final collected terminologies and their definition (see Additional file 1). It can be seen in Figure 2 that the majority of the terms (90.44%) were sourced from 12 sessions of IJC DH, indicating a broad and detailed discussion within these sessions on various aspects of telehealth. Table 3 summarized a significant number of terms related to Digital Health (84), Digital Psychiatry (51), Neurorehabilitation (31), and Robotic Surgery (50), showing the extensive use and exploration of digital tools, AI-driven solutions, and remote monitoring in these fields. The definition of each terms is explained in Additional file 1. Categories like Epidemic Mathematical Models and Gamification, though smaller, highlight the integration of specialized methodologies and interactive approaches in healthcare. The rapid technological evolution in telehealth is evident through specialized terms like "gamified intervention" and "robotic telesurgery," which reflect the industry's increasing complexity. Notably, the terms span a wide range of technologies and approaches, reflecting the dynamic and multifaceted nature of telehealth.

Phase 3: literature review

From the literature review, 30 unique terms were identified, encompassing advanced and niche areas such as Tele-poisoning care, Tele-lactation, and Virtual breast feeding support, among others. These terms enrich the overall dataset and emphasize the diversity in telehealth applications. When analyzing the definition of the terms that are provided in Appendices, it is evident that a significant proportion (72.62%) are not officially defined in MeSH, underscoring the evolving nature of the telehealth field and the introduction of new terminologies as technology advances. The officially defined terms in MeSH (27.38%) provide a foundation for standardizing and understanding common telehealth concepts. This analysis highlights the extensive reach of telehealth terminology and the continuous growth and innovation within the field.

Table 4 outlines key telehealth terms, combining recognized concepts like Digital Health and Telemedicine with emerging innovations such as Active Symptom Monitoring and Clinical Artificial Intelligence (cAI). It highlights AI-driven health interventions, tailored digital solutions like Personalized Digital Health Interventions, and technologies such as Digital Pills and the Intelligent Internet of Medical Things (IoMT). The importance of Digital Literacy and Game-Based Approaches is also emphasized, showcasing how telehealth enhances healthcare delivery, improves patient outcomes, and adapts to modern challenges.

Phase 4: validation by experts

Five digital health experts and educators reviewed the proposed definitions and generally agreed with the terminology guide. However, there were some areas of disagreement, indicating that certain terms require further discussion and refinement to achieve broader consensus. This underscores the dynamic and evolving nature of telehealth terminology, which is continuously shaped by technological advancements and practical applications in the field.

The variety of digital health terms highlights the need for standardization to enhance clarity and communication in inter-professional telehealth practice. Addressing these inconsistencies is essential for fostering more effective collaboration among healthcare professionals, ultimately improving the quality and efficacy of telehealth services. Standardized terminology ensures that all stakeholders are on the same page, which is crucial for delivering seamless and coordinated care.

The professions selected for this study, including general practitioners, specialists, nurses, digital health experts and educators, and other medical professionals, were chosen due to their pivotal role in implementing telehealth across various healthcare settings. These professionals are at the forefront of utilizing telehealth technology to deliver efficient and effective healthcare services, especially during the COVID-19 pandemic, which has significantly accelerated the adoption of digital technologies in healthcare. Their first-hand experiences and insights are invaluable for understanding the practical challenges and opportunities associated with telehealth education.

The perceived challenges and benefits of using standardized telehealth terminology

The results highlight several perceived challenges in using standardized telehealth terminology among interprofessional health providers and educators. A major issue stems from the dynamic and evolving nature of telehealth, as evidenced by the finding that 73% of the collected terms are not officially defined in the Medical

