UNIVERSITÀ DEGLI STUDI DI MILANO

UNIVERSITÀ DEGLI STUDI DI MILANO

CORSO DI DOTTORATO INDUSTRIALE
IN INTERSECTORAL INNOVATION – DOTTORATO INTERSETTORIALE PER L'INNOVAZIONE

XXXVIII ciclo

Area Scienze Umanistiche

DIPARTIMENTO DI FILOSOFIA "PIERO MARTINETTI"

TESI DI DOTTORATO DI RICERCA

DIGITAL HEALTHCARE: RETHINKING THE PATIENT ROLE IN TELEMEDICINE

PSIC-03/A – Psicologia Sociale

PICCARDO MARIA ADELE
Matr. R14041
ORCID n. 0000-0003-4756-0593

TUTOR
Prof.ssa CHIARA GUGLIELMETTI

CO-TUTOR
Prof.ssa SILVIA GILARDI
Dott.ssa STEFANIA MARCOLI

COORDINATORE DEL CORSO DI DOTTORATO
Prof. Ernesto Damiani

A.A. 2024/2025

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Abstract

In the recent decades, the healthcare system has undergone several transformations driven by digitalization and technological innovation. The advent of healthcare technologies has changed the way patients are cared for by healthcare professionals, offering new opportunities for continuity of care and for the role assumed by patients in managing their health. The COVID-19 pandemic has accelerated the transition to telemedicine interventions, ensuring the provision of adequate remote care to reduce infection risks and travel. However, this rapid spread has raised some critical issues such as long-term sustainability, accessibility (e.g., health and digital literacy), and the psychological implications for patients involved through digital tools. Within this context, this thesis aims to explore digital healthcare from a psychosocial perspective, with the intention of understanding how this innovation changes social representation and the experience of care by patients. The first study investigates the evolution of the patient role in telemedicine. By comparing the fields of psychology and medicine, different conceptualizations of patient participation were explored. Constructs such as adherence, engagement and activation lead to a representation of the patient along a continuum ranging from passivity to active involvement. Through a bibliometric analysis of scientific production from 1990 to 2023, the study showed that the medical field tends to use terms such as compliance and adherence, while psychology is gradually shifting toward engagement, indicating a more collaborative role for patients in their own care pathway. The second study explores how telemedicine is represented in the Italian press, since it entered public discourse, to identify different representations of digital healthcare among

laypeople. The findings showed that telemedicine is predominantly represented as an innovative and efficient tool for facilitating access to and delivery of care. However, alongside an optimistic narrative of this innovation, it was possible to identify elements of ambivalence and resistance that highlight several difficulties in the large-scale implementation of telemedicine tools. Finally, the third study focused on patients diagnosed with heart failure, in a healthcare setting where a telemonitoring tool was proposed. In the early stages of the research project, the psychological mechanisms underlying the relationship between self-care behaviors, patient activation and perceived quality of life were explored. The findings revealed that the level of patient activation plays a mediating role between self-care and well-being, suggesting that behaviors aimed at disease management and improving quality of life are not sufficient if patients are not aware and actively involved in their own care pathway. This thesis considers telemedicine from a perspective that goes beyond its purely technological and innovative aspects, viewing it instead as a process that involves psychological dimensions, transforming patient care and management in the healthcare context and redefining the boundaries between technology, medicine and patient experience. Integrating a health and social psychology perspective, this work emphasizes the need for a person-centered approach when proposing and implementing a telemedicine service. Technology thus becomes a support for the clinician-patient relationship and to foster patients' self-management.

Keywords: Telemedicine; Healthcare system; Bibliometric Analysis, Media Analysis; Mediation Analysis.

Introduction

A look at the evolution of telemedicine: Definitions, challenges and opportunities for digital healthcare

1.1 The transformation of healthcare services in the digital age

Digital transformation of the healthcare system: From digitalization to inclusion

