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THEORETICAL AND METHODOLOGICAL FOUNDATIONS FOR THE COMPARATIVE STUDY OF TELEMEDICINE TERMINOLOGY

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Abstract: The rapid integration of information and communication technologies into healthcare has created a large and continuously developing layer of telemedicine terminology. Terms such as telemedicine, telehealth, digital health, eHealth, mHealth, remote patient monitoring, virtual consultation and telecare are widely used in scientific, clinical and institutional discourse, yet their conceptual boundaries are not always identical. This article examines the theoretical and methodological foundations for the comparative study of telemedicine terminology and argues that specialized units should be analyzed as elements of an interconnected conceptual system rather than as isolated lexical forms. Particular attention is paid to concept-oriented terminology theory, definitional and componential analysis, structural and semantic comparison, corpus methods, contextual analysis and the identification of interlingual equivalence. The article also describes a practical sequence for comparative research: corpus formation, term extraction, conceptual classification, analysis of definitions, structural-semantic comparison, contextual verification, equivalence assessment and terminographic representation. The study demonstrates that the combination of linguistic and terminological methods makes it possible to distinguish full, partial and zero equivalence, to identify competing variants and to formulate recommendations for standardization. Such an approach is important for multilingual medical communication, specialized translation, terminology databases and the development of consistent national terminology in the rapidly changing field of digital healthcare.

Keywords: telemedicine terminology, telehealth, digital health, comparative terminology, terminological equivalence, semantic analysis, corpus analysis, standardization, medical terminology.

INTRODUCTION

The digital transformation of healthcare has changed not only the mechanisms by which medical services are provided but also the professional language used to describe them. Remote consultation, electronic exchange of clinical information, mobile health applications, wearable devices, telemonitoring platforms and virtual models of care have become integral components of modern healthcare systems. As these technologies have expanded, a corresponding terminological system has developed at the intersection of medicine, information technology, telecommunications, public health and healthcare management. This system is dynamic, interdisciplinary and highly sensitive to technological innovation. Consequently, the study of telemedicine terminology requires methods capable of explaining both linguistic form and specialized conceptual content.

The relevance of comparative research in this field is connected with the international character of digital medicine. Many technological innovations and scientific publications first circulate in English, after which the related concepts enter other languages through translation, borrowing, calquing or descriptive nomination. This process may produce several competing equivalents for a single concept. In some cases, an English term is adopted without modification; in others, a national equivalent is created; and in still others, both forms coexist for a considerable period. Such variability can complicate professional communication and make it difficult to determine whether two linguistic units are complete equivalents or only partially overlapping designations.

A further difficulty is caused by the unstable conceptual relationship among key terms such as telemedicine, telehealth, eHealth, mHealth and digital health. These units frequently occur in the same scientific and institutional contexts, but they do not always have identical scope. Some organizations use telehealth as a broad concept that includes clinical and non-clinical remote health services, while telemedicine is treated as a more restricted concept associated primarily with clinical care. Other sources use the two terms almost interchangeably. Similar overlap occurs between eHealth and digital

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health. Research into digital-health definitions has repeatedly shown that terminological inconsistency is not an exceptional phenomenon but a structural feature of this rapidly developing field [3; 6; 7].

For this reason, a comparative study should not begin with a simple search for word-to-word correspondences. Contemporary terminology science emphasizes the relationship between concepts, definitions and designations. ISO 1087:2019 and ISO 704:2022 provide an important methodological basis for this approach by distinguishing specialized concepts from the terms that designate them and by stressing the need to analyze conceptual systems and definitions [1; 8]. Within such a framework, a term is meaningful because it occupies a particular position within a structured field of professional knowledge. The same concept may therefore be represented by formally different expressions in different languages, while formally similar terms may in fact differ in semantic scope.

The purpose of the present article is to determine the major theoretical and methodological principles that can be used for a systematic comparative study of telemedicine terminology. The study focuses on concept-oriented analysis, structural and semantic comparison, definition analysis, corpus methodology, contextual verification, the identification of interlingual equivalence and terminological standardization. It also proposes a sequence of research procedures that can be applied to multilingual telemedicine materials. The theoretical significance of this approach lies in clarifying the relationship between language and specialized knowledge, while its practical significance concerns translation, lexicography, professional education, terminology management and the creation of consistent multilingual resources.