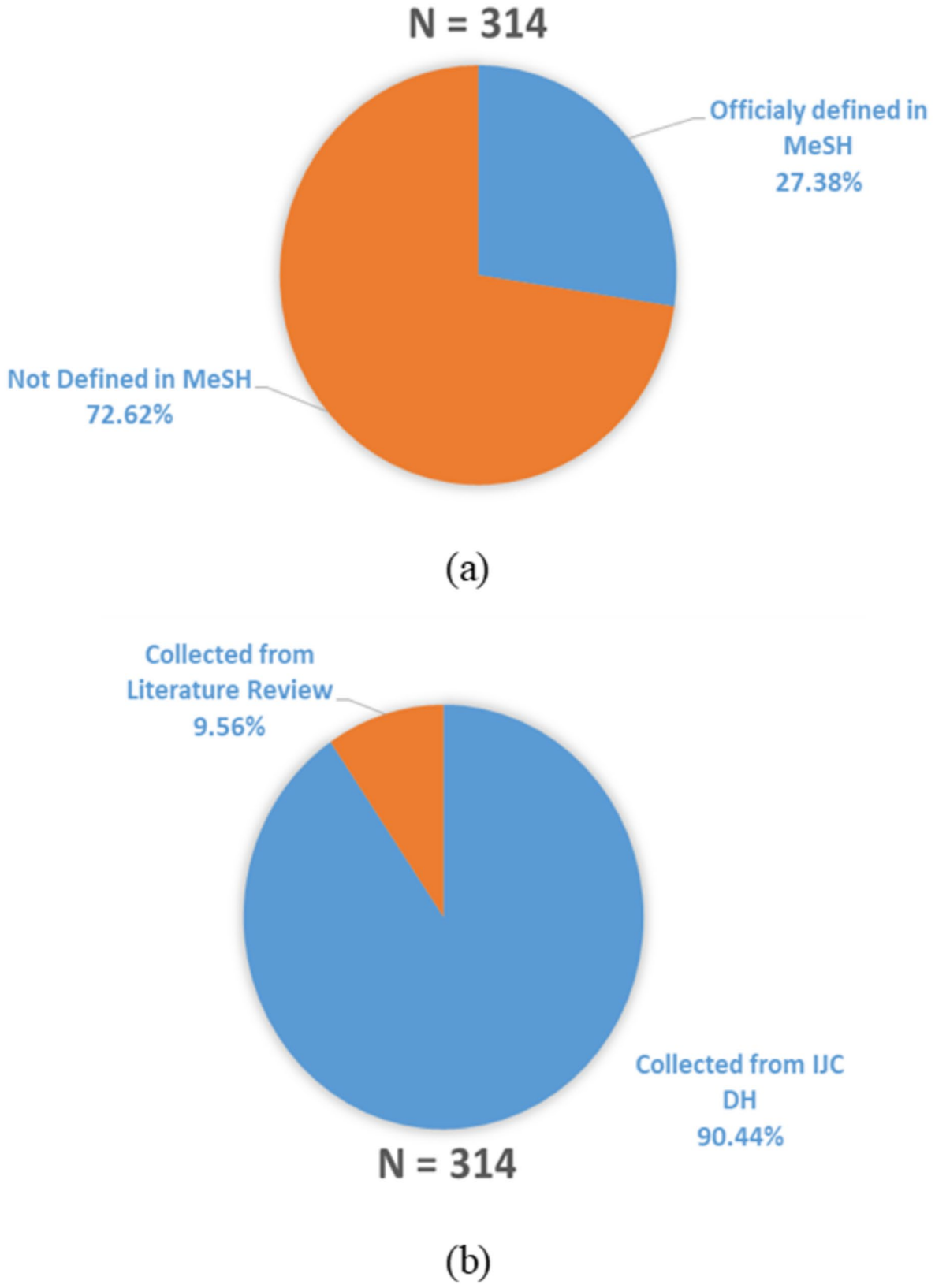

Fig. 2 Analysis of terms counted. (**a**) Term based on MeSH; (**b**) Terms based on sources