In the recent decades, the healthcare system has been through a deep change because of digitalization, the globalization of medical and scientific knowledge, and the aging population. The advent of new technologies has redefined the healthcare ecosystem (Purnomo et al., 2018; Scott Kruse et al., 2019), and a growing number of facilities have implemented digital technology to improve the quality of patient care and increase productivity and efficiency in the delivery of medical services (Alomar et al., 2024). Furthermore, with an increasing focus on the inclusion of all minorities (e.g., ethnic groups, socioeconomically disadvantaged individuals, and people living rural areas) and the promotion of equitable access and continuity of care, efforts are being made to ensure and promote the psychological and physical well-being of the entire population by reducing limitations and barriers (e.g., health literacy, access to digital devices; Deml et al., 2021; Gallegos-Rejas et al., 2025; Woolley et al., 2023;). In this regard, Information and Communication Technologies (ICT) have progressively redefined the ways in which healthcare services are accessed, delivered, and experienced. In this scenario, telemedicine has emerged as one of the most significant

developments, offering new possibilities for access to care, especially for vulnerable and isolated populations, and promising more efficient management of healthcare resources (Ezeamii et al., 2024; Xu et al., 2025).

A booster for telemedicine implementation: Covid-19 as a catalyst for innovation

The transformation of healthcare delivery services worldwide has been accelerated and amplified by the Covid-19 pandemic. The necessity to ensure continued care has led to the adoption of different approaches and strategies to deal with the current emergency (Mann et al., 2020; Sagan et al., 2021). Digital transformations and innovations that were becoming more established in healthcare settings have now become a necessity (Antonacci et al., 2023). In fact, the use of telemedicine tools has rapidly increased in healthcare systems around the world, in an attempt to respond to the dual need to adopt social distancing measures and continue to provide care to non-Covid-19 patients (Gilbert et al., 2020; Keesara et al., 2020; Ohannessian et al., 2020; Smith et atl., 2019;). This acceleration in the adoption of telemedicine tools and changes in the way healthcare services are delivered has demonstrated, on the one hand, the usefulness of new technologies in the service on "digital healthcare" and, on the other, the capacity of healthcare facilities to adapt effectively (England, 2020; Thornton, 2020). Despite the challenges faced by healthcare sector (e.g., workflow reorganization, disparity in access, digital grey divide; Haleem et al., 2021; Leff et al., 2025), telemedicine has contributed to a decrease in virus transmission rates and mortality by reducing outpatient visits (Mann et al., 2020; Wosik et al., 2020). At the same time, the

Covid-19 pandemic has promoted the development of relevant legislation and public health guidelines (Casariego-Vales et al., 2021; Chauhan et al., 2020; Ferorelli et al., 2020; Patel et al., 2021). However, as is often the case during periods of sudden transition, it is important to question the ability of systems to maintain these changes over time and, above all, to assess both the advantages and risks, impact, and sustainability over time in terms of infrastructures, finances, and human resources (Antonacci et al., 2023; Jimenez-Rodriguez et al., 2020; Smith et al., 2020). The temporary adoption effect was revealed by this rapid acceleration. Many telemedicine solutions were initially implemented under the pressure due to the pandemic. However, they were later discontinued or scaled down once the acute crisis ended (Kichloo et al., 2020; Nittari et al., 2022; Xu et al., 2022). This highlights how emergency-driven adoption does not necessarily translate into long-term integration (Mandal et al., 2022). The challenge for healthcare systems, therefore, is not only to introduce digital tools but to ensure their organizational, financial, and psychological sustainability beyond the crisis context (Bocean & Vârzaru, 2025; Cripps & Scarbrough, 2022; Frisinger & Papachristou, 2024).

1.2 Definitions and articulation of telemedicine

Defining telemedicine: From global standards to national guidelines

European Commission (2008) states that telemedicine consists of providing healthcare services through the use of ICTs in situations where the HCP and the patients (or two HCPs) are not located in the same place. This

digital service enables the secure transmission of clinical information and data (e.g., text, sound, images, or other clinically relevant digital formats) to support care processes in prevention, diagnosis, treatment and follow-up.

Telemedicine is an accessible and cost-effective medical system capable of providing high-quality care (Armaignac et al., 2018; Koehler et al., 2018; Saigi-Rubio et al., 2022). Telemedicine is an umbrella term that encompasses various modes of delivery and different healthcare services provided through digital infrastructure. At first glance, telemedicine can be defined as a system that, through the use of new digital technologies, allows medical and clinical services to be provided remotely (Gallè et al., 2023). For instance, new technology, especially with the internet support, allow patients and healthcare professionals (HCPs) to use and provide online video consultations, communicate clinical data remotely, and monitor patients and parameters without requiring an in-person visit (Kichloo et al., 2020; Gajarawala & Pelkowski, 2021). Therefore, telemedicine can increase access to care in remote locations and rural areas, reducing travel and healthcare costs (Gajarawala & Pelkowski, 2021). Furthermore, telemedicine is not only useful in the relationship between the patient and the healthcare provider, but also allows clinicians to communicate with each other through teleconsultation, which can lead to numerous benefits for patient health, such as rapid diagnosis and appropriate treatment (Azzolini et al., 2013; Ebbert et al., 2023).