MAIN BODY

Telemedicine terminology should be regarded as a structured conceptual system rather than a random collection of technical words. One of the fundamental principles of modern terminology studies is the distinction between a concept and its designation. A concept represents a unit of specialized knowledge, whereas a term is a linguistic form used to name and communicate that concept. This distinction is methodologically important because the same professional concept may be designated differently in two languages, and one lexical form may develop different meanings in different professional traditions. In comparative research, the first task is therefore to identify what concept a term denotes, what essential characteristics define that concept and how the concept is related to neighboring units within the same field.

The broader conceptual field of digital healthcare contains several umbrella terms whose meanings partially intersect. Digital health usually has the widest scope and can include electronic records, mobile applications, artificial intelligence, wearable devices, telemedicine, data analytics and other digital technologies used for health-related purposes. eHealth is traditionally connected with the use of electronic and information technologies in healthcare and often overlaps with digital health in practice. mHealth refers more specifically to health activities supported by mobile devices and mobile communication technologies. Telehealth generally denotes remote health-related services and may include clinical care, professional education, preventive communication and administrative interaction. Telemedicine, by contrast, is commonly associated more directly with remote clinical services delivered by healthcare professionals. However, these distinctions are not universal, which is precisely why comparative terminology research must rely on definitions and professional contexts rather than on intuitive lexical similarity.

Table 1. Comparative characteristics of core telemedicine-related terms

Term	General conceptual scope	Main comparative issue
Digital health	Broad use of digital technologies and data in health.	Wide scope; often includes eHealth, mHealth and telemedicine.
eHealth	Use of electronic information technologies in healthcare.	Overlaps with digital health in many definitions.

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Telehealth	Remote clinical and non-clinical health services.	May be an umbrella term or a synonym of telemedicine.
Telemedicine	Remote clinical care using communication technologies.	Scope differs across institutions and countries.
mHealth	Health services supported by mobile devices.	Overlaps with eHealth and telehealth in mobile care.

The comparison shown in Table 1 demonstrates that terminological similarity does not automatically mean conceptual identity. The essential methodological task is to determine how a term is defined in authoritative sources and how it behaves in real professional discourse. This is particularly relevant to telemedicine and telehealth. If one language differentiates these concepts consistently while another language uses a single general equivalent for both, the relationship cannot be described as simple full equivalence. Instead, the researcher must record the degree of conceptual overlap, identify contextual restrictions and explain the conditions under which a particular equivalent is appropriate.

Structural and word-formation analysis is therefore an essential component of methodology. English telemedicine vocabulary is characterized by the productivity of the element tele-, which expresses distance and combines readily with medical or healthcare bases. Forms such as telemedicine, telehealth, telecare, telemonitoring, teleconsultation, telerehabilitation and telepsychiatry show how new concepts can be named economically through a recognizable model. When these terms are transferred into another language, several strategies are possible: direct borrowing, transliteration, calquing, hybrid formation or descriptive translation. Comparative research should record which strategy is used, whether alternative variants coexist and which form is preferred in official or specialist sources. Multiword terms require special attention because their structure often encodes several conceptual characteristics simultaneously. Remote patient monitoring combines the ideas of distance, patient-centered observation and continuous or repeated measurement. Clinical decision support system combines the clinical domain, decision-making function and technological system. A literal translation of such a unit may be grammatically possible but terminologically unnatural in the target language. Therefore, structural equivalence must be distinguished from functional and professional acceptability. The most adequate equivalent is the form that preserves the essential concept while conforming to the lexical and syntactic norms of the target professional discourse.

Semantic and definitional analysis occupies the central position in a concept-oriented methodology. General dictionaries are often insufficient because a specialized term may have a narrower and more technical meaning in professional discourse. Definitions should therefore be collected from international standards, scientific publications, professional glossaries, healthcare organizations and authoritative institutional documents. ISO 17439:2022 specifically emphasizes the development of terms and definitions for health informatics glossaries [9], confirming that definition management is not a secondary task but a core requirement for consistent communication in digital medicine.

Componential analysis can be used to divide a definition into its essential semantic features. A working representation of telemedicine, for example, may include the components healthcare service, spatial distance, information and communication technology, healthcare professional and clinical purpose. The equivalent in another language can then be tested against these characteristics. If the target term includes all essential components and occupies the same conceptual position, the relationship may be considered close to full equivalence. If it omits a relevant feature, has broader scope or is restricted to a particular institutional context, partial equivalence is more appropriate. This method provides a transparent basis for terminological decisions and reduces dependence on subjective intuition. Comparative and contrastive methods allow the identified material to be analyzed at several interconnected levels. At the lexical level, the researcher records direct equivalents, borrowings, synonyms and competing variants. At the structural level, morphological and syntactic patterns are compared. At the semantic level, meanings and definitional components are examined. At the

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conceptual level, each unit is located within the wider system of digital-health concepts. At the pragmatic level, the researcher considers frequency, professional group, genre, institutional status and communicative function. A term that appears in official clinical guidelines may have a different terminological status from a form found mainly in journalistic or promotional discourse.