Table 3 Overview of telehealth terminology collected

Classification	Terms	Number
Terms collected from 12 sessions of IJC DH		
Digital Health	Data-driven approach; Telehealth; Global digital eye health task force; Telemedicine; AI-generated referrals; Automate clinical encounters; Cybersight AI; Remote consultations; Remote hubs; Real-time communication; Health monitoring; Intelligent internet of medical things; Electronic health records; Electronic patient records; Electronic medical record; Digital health integration; Digital health tools; Medicolegal issues; Digital Health Technologies; Software as a Medical Device (SaMD); AI-assisted diabetic retinopathy screening; Asynchronous store-and-forward telehealth models; Patient data confidentiality; Developmental and Exploratory Clinical Investigations of Decision support systems driven by Artificial Intelligence (DECIDE-AI); Digital therapeutics; Digitalized drug products; Digitalized medicine; Digitalized dose adjustment; Digital literacy; Digital healthcare; Digital pills; Telemetric capsule; Interactive personalized treatment; Pharmaceutical supply chain; Traceability; Digitalization of healthcare; Human-machine interface; Virtual visits; App-based communication; Digital worlds; Personalized Drug Delivery Systems (PDDS); E-prescription; Edible barcodes; Digital interconnection; Smart tracers; Traceable micro-tag; Data-enriched edible pharmaceuticals (DEEP); DNA reader; Edible silica micro tag; Cryptopharmaceuticals; Proof-of-concept app; Dose-level traceability; Customized information; Digital reminder; Digital features; Pharmaceutical drug products; Digital flexibility; Wearable device; Context-aware system; Medication adherence sensor; Technologies tracing behaviors; Ingestible electronics sensors; Smart pills; Medication monitor; Neuro-games; Therapeutic video game; Mass customization; Encapsulated information; Patient-tailored therapy; Gamified rehabilitation; Gamified training; VR-based gaming interventions; Functional task-based gaming therapy; Game-based rehabilitation program; VR-based gaming therapy; Delivery platforms; Digital monitoring; Remote telephone monitoring; Pre-pandemic telehealth services; Open text telehealth answers; Appointments; Visits; Hybrid version; Alternative telehealth; Technology; Implementation; Psycho-social screening.	84
Epidemic Mathematical Models	Susceptible-Infectious-Removed (SIR); Susceptible-Exposed-Infectious-Recovered (SEIR); Drug order system; Forecasting drug demand; Patients and drug data.	5
Gamification	Gamified intervention; Elements; System; Game-based approach; Activities; Learning experience; Full intervention; Techniques; Virtual environment; Real-time performance; Physical robots; Interactive devices; Wearable devices; Virtual badges; Virtual prize; Feedback and progress tracking.	15
Digital Psychiatry	Mobile mental health technologies; Digital health technologies (DHTs); Augmenting traditional mental health care; Digital phenotyping; Remote intervention; Integrated Promoting Action on Research Implementation in Health Services (i-PARIHS); Electronic medical records; Classical telepsychiatry; App-based therapeutic interventions; Smartphone-based survey; Active symptom monitoring; Remotely monitoring symptoms; Personalized digital health interventions; Just-in-time-adaptive-intervention (JITAI); Robot therapists; Automate therapy; Digital therapeutic alliance; Chatbot interventions; Virtual reality treatment; Virtual reality exposure treatment; App intervention; Computer-based interventions; Depression and anxiety apps; App-delivered interventions; Psychological interventions via smartphone; Smartphone-based interventions; Monitoring technology; Smartphone-based monitoring and treatment; Digital markers; Neural network approach; Passive monitoring; Transdiagnostic cognitive-behavioral app; Computerized or Internet cognitive behavioral therapy (iCBT); Digital mental health; Human facilitation of app-based tools; Digital navigator; Telepsychiatry; Traditional telehealth services; Internet-delivered therapy; Substitutable Medical Applications and Reusable Technologies (SMART); Fast Healthcare Interoperability Resources (FHIR).	51
Neurorehabilitation	Robot assisted therapy; Minimally supervised robot-assisted neurorehabilitation technologies; Connected RehabGym; Minimally supervised robotic-assisted therapy; Home-centered model of care; Home-centered model of neurorehabilitation; Remote patient monitoring; High-quality therapy from a distance; Telerehabilitation; Typical telerehabilitation scenario; Telerehabilitation approach; Socially assistive robots; Humanoid robot; Telepresence; Technology-assisted therapy; Rehabilitation robots; Technology-assisted interventions; Artificial intelligence; Clinical artificial intelligence (cAI); Assessment-driven therapy; Adaptation algorithms; Digital questionnaire; Caregiver; Teleconsultation; Virtual working alliance; Chat robot; Interface; Complementary upper limb robotic devices; Digital connected interventions	31
E-health Literacy	Italian-electronic Health Literacy Scale (eHEALS); Self-assessment tool; Online educational interventions; Health resources; Health information; Infodemic; Health information assessment skill.	6
History of Tele-surgery	Evolution of telemedicine; Exchange health information over long distances; Telesurgical laparoscopic cholecystectomy; Transatlantic human telesurgery; Robotic telecommunication; Robotic telesurgery system; Robot surgeon; Tele-operated robot; AR telesurgery; Virtual pen; Surgery operated from the air; Virtual medical operation center; Remote surgeons; Mobile surgical robot; Trans-oceanic telesurgery; Multisite surgical telementoring; Five degrees of freedom robot; Telementoring surgery; Transcontinental telesurgery; Robot-assisted teleneurosurgery; Underwater telesurgery; Automated Endoscopic System for Optimal Positioning (AESOP); Microgravity surgery; Telesurgery simulation; Space telesurgery; Lightweight prototype; Telesurgical robot; Robot-assisted microsurgery (RAMS); Miniaturized in vivo robotic assistant (MIRA); Remote surgical procedures; Real-time teleoperation; Teleconsultation; Computer-integrated surgery technology; Tele-surgical procedures; Robotic telesurgery system; Telesurgery site; Telesurgical console; Telesurgical slave; Complex remote surgeries; Remote robotic surgery; Health care technology; Health care delivery; Robotic surgery; Pilot project; Robotic telesurgery training center; Robotic telesurgery skill.	42