Although the term “telemedicine” has only come into common use in recent years, in medical and scientific areas this system of healthcare delivery

has been evolving since the 1990s (Grigsby & Sanders, 1998). There are various definitions of telemedicine provided by different competent health authorities, but they all share the idea that it is no longer just the patient who has to move to healthcare facilities, but that information can reach them wherever they are (Cohen & Strawn, 1996; Sood et al., 2007). In the 1997, the World Health Organization defines telemedicine as the delivery of healthcare services in which distance is a critical factor, by HCPs using ICT for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, with the aim of advancing the health of individuals and their communities (WHO, 1997). Furthermore, the European Union (EU; Com. 2008) – describes telemedicine as "*the provision of healthcare services, through the use of ICTs, in situations where the interested parties are not in the same location. It involves secure transmission of medical data and information, through text, sound, images or other forms needed for the prevention, diagnosis, treatment and follow-up of patients*" (p. 3). Focusing on the Italian context is particularly relevant to this thesis, for both organizational and psychological reasons. From an organizational point of view, Italy represents a paradigmatic case of a healthcare system characterized by strong regional autonomy within a universalistic framework, in which the implementation of telemedicine requires coordination between heterogeneous infrastructures, resources and governance models. From a psychological perspective, this complexity provides fertile ground for exploring how socio-contextual factors, such as regional differences in digital literacy, patient participation, and HCPs competency, influence the individual

experience of adopting telemedicine. Understanding these dynamics in the Italian context allows for nuanced consideration on how institutional and cultural contexts shape psychological engagement with digital health. In practice, telemedicine in Italy began to gain widespread interest in 2012 (Ferorelli et al., 2020), with the Agreement between the Government and the Regions that led to the development of the National Guidelines for Telemedicine. This document was approved by the General Assembly of Superior Health Council on July 10, 2012, and by the State-Regions Conference on February 20, 2014 (Health Ministry, 2014), adopting the definition given by the European Union, even if some additional details were added. In fact, the guidelines stated that telemedicine services should by assimilated to any diagnostic or therapeutic health service. However, they should not replace traditional healthcare in the personal clinician-patient relationship, but rather complement it to potentially improve effectiveness, efficiency, and appropriateness. Specific details regarding regulations were also included, emphasizing that telemedicine must adhere to all the rights and obligations of any healthcare act. Furthermore, in this definition, unlike the first two definitions, the Health Ministry not only outlines the characteristics of telemedicine, but also begins to delineate its boundaries. In fact, it also emphasizes what does not fall within the scope of telemedicine, such as the use of ICT tools for the processing of health information or the online sharing of health data and information, which do not in themselves constitute telemedicine services (e.g., health information portal, social networks, forum, newsgroups, email, or other). During the Covid-19, the need to ensure continuity of care led to a revision of the National Guidelines for

Telemedicine, which was discussed by the State-Regions Conference on December 17, 2020. However, the official approval of the updated guidelines came later, with the Ministerial Decree of September 21, 2022, then published in the Official Gazette of the Italian Republic (General Series no. 256 of November 2, 2022). This document defines the functional requirements and service levels for telemedicine. Moreover, it provides guidance on the patients' eligibility to use these services, aiming to ensure the appropriateness of use in clinical and cultural terms and regarding accessibility to services, both in accordance with digital skills and digital access. It should be noted that, in assessing the appropriateness of a telemedicine service proposal, both the patient's skills and specificities and their entourage (e.g., caregivers, other support figures) are considered, highlighting that the patient is not the only actor in the use of telemedicine.