Corpus-based analysis provides the empirical foundation needed for such verification. A specialized telemedicine corpus can include research articles, clinical recommendations, legislation, international reports, technical documentation, medical websites and educational materials. Corpus analysis makes it possible to observe actual use, calculate frequency, identify typical collocations, compare competing variants and trace changes over time. For instance, the distribution of telemedicine and telehealth in different genres may show whether authors treat them as interchangeable units or reserve each term for a particular conceptual scope.

One of the principal goals of comparative research is the identification of interlingual terminological equivalence. For practical purposes, three major degrees can be distinguished: full, partial and zero equivalence. Full equivalence occurs when source and target terms represent essentially the same concept, contain comparable semantic features and function similarly in professional communication. Partial equivalence occurs when the central meaning corresponds but the terms differ in scope, register, institutional use or conceptual detail. Zero equivalence, or a terminological gap, occurs when the source language has an established designation for a concept that lacks a stable equivalent in the target language.

A systematic research procedure can therefore begin with corpus formation and term extraction. Candidate units should be collected from reliable and comparable professional sources, and each occurrence should be documented with context and source information. The terms can then be grouped according to conceptual categories such as remote consultation, diagnostics, monitoring, mobile healthcare, digital records, clinical decision support, information security and specialized telemedicine services. Conceptual classification prevents the analysis from becoming a simple alphabetical list and makes it possible to examine relations between general and specific terms.

The next stage involves the collection and comparison of definitions. Essential semantic features are identified through componential analysis, after which structural and semantic forms are compared across languages. Proposed equivalents are then verified in authentic professional contexts and classified according to degree of equivalence. The final stage is terminographic representation. A multilingual terminology entry may contain the source term, target equivalent, definition, conceptual category, synonyms, abbreviation, grammatical information, contextual example, source and a note on equivalence or recommended use. ISO 26162-1:2019 provides relevant principles for the organization of terminology databases and supports the systematic management of such information [2].

The comparative study of telemedicine terminology consequently has both theoretical and applied value. Theoretically, it contributes to the understanding of how specialized concepts are structured and lexicalized across languages and how linguistic systems respond to technological change. Practically, it can improve specialized translation, support professional education, facilitate international research and provide the basis for multilingual dictionaries and electronic terminology resources. A concept-oriented methodology that combines definitions, structural-semantic analysis, corpus evidence, contextual verification and equivalence assessment offers a reliable framework for achieving these goals.

CONCLUSION

The comparative study of telemedicine terminology requires an integrated theoretical and methodological approach because the vocabulary of digital healthcare represents a system of specialized concepts rather than a simple set of lexical items. The central methodological principle is the distinction between concept, definition and designation. This principle makes it possible to evaluate whether terms in different languages represent the same professional knowledge even when their linguistic forms differ. It also helps identify cases in which formally similar units have different conceptual scope.

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The analysis shows that the most productive methodology combines conceptual classification, definitional and componential analysis, structural-semantic comparison, contextual investigation and corpus-based verification. Such procedures allow researchers to examine terminology at lexical, structural, semantic, conceptual and pragmatic levels. They also provide a transparent basis for distinguishing full, partial and zero equivalence and for explaining why several competing variants may coexist in a developing terminological system.

Particular attention should be paid to the relationship among telemedicine, telehealth, eHealth, mHealth and digital health. Their boundaries remain variable across organizations and publications, which means that equivalence cannot be established through lexical similarity alone. Comparative analysis should rely on authoritative definitions, authentic professional contexts and recognized conceptual classifications. In multilingual environments, the preferred equivalent should combine conceptual accuracy, professional acceptability and linguistic naturalness.

In conclusion, systematic comparative research can contribute to the development of consistent telemedicine terminology, high-quality specialized translation and reliable multilingual terminology databases. As digital healthcare continues to evolve, national terminological systems should be regularly updated while maintaining stable definitions for core concepts. The proposed methodological framework can serve as a basis for further comparative studies of English and other languages and for the standardization of emerging telemedicine terminology.

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