Table 3 (continued)

Classification	Terms	Number
Robotic Surgery	Remotely far away conducted surgery; Robotic rehabilitation systems; Robotic surgery simulator; Robotic surgery arm; Flexible robotic surgical tool; Laparoscopic assistant robot; Robotic surgery; Robotic rehabilitation; Medical simulators; Teleoperation; Surgeon's console; Telesurgery demo; Robotic surgery self-production development; Robotic surgery laboratory (RSL); Roadmap; Robotic services; Robotic urology surgery; Robotic digestive surgery; Robotic obstetrics and gynecology surgery; Robotic pediatric surgery; Robotic kidney transplantation; Tele-surgery service; Remote surgery; Robotic surgical systems; Tele-operated surgical robots; Remote assistance; Telesurgery technology; Robotic unit; Robotic surgery training; Robotic surgeon.	50
Terms collected from literature review		
Literature review	Robot-assisted micro-surgery RAMS; Digital psychiatry; Tele-poisoning care; Tele-lactation; Tele-intensive care; Tele-echocardiography; Synchronous primary care telemedicine; Synchronous telehealth; Virtual breast feeding support; Virtual breast feeding clinics; edible bar code; telehealth appointments; data-driven approach; Nurse-led homecare; telesurgery simulation; Video conference telehealth education; Virtual breast feeding education; Nurse-led telephone; Telephonic medical toxicology; Smart home; Tele-emergency care; E-midwife; Virtual ward; Smart hospital; Tele-emergency medicine; robotic surgery laboratory RSL; edible silica microtags; VR-based gaming therapy.	30
Total Terms		314

Subject Headings (MeSH) database. This lack of standardization creates confusion and inconsistency, complicating efforts to integrate telehealth concepts into education and practice. Furthermore, expert reviews revealed areas of disagreement regarding certain terms, emphasizing the need for ongoing discussion and refinement to ensure consensus. These challenges underscore the difficulty in achieving a universally accepted framework for telehealth terminology due to the rapid technological advances and diverse applications in fields such as Digital Psychiatry, Robotic Surgery, and Neurorehabilitation.

Despite these challenges, the benefits of adopting standardized telehealth terminology are evident. The study identified terms across diverse professional disciplines and applications, illustrating the potential for improved communication and collaboration through a shared language. For example, the extensive use of terms like "gamified intervention" and "robotic telesurgery" demonstrates how standardized terminology can facilitate the integration of innovative tools and approaches across inter-professional teams. Expert validation of the terminology guide further supports its relevance in bridging knowledge gaps and enhancing clarity in practice. By fostering a common understanding, standardized terminology can lead to more effective interdisciplinary collaboration, streamlined education, and ultimately better patient care and outcomes. The findings suggest that while challenges remain, the standardization of telehealth terminology is a critical step toward advancing the field.

Discussion

The COVID-19 pandemic significantly accelerated the adoption of telehealth across various healthcare settings, revealing both opportunities and challenges. One of the most pressing challenges was the lack of standardized terminology used in telehealth, which has emerged as a barrier to effective inter-professional practice and education. This lack of clarity can hinder communication amongst healthcare providers, ultimately affecting patient care and outcomes. A structured guide to telehealth terminology was important for ensuring consistency and clarity in communication, particularly in interdisciplinary teams that must collaborate effectively to deliver care.

Healthcare educators have expressed a desire for more training and guidelines regarding telehealth best practices. For instance, the Reimagine New York Commission conducted a needs assessment finding that many healthcare providers want more training, guidelines, and information about best practices in telehealth [41]. Furthermore, the absence of a standardized vocabulary can lead to confusion and misinterpretation of telehealth practices, as noted in systematic reviews that emphasize the importance of clear and consistent terminology in telehealth trials. The TIDieR-Telehealth guide proposes a taxonomy that could help unify the language used in telehealth, thereby facilitating better understanding among practitioners [42].

Moreover, the COVID-19 pandemic has underscored the importance of inter-professional collaboration in telehealth settings. As healthcare providers transitioned to telehealth, many faced challenges due to the lack of guiding resources and a clear communication framework [43]. This situation was exacerbated by the rapid shift to virtual care, which often did not include adequate training on the use of telehealth technologies and terminologies [44]. The integration of standardized terminology can enhance inter-professional collaboration by providing a common language that all team members can understand, thereby improving the quality of care delivered to patients [45].