Different telemedicine services: remote visit, teleconsultation, teleassistance and telemonitoring

In Italy, the Official Gazette of the Italian Republic published the ministerial decree issued by the Ministry of Health, in collaboration with the Minister for Technological Innovation and Digital Transition (2022). This decree approves the guidelines for telemedicine services and defines functional requirements and service levels. The aim is to promote uniformity and efficiency at the national level. The guidelines published of September 21, 2022, concern the four minimum services (remote visits, teleconsultation, telemonitoring, and teleassistance) that regional telemedicine infrastructures must provide. In line with the National Recovery and Resilience Plan

(NRRP), the guidelines focus on technological integration and the training of healthcare personnel and patients. The four minimum services are defined in accordance with the national guidelines for the provision of telemedicine services of the State-Regions Agreement of December 17, 2020. In addition, this agreement categorizes services as either telemedicine services (including remote visits, teleconsultation and teleassistance), and telemedicine operating modalities (including telemonitoring and telecontrol). To better understand the specifics of each service, they will be described below.

A remote visit is a medical practice in which the HCP interacts remotely with the patient in real time (e.g., Perrone et al., 2024), with the eventual support of a caregiver (formal or informal). As specified in the code of medical ethics, this service can never be considered a means of conducting the clinician-patient relationship exclusively at a distance, nor can it be automatically considered a substitute for the first medical examination in person. For this reason, the physician must assess which situations are suitable for a remote visit and decide to what extent it can be offered to the patient. Furthermore, remote visits are limited to monitoring patients whose diagnosis has already been made during an in-person visit. Finally, the possibility of exchanging clinical data, medical reports, images, and audio-video material relating to the patient in real time must always be guaranteed.

Teleconsultation is a medical act in which the HCP interacts remotely with one or more clinicians to discuss, including via video call, a patient's clinical situation, based primarily on the sharing of all clinical data, reports, images, and audio-video recording relating to the specific case (e.g., Barrett, 2016).

Sometimes, when the patient is present at the teleconsultation, it takes place in a similar way to a remote visit and is configured as a multidisciplinary visit. Health tele-cooperation is a healthcare activity, not necessarily medical but specific to the healthcare professions, which is carried out remotely and performed by two or more people who have different responsibilities with respect to the specific case. It consists of requesting support during healthcare activities, followed by a video call in which the professional consulted provides guidance for the decision or execution of care actions aimed at the patient. As with teleconsultation, this can also take place in the presence of the patient or at a later time (e.g., Blätzinger, 2019).

Teleassistance is a professional healthcare service involving remote interaction between a HCP and a patient or caregiver via video call. Data, reports or images can be added and shared if necessary. The aim of teleassistance is to facilitate proper care activities that can mainly be carried out at home (e.g., De Cola et al., 2020; Favero et al., 2009).

In the end, telemonitoring is a method of delivering telemedicine that enables the continuous, remote detection and transmission of vital and clinical parameters via sensors that interact with the patient (biomedical technologies with or without installed components). The software system must collect and integrate sensor data, making it available to both HCPs and the patient through local recording on the device, for greater security. The aim is to monitor trends in measured parameters (e.g., heart rate, blood sugar) over time. This allows for more frequent and uniform measurements, reducing the

need for in-person outpatient check-ups (e.g., Emelianov et al., 2024; Félix et al., 2023). Telemonitoring has been categorized into two levels:

- *Basic* (level 1): this involves the integration of medical devices (e.g., pulse oximeter, electrocardiograph, scale, thermometer). This approach is mainly aimed at patients with chronic conditions, with the aim of acquiring data from the devices and conveying it to a centralized regional telemonitoring system (e.g., Bonometti et al., 2023).
- *Advanced* (level 2): this involves monitoring by specialized and qualified personnel, and the use of specific technological solutions tailored to the degree of complexity. Given its characteristics, this approach is targeted at highly complex patients, including those with implantable devices (e.g., Varma et al., 2023).

Beyond their technical and operational differences, these services also redefine traditional dynamics of responsibility within the care relationship (Andreadis et al., 2023). In remote settings, patients are often required to take a more active role in data collection, symptom monitoring and adherence to clinical recommendations (Vicente et al., 2022). This shift implicitly redistributes some of the responsibility for care from HCPs to patients and their caregivers, transforming them from passive recipients to proactive contributors to the therapeutic process (Olofsson et al., 2025). At the same time, HCPs are asked to reinterpret their role, moving from direct care providers to facilitators and coordinators of digital interactions (Ekstedt et al., 2023; Jones & Gijsbers, 2025). This evolution highlights that telemedicine is not only a technological innovation, but a relational and psychological

transformation in the way care is experienced and co-produced (Bernuzzi et al., 2024). These initial distinctions and specifications, as set out in the guidelines for telemedicine service (Ministerial Decree of September 21, 2022) ensure terminological clarity and a shared approach to care across Italy. However, scientific literature ha also classified telemedicine services based on other characteristics (e.g., temporality, continuity; Bashshur et al., 2011), which will be discussed in the following section.

Telemedicine service categorization

Another classification concerns the delivery method. Depending on the service offered, the patient and HCP may be connected simultaneously and interact with each other in real time (Edwards et al., 2022; Pandian, 2018), outlining the synchronous mode of healthcare delivery in telemedicine or, conversely, using an asynchronous way, where the HCP uses images, audio files or data sent by the patient via ICT for monitoring or requesting clinical information that does not require a real-time visit (Alonoghena et al., 2023; De Almeida et al., 2010; Khodadad-Saryazdi, 2021; Pandian, 2016). This approach is also called "store and forward" consisting in collect and share clinical information remotely (WHO, 2023; WHO, 2022). The decision to provide healthcare services synchronously or asynchronously depends on the specific needs of the patient and their clinical situation, and it is the responsibility of the HCP to propose and offer the most appropriate method to safeguard the patient's well-being and health (Payne et al., 2024; Wang et al., 2023). Furthermore, in some situations, it is possible for the HCP to combine both methods, configuring a hybrid form of service delivery (Erbe

et al., 2017; Espel-Huynh et al., 2024). This allows them to reach the patient wherever they are, responding consistently to their needs and clinical condition (Singhal et al., 2023). Another possible classification refers to the level of care and information continuity, distinguishing between continuous remote care models, in which data communication between the patient and the HCP is continuous over time (e.g., glucose sensors, blood pressure; Alfadli et al., 2025), and episode care models, in which the clinician-patient interaction occurs at a certain moment and then, possibly, resumed at the next visit, without a continuous data flow in between (e.g., remote visit; Hallberg & Harrison, 2021; Mirone et al., 2022). Another distinction that can be suggested concerns the level of patient activation and engagement. In fact, this can also vary, particularly in telemonitoring situations. For instance, a patient with type 1 diabetes who wears a continuous glucose monitoring (CGM) device does not play an active role in sending data to the clinical team. This because the process is automated by the reference software and the patient's only commitment is to adhere to the treatment and instruction by wearing the medical device (e.g., Natale et al., 2023; Welsh et al., 2019). On the other side, a patient with heart failure, who has to check their body weight and heart rate daily without the aid of automated devices, but through the use of a smartphone app, will have to spend part of their time collecting the data and then sharing it on the platform manually (see study 3; Brons et al., 2023; Kwaah et al., 2025;). Through telemonitoring, in addition to being able to monitor the patient's parameters and symptoms from home, numerous studies show greater adherence to treatment, self-care behaviors and self-awareness about the benefits associated with lifestyle changes and the treatment

proposed by the clinical team (Creber et al., 2023; Ding et al., 2020; Nick et al., 2021; Sabatier et al., 2022). However, the way in which telemonitoring services are used can affect patient adherence and continuity of use of these tools. Automated systems with simplified clinical data collection tend to reduce patient burden, encourage active and consistent participation, improving quality of life (Fanzola et al., 2022; Fairbrother et al., 2013), while solutions that require frequent interaction with the system may introduce elements that can lead to early dropout (Pedersen et al., 2019) and poor sustainability over time (Hammersley et al., 2020; Scott Kruse et al., 2018; Ware et al., 2019). Among these, it is possible to mention the commitment required and the complexity of the tool (e.g., Celler et al., 2018), as well as the ease of use and the digital skills of the patient (Cuppen et al., 2025). To analyze the broader process of telemedicine adoption, it is crucial to understand the features and evolving modalities. As digital interactions become more common in clinical practice, the success of these innovations relies not only on their technical functionality, but also on the willingness and ability of patients and HCPs to adapt to them. The following section explores the multidimensional factors that facilitate or hinder this complex process of acceptance and adaptation.