In addition to enhancing communication, standardizing telehealth terminology can also improve the implementation of telehealth practices. As healthcare systems continue to evolve, the need for a cohesive approach to

Table 4 Definition of terms in telehealth

No.	Terminology	Definition	Ref.
1.	Active Symptom Monitoring	Not available in MeSH, but based on a reference, it refers to the systematic and regular tracking of symptoms in individuals, typically through daily check-ins via phone calls, text messages, or digital tools. This approach is used to promptly identify and manage any emerging health issues, ensuring timely intervention and care.	[26]
2.	Automate Therapy	Not available in MeSH, but based on a reference, it refers to the use of technology, particularly artificial intelligence (AI) and machine learning, to deliver therapeutic interventions without direct human involvement. This can include chatbots, virtual therapists, and other digital tools designed to provide mental health support, monitor progress, and offer therapeutic exercises.	[27]
3.	Clinical Artificial Intelligence (cAI)	Not available in MeSH, but based on a reference, it refers to AI systems designed to automate intelligent behaviors in clinical settings to support physician-mediated care-related tasks. These systems aim to enhance diagnostic precision, treatment planning, and patient monitoring by leveraging machine learning algorithms and large datasets.	[28]
4.	Computer-Based Interventions	Not available in MeSH, but based on a reference, it refers to use technology in some form to provide an interactive, multisensory learning experience. Also called computer-assisted instruction (CAI), this form of intervention is used to present information, allow a user to practice certain skills repeatedly, or to test knowledge or comprehension.	[29]
5.	Digital Flexibility	Not available in MeSH, but based on a reference, it refers to the ability of an organization to adapt its digital resources, processes, and strategies in response to changing technological and market conditions. This concept is crucial for businesses undergoing digital transformation, as it allows them to remain competitive and responsive to new opportunities and challenges.	[30]
6.	Digital Health	Officialy available in MeSH with included terminology: Digital Health Technologies.	MeSH
7.	Digital Interventions	Not available in MeSH, but based on WHO, it refers to as "the use of digital technologies to deliver health interventions, improve health outcomes, and enhance healthcare delivery." These interventions can include mobile health apps, telemedicine, wearable devices, and online health platforms.	[31]
8.	Digital Literacy	Not available in MeSH, but based on American Library Association, it refers to as "the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills." This definition emphasizes the comprehensive nature of digital literacy, encompassing a range of skills necessary for effective digital engagement.	[32]
9.	Digital pills	Not available in MeSH, but based on a reference, it refers to an innovative drug-device technology that combines traditional medications with a monitoring system to automatically record data about medication adherence and patients' physiological data. This technology integrates sensors within the pills, which communicate with external devices to track ingestion and other health metrics.	[33]
10.	Electronic Health Records	Officialy available in MeSH with included terminology: Electronic Medical Records; Computerized Medical Records; Electronic Health Record Data.	MeSH
11.	Game-based approach	Not available in MeSH, but based on a reference, it refers to the use of game elements and principles in non-game contexts to engage users, enhance learning, and solve problems. This approach leverages the motivational aspects of games to create interactive and immersive experiences that promote deeper understanding and retention of knowledge.	[34]
12.	Home-centered model of care	Not available in MeSH, but based on a reference, it is often referred to as the Patient-Centered Medical Home (PCMH) model. According to the Agency for Healthcare Research and Quality (AHRQ), the PCMH is a model of primary care that is patient-centered, comprehensive, team-based, coordinated, accessible, and focused on quality and safety. This model aims to transform how primary care is organized and delivered, ensuring that care is comprehensive and coordinated across all elements of the broader health care system.	[35]
13.	Intelligent internet of medical things	Not available in MeSH, but based on a reference, it refers to the integration of medical devices and applications that connect to healthcare IT systems through online computer networks. These devices use sensors, automation, and machine-based intelligence to collect, analyze, and transmit health data, thereby reducing the need for human intervention in routine healthcare procedures and monitoring.	[36]
14.	Internet-based intervention	Officialy available in MeSH with included terminology: Web-based Interventions; Online Interventions.	MeSH
15.	Medical informatics	Officialy available in MeSH with included terminology: Health Informatics; Clinical Informatics; Medical Computer Science; Health Information Technology.	MeSH
16.	Medical simulators	Not available in MeSH, but based on a reference, it refers to tools used to create real-world medical scenarios for training healthcare professionals. These simulators can range from simple models to complex virtual reality systems, allowing practitioners to practice and refine their skills in a safe, controlled environment. They are designed to improve patient safety, enhance clinical skills, and reduce medical errors by providing hands-on experience without risk to actual patients.	[37]
17.	Nurse-led homecare	Not available in MeSH, but based on a reference, it refers to home healthcare services managed by nurses, utilizing telecommunication technologies to deliver care and support to patients in their homes	[38]
18.	Personalized digital health interventions	Not available in MeSH, but based on a reference, it refers to the use of digital technologies to deliver healthcare services that are tailored to the individual needs, preferences, and characteristics of patients. These interventions leverage data from various sources, such as electronic health records, wearable devices, and patient-reported outcomes, to provide customized care plans and support.	[39]

Table 4 (continued)

No.	Terminology	Definition	Ref.
19.	Telemedicine	Officialy available in MeSH with included terminology: Virtual Medicine; Tele-Referrals; Mobile Health; mHealth; Telehealth; eHealth; Tele-Intensive Care; Telecare.	MeSH
20.	Telepresence	Not available in MeSH, but based on the Merriam-Webster Dictionary, it refers to technology that enables a person to perform actions in a distant or virtual location as if physically present in that location. It also encompasses the practice of using such technology in the remote operation of a machine, such as a robot.	[40]

telehealth education and practice becomes increasingly evident. A review of educational guidelines emphasizes the necessity for inter-professional education that incorporates telehealth competencies, ensuring that future healthcare providers are well-equipped to navigate the complexities of telehealth [46]. By establishing a common lexicon, healthcare educators can better prepare students to engage in telehealth practices effectively, thereby improving patient outcomes and fostering a more collaborative healthcare environment [47].

The findings of recent studies underscore the critical importance of standardized terminology in enhancing inter-professional collaboration within telehealth settings. The COVID-19 pandemic catalyzed a rapid shift towards telehealth; however, the absence of a shared lexicon poses significant challenges for effective communication among healthcare providers from diverse professional backgrounds. A common language is essential for minimizing misunderstandings, which can lead to improved patient care outcomes. For instance, consistent definitions of terms such as "telehealth platforms" and "remote monitoring" can facilitate more cohesive and coordinated treatment plans, particularly in complex cases that require input from multiple specialties [48, 49].

The significance of standardized terminology is further highlighted by the challenges faced by healthcare providers during the transition to telehealth. Many practitioners reported difficulties in adapting to virtual care due to a lack of clear guidelines and consistent terminology [43]. This situation has been exacerbated by the rapid pace of change during the pandemic, which left many professionals unprepared for the nuances of telehealth communication. Studies indicate that inter-professional collaboration is often hindered by differing expectations and understandings of roles within healthcare teams, which can be alleviated through the establishment of a standardized vocabulary [45, 50]. For example, a study on telemedicine in long-term care settings found that the presence of multidisciplinary care providers significantly enhanced telemedicine services and promoted inter-professional collaboration [51].

Moreover, the integration of standardized terminology into telehealth education and practice is crucial for preparing future healthcare providers. Educational frameworks that emphasize inter-professional collaboration and the use of a common language can foster a better understanding of team dynamics and improve the quality of care delivered to patients [46]. Research suggests that incorporating telehealth competencies into health professions curricula can enhance students' readiness to engage in collaborative practice, ultimately benefiting patient outcomes [51, 52]. By ensuring that all team members are familiar with the same terminology, healthcare providers can work more effectively together, leading to improved care coordination and patient satisfaction [53].

This study has developed a comprehensive guide comprising 314 telehealth terminologies, as detailed in Appendices, which serves as a foundational resource for telemedicine research worldwide. The flexibility of this guide allows for future expansion and modifications, resembling a dynamic, wiki-like structure. As telehealth practices and technologies continue to evolve, researchers in digital health can contribute to this repository by adding new terminologies. This adaptable approach ensures that our guide remains current and relevant, making it a pioneering tool for facilitating global understanding and consistency in telemedicine research.

We included a diverse range of professions in this study, recognizing their crucial role in the practical implementation of telehealth. These professions represent the primary users of telehealth technologies and practices, making their input vital to ensure that the terminology guide is representative and applicable to real-world inter-professional settings. By engaging professionals who are highly active in telehealth, we ensured that the guide captures the nuances and terminology most relevant to those directly involved in delivering telehealth services, thereby enhancing its applicability across different healthcare contexts.

Incorporating standardized telehealth terminology into medical education is essential for preparing future healthcare professionals to navigate the evolving landscape of digital health practices. As telehealth continues to expand, embedding clear definitions and consistent usage of terminology in curricula will ensure that graduates are well-equipped to participate effectively in telehealth services. This integration not only enhances the understanding of telehealth among students but also promotes a seamless incorporation of telehealth into routine clinical care, ultimately improving inter-professional collaboration.