1.3 Factors that facilitate and inhibit the adoption of telemedicine: A multidimensional perspective

Telemedicine offers numerous advantages to the healthcare system, patients and HCPs. In addition to reaching people in rural areas more easily,

it facilitates access to specialist care and provides patient monitoring directly from home (AlDossary et al., 2017; Khodadad-Saryazdi, 2021). However, implementing these tools in everyday clinical practice is not always easy. Although telemedicine leverages ICT, which is now widely used throughout most of the country and across various platforms (e.g., social networks, work platforms, algorithms), the adoption of these tools involves different actors and encounters certain difficulties that are not only related to technology (Papoutsi et al., 2021; Wherton et al., 2022). In fact, literature considered ICT as an enabler of innovation in work processes, creating new ways of working and new spaces for work and sharing (Attaran, 2004; Davenport, 1993; Hammer, 2007), but telemedicine is part of an ecosystem where the interaction between patients, HCPs, technology providers, healthcare organizations, and the national healthcare system creates a complex structure that requires internal reorganization and coordination between actors for its successful implementation (Khodadad-Saryazdi, 2021). This complex set of factors influences the adoption of telemedicine. It acts at different levels (individual, professional, organizational, and systemic) and determines the effective implementation of these tools in clinical practice (Saigi-Rubio et al., 2022). Among the individual and professional factors hindering the adoption of telemedicine, both for patients and HCPs, are concerns about the use of technology, which involves a change in the usual workflow and the process of care and treatment (Bokolo, 2020; Scott Kruse et al., 2018). Resistance to change, often resulting from the perception of an increased workload, is another significant obstacle (Mold et al., 2019; O'Cathail et al., 2020; Trettel et al., 2018; Verma & Kerrison, 2022). Alongiside this, it is possibile to

identify a lack of digital skills, adequate technological devices (Cordes et al., 2020; Nielsen et al., 2020; Raja et al., 2021; Verma & Kerrison, 2022) and a perceived gap in motivation and support in the adoption of new technologies (Labiris et al., 2018; Raja et al., 2021; Verma & Kerrison, 2022). Concomitantly, at the individual and professional level, certain facilitators of adoption have been identified. Good levels of patient empowerment (Hartasanchez et al., 2022; Jaana et al., 2019), perceived usefulness and ease to use (Almathami et al., 2020; Hoonsopon et al., 2025) promote a proactive attitude, allowing patients to use telemedicine more easily and effectively (Saigi-Rubio et al., 2022). Participatory design tools in the various implementation phases would also facilitate the adoption of telemedicine, involving various stakeholders and paying attention to different poits of view (Duman-Lubberding et al., 2015; Van Gemer-Pijnen et al., 2011). Furthermore, from an organizational and technological standpoint, healthcare organizations are also called upon to take the lead in making changes and adapting the management processes of their HCPs and administrative staff (Bjorkquist et al., 2019). When telemedicine is effectively integrated into the workflow, it reduces workload (Maresca et al., 2019; Verma & Kerrison, 2022) and response-intervention times, offering prompt interventions (Mold et al., 2019, Verma & Kerrison, 2022, Zanin et al., 2022). The development of adequate technological infrastructure, interoperability between different systems (Vismara et al., 2013; Walsh & Coleman, 2005), and the availability of ongoing technical support facilitate the adoption and improve the sustainability of telematic practices (Almathami et al., 2020; Thomas et al., 2024). Lastly, from a systemic perspective, it is possible to identify economic

and legislative factors that prevent the large-scale adoption of these services, such as the high cost of their implementation (Carbo et al., 2018, Farabi et al., 2020, Raja et al., 2021) and the lack of defined business and financing models (Kelley et al., 2020; Verma & Kerrison, 2022) which, if well delineated, can lead to economic benefits (Gentili et al., 2022; Raja et al., 2021) and a reduction in costs for the healthcare system (Haleem et al., 2021; Snoswell et al., 2020). Factors concerning legislative, security and privacy aspects are multidimensional and involve technological limitations (Gajarawala & Pelkowski, 2021; Puzzitiello et al., 2021), data privacy (Andreadis et al., 2024; Kato-Lin & Thelen, 2022; van Houwelingen et al., 2018), but also the absence of approved and common regulations (Houser et al., 2023; Mishkin et al., 2023). The development of joint and shared standards would ensure privacy and security for all involved stakeholders (Fernandes & Chaltikyan, 2020; Qizi, 2024; Trettel et al., 2018). In this regard, the European Health Information Initiative (EHII), promoted by the European Delegation of the WHO (2012), aims to organize health information in a uniform way across the various countries of the European Union. In March 2025, EU Regulation 2025/327 on the European Health Data Space (EHDS) become effective, with the dual objective of creating a shared space for the collection and protection of health data, and for its use for research and innovation purposes. In Italy, in detail, the goal is to establish a transparent and widely accepted method for collecting, using, and managing health data, as well as for providing telemedicine services within the country and between different regions (Guidelines published by the Ministry of Health, 2012; 2022). This includes implementing a Health Data Ecosystem (acronymized as EDS in Italian),