Research indicates that successful telehealth interventions require healthcare teams to receive training in telehealth communication and clinical assessment [54]. This training is vital as it equips future healthcare providers with the necessary skills to engage in telehealth effectively. For instance, a study in physiotherapy students demonstrated that a curriculum incorporating both theoretical content and experiential learning significantly increased students' self-efficacy regarding telehealth practices [55]. Such findings highlight the importance of practical training in telehealth, which can prepare students to face real-world challenges in their future careers.

Moreover, the rapid transition to telehealth during the COVID-19 pandemic has revealed gaps in healthcare professionals' training and knowledge regarding telehealth tools and practices [56]. A case report indicated that academic nurse-managed clinics had to develop new skills for web-based rapport building and remote patient management, underscoring the need for updated training curricula that include telehealth competencies [57]. By integrating standardized terminology and practical telehealth training into medical education, institutions can better prepare students to meet the demands of modern healthcare delivery.

The importance of a standardized approach to telehealth terminology is further emphasized by the need for inter-professional collaboration in healthcare settings. A qualitative exploration of medical students' experiences with telehealth during the pandemic highlighted the necessity of improving educational telehealth experiences to enhance the capabilities of future medical professionals [56]. By fostering a common language and understanding of telehealth practices, educational programs can facilitate better communication and collaboration among healthcare providers from various disciplines, ultimately leading to improved patient care outcomes.

Achieving widespread adoption of standardized telehealth terminology presents several significant challenges. One of the primary obstacles is the inherent variability in healthcare systems across different countries and regions. Each system may have its own established practices, terminologies, and cultural contexts, making it difficult to create a universally accepted lexicon. For instance, a scoping review highlighted that healthcare organizations (HCOs) often face organizational challenges when implementing telehealth, particularly when they lack a history of its use and the necessary training for staff and patients [58]. This lack of familiarity can lead to inconsistent application of telehealth terminology, further complicating efforts to standardize language across diverse healthcare settings.

Cultural differences also play a crucial role in the challenges of standardizing telehealth terminology. Different countries may prioritize various aspects of healthcare delivery, which can influence the terms used in telehealth practices. For example, a qualitative study on telehealth education in physiotherapy programs in Australia identified challenges related to integrating new content into curricula, including responding to international trends and local demands [59]. Such discrepancies can hinder the establishment of a cohesive terminology framework that is applicable across different healthcare systems.

Moreover, language barriers can significantly impede the standardization process. In multilingual contexts, the translation of telehealth terms may not capture the same meaning or nuance, leading to misunderstandings between healthcare providers. This issue is compounded by the rapid pace of technological advancements in telehealth, which continuously introduces new terms and concepts. As noted in a systematic review, the evolving nature of telehealth technologies necessitates ongoing updates and revisions to any established terminology [60]. The challenge lies in ensuring that all stakeholders are informed and trained on these updates, which requires a robust communication strategy and resources.

Additionally, the implementation of standardized terminology must contend with the existing disparities in access to technology and training between healthcare providers. A study examining telehealth services working within diverse patient groups during the COVID-19 pandemic found that access to telehealth was often limited by factors such as internet connectivity and technological literacy [61]. These disparities can lead to uneven adoption of standardized terminology, as providers in resource-limited settings may not have the same exposure to or understanding of the terms being standardized.

To maximize the impact of standardized telehealth terminology, future research and policy development must focus on several key areas. First, it is essential to evaluate the application of standardized terminology in real-world healthcare settings. Research should investigate how the implementation of a standardized lexicon affects interprofessional communication and collaboration among healthcare providers. For instance, studies have shown that educational interventions in telehealth can significantly enhance the confidence and skills of healthcare professionals, which in turn can improve patient care outcomes [62]. By assessing the effectiveness of standardized terminology in practice, stakeholders can identify best practices and areas for improvement.

Moreover, policymakers should consider integrating standardized telehealth terminology into existing regulations and guidelines. This integration would ensure consistent usage across various healthcare settings, facilitating clearer communication among providers and enhancing the overall quality of care. For example, the establishment of telehealth competencies has been shown to improve the preparedness of healthcare professionals

to engage in telehealth practices [63]. By embedding standardized terminology into policy frameworks, regulatory bodies can promote a unified approach to telehealth across different regions and specialties.

Collaboration among educational institutions, healthcare organizations, and regulatory bodies is crucial for driving the widespread adoption of standardized telehealth terminology. Educational programs must incorporate telehealth training that emphasizes the importance of a common lexicon, as well as the skills necessary for effective inter-professional collaboration [64]. Research indicates that telehealth education can significantly improve the readiness of healthcare professionals to utilize telehealth technologies effectively [65]. Additionally, inter-professional education initiatives can foster a shared understanding of telehealth practices, further enhancing collaboration among diverse healthcare teams [66].

Limitation

This study's retrospective analysis, reliant on discussions and presentations from International Journal Club sessions, may have resulted in some terminologies being under-represented or overlooked. This reliance on a limited set of sources could impact the completeness of the terminology guide, particularly in niche areas of telehealth not extensively covered during these sessions. Additionally, the rapidly evolving nature of digital health technologies presents a significant limitation, as telehealth terminology continually changes. This necessitates ongoing updates to ensure the guide remains relevant and reflective of current practices.

Another limitation is the potential variability in the application and interpretation of telehealth terminology across different regions and healthcare systems. Cultural, organizational, and regulatory contexts in different countries may influence established practices and terminologies, creating challenges in achieving widespread adoption of a standardized lexicon. Language barriers in multilingual contexts further complicate standardization, as translation of telehealth terms may not always capture the same meaning or nuance, leading to potential misunderstandings between healthcare providers.

Moreover, the study's focus on a specific sample of professionals from the journal club sessions might limit the generalizability of the findings. The perspectives and terminologies used by these professionals may not fully represent the broader telehealth community. Additionally, disparities in access to technology and training between different healthcare providers and settings can impact the implementation and standardization of telehealth terminology. Despite these limitations, this study is an important step toward achieving standardized telehealth terminology, providing a foundational resource for future research and collaboration.

Conclusion

This study provides a structured guide to telehealth terminology, addressing a critical gap in inter-professional practice. By promoting consistent use of these terms, the guide aims to enhance communication and collaboration, which can improve the effectiveness of telehealth services. However, achieving widespread adoption will require sustained effort, ongoing research, and active engagement from all stakeholders in the digital health landscape.

To effectively adopt standardized telehealth terminology, it is important to involve healthcare professionals, policymakers, and educators in its dissemination and utilization. Incorporating these terms into medical and nursing education, creating collaborative digital platforms for feedback, and leveraging AI to refine terminology can enhance clarity and consistency. International standardization efforts that include patient and lay perspectives will ensure that terminology is relevant and understandable to all stakeholders. These recommendations can help foster a cohesive telehealth ecosystem, improving collaboration and the quality of care.

Abbreviations

cAI	Clinical artificial intelligence
CITL	Center for information technology leadership
DDH	Department of digital health
DECIDE-AI	Developmental and exploratory clinical investigations of decision support systems driven by artificial intelligence
DEEP	Data-enriched edible pharmaceuticals
DHTs	Digital health technologies
eHEALS	Electronic health literacy scale
FHIR	Fast healthcare interoperability resources
HCOs	Healthcare organizations
iCBT	Internet cognitive behavioral therapy
IJC-DH	International journal club in digital health
i-PARIHS	Integrated promoting action on research implementation in health services
JITAI	Just-in-time-adaptive-intervention
MIRA	Miniaturized in vivo robotic assistant
PDDS	Personalized drug delivery systems
RAMS	Robot-assisted micro-surgery
SaMD	Software as a medical device
SEIR	Susceptible-exposed-infectious-recovered
SIR	Susceptible-infectious-removed
SMART	Substitutable medical applications and reusable technologies
TUMS	Tehran university of medical sciences
UMSurabaya	Universitas muhammadiyah surabaya

Supplementary Information

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Supplementary Material 1

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Author contributions
LR, ASH, GH, contributed to the conceptualization and design of the study. LR, SSA, and ASH conducted the literature review and managed the data extraction process. LR, ASH, MM, MA, SS and GH organized and facilitated the International Journal Club sessions. LR and SSA, performed the data analysis, while ASH validated the terminology guide with expert review. LR, AFP, and NCL wrote the initial draft of the manuscript. LR, NM and AFP contributed in manuscript editing. MA provided critical revisions, while LI, FI, GH, and ASH conducted review and final approval of the manuscript. All authors read and approved the final manuscript.

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Data availability
All data supporting the findings of this study are available within the paper and its Supplementary Information. The definition of each terms collected in this study are provided in Additional file 1, along with the references of the definitions. The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
We have received approval to conduct this study from the Ethical Committee of Tehran University of Medical Sciences, under the ethical code IR.TUMS.MEDICINE.REC.1403.387. Informed consent to participate was obtained from all participants in the study. Before the study began, participants were informed that their voices would be recorded. This study adhered to the principles of the Declaration of Helsinki.

Consent for publication
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Competing interests
The authors declare no competing interests.

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