which was established by decree on December 31, 2024 (no. 53 of March 5, 2025), drawing on data from the Electronic Health Record (*Fasicolo Sanitario Elettronico*) and the Health Card System (*Sistema Tessera Sanitaria*). Telemedicine represents a new way of working in the medical and healthcare field, but require significant personal, technological and organizational changes to foster an effective implementation (Barlow, 2015; Cannavacciuolo et al., 2023; Thapa & Gandhi, 2024). Taken together, these factors reveal that the telemedicine adoption cannot be explained solely by infrastructural or organizational availability, but rather point to the need for a more comprehensive understanding. Beyond technological and systemic dimensions, the psychological and behavioral components of innovation play a decisive role, including in terms of whether telemedicine becomes a sustainable practice or remains a temporary innovation. For this reason, theoretical models from psychology and behavioral science are essential to understanding how people, both patients and HCPs, approach, accept and adopt digital care. The next section introduces these models, tracing the shift of healthcare systems from a technology-centered paradigm toward a person-centered approach.

1.4 Towards a new healthcare system

Telemedicine fits into a rich and complex environment, where social change, such as digitalization and globalization, but also Covid-19 pandemic, has repercussions on the entire ecosystem (Iyawa et al., 2016; Sousa et al., 2019). The advent of digital healthcare settings requires adaptation on the part

of healthcare organizations, the people who work in them, and the patients who benefit from them (Gong & Ribiere, 2021; Kraus et al., 2021). Telemedicine, therefore, cannot be configured as a stand-alone innovation, but as part of a broader socio-technical transformation involving patients, HCPs, and the entire organization (Barlow, 2015; Saigì-Rubiò et al., 2022). These profound transformations redefine the boundaries of care, going beyond the physical space of the "here and now" of the outpatient visit, expanding the focus to the "there and then" of the digital world. It is not only the approaches that are changing, but also the roles of patients and professionals. The former are called upon to take on an increasingly central role in their care pathway, working alongside the clinicians as co-pilot, while the latter are called upon to understand an effective way to offer patients the right strategies, at the right time, with the right method of service delivery (Battineni et al., 2021). This evolution reflects a broader paradigm shift from a traditional medical model to a patient-centered and, subsequently, to a person-centered approach (Santana et al., 2018). This shift has also required changes in how health-related services are designed and in the roles of various actors involved (Frow et al., 2019; Gabay et al., 2022; Keshet et al., 2025). For decades, in fact, the importance of enabling patients to play an active role in their own treatment process has been emphasized (Ekman et al., 2011; Epstein et al., 2010; Vogus et al., 2020). In the era of digital healthcare, services that were previously offered in person now require technological adaptation, as new tools and methods for patient and care management emerged (Awad et al., 2021; Gallè et al., 2023; Stoumpos et al., 2023). Technology acceptance remains a crucial prerequisite for the diffusion of

telemedicine among patients, HCPs and the broader social context (e.g., users, laypeople). Beyond it lie deeper psychological and relational dynamics, such as self-efficacy and participation, that sustain the effective integration of telemedicine into everyday care. In summary, the digital transformation of healthcare requires a change in perspective, moving from viewing telemedicine as a simple technological innovation to recognizing it as a socio-technical process involving people, organizations and context. To understand how people (in this case, patients, HCPs and all stakeholders) accept the use of technology (here declined to telemedicine), the literature mainly draws on two key frameworks: the Technology Acceptance Model (TAM; Davis, 1986; Davis, 1989; Davis et al., 1989) and its development with the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003; Venkatesh et al., 2012). The next section introduces these main theoretical frameworks, which provide the conceptual basis for analyzing the cognitive and behavioral mechanisms underlying the adoption of telemedicine.

Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM; Davis et al., 1989) offers a psychological and behavioral model based on the idea that the intention to use technological tools (and their subsequent actual use) depends on two main cognitive factors: *perceived usefulness* (PU) and *perceived ease of use* (PEOU). Alongside, Davis (1989) identifies three other key variables: *attitude toward use* (A), *behavioral intention to use* (BI) and *actual system use* (U). These are explained below:

- *Perceived usefulness* (PU) refers to the degree to which a person believes that using that particular tool has a positive impact on improving their performance (applying this to the healthcare context, the degree to which a person believes that using a telemedicine service improves, for instance, the management of a patient's condition. Or improve workflow, in the case of HCPs or the administrative team, with a reduction in time and costs).

- *Perceived ease of use* (PEOU) relates to the degree to which a person thinks that using that particular digital tool does not require excessive effort.

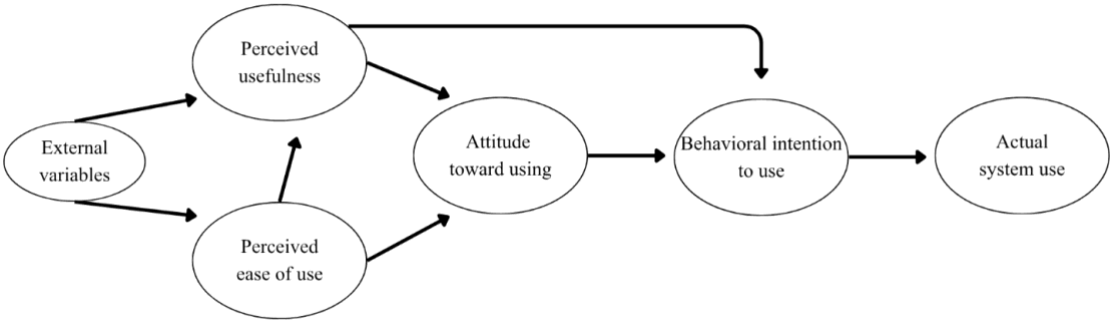
- Attitude toward use (A) identifies the user's attitude toward the use of technology. This dimension is influenced by PU and PEOU, and several studies have shown that, although mediation is always present, attitude toward use influences the intention to use (Luo et al., 2024; Palos-Sanchez et al., 2021)

- *Behavioral intention to use* (BI) involves the behavioral dimension, considering the person's intention to use the technology.

- *Actual system use* (U) concerns the actual use ot the technological tool or service, in the case of telemedicine.

In tandem with identifying these variables, Davis and colleagues (1989) propose several specific causal relationships between the variables under study (Figure 1).

Figure 1. Technology acceptance model (TAM), adapted from Davis et al. (1989).



The analysis shows that PU mediates most the effect of PEOU on A, suggesting that perceived usefulness is significantly more relevant than perceived ease of use in influencing the use of a technological tool. TAM thus provides a simple and operational model based on subjective perceptions, drawing inspiration from the theory of reasoned action (Fishbein & Ajzen, 1975) for the identification of various variables in the proposed model. However, limitations and critical issues have been highlighted, leading to several updates and revisions of the model (e.g., TAM2, Venkatesh & Davis, 2000). While considering some psychological dimensions, Davis (1989) focuses mainly on the cognitive and behavioral aspects (e.g., attitude toward use, behavioral intention to use), but does not explain how people experience the use of a technological tool. For these reasons, including a lack of attention to the social and organizational context, in 2003 Venkatesh and colleagues proposed the Unified Theory of Acceptance and Use Technology in an attempt to theoretically integrate the theories that, over the years, have sought to explain the technology acceptance (e.g., Theory of Diffusion Innovation,

DOI, Rogers, 1962; Model of PC Utilization, MPCU, Thompson et al., 1991; Combined TAM and TPB, C-TAM-TPB, Taylor & Todd, 1995b).

Unified theory of acceptance and use technology

The objective of the Unified theory of acceptance and use technology (UTAUT; Venkatesh et al., 2003) is to identify a minimum but sufficient number of variables that determine the use of technology and to increase the predictive power of the model. At the core of the theory, as with TAM, it is assumed that people evaluate technology in terms of usefulness and ease of use. By recognizing and overcoming the limitations of TAM and integrating elements of the other psycho-behavioral theories that have been developed in previous years, UTAUT broadens the perspective by proposing social and contextual dimensions. The determining factors identified are as follows:

- *Performance expectancy* (PE) encompasses the concept of TAM's PU, but with a formulation that allows it to be adapted to different contexts (e.g., organizational, healthcare, business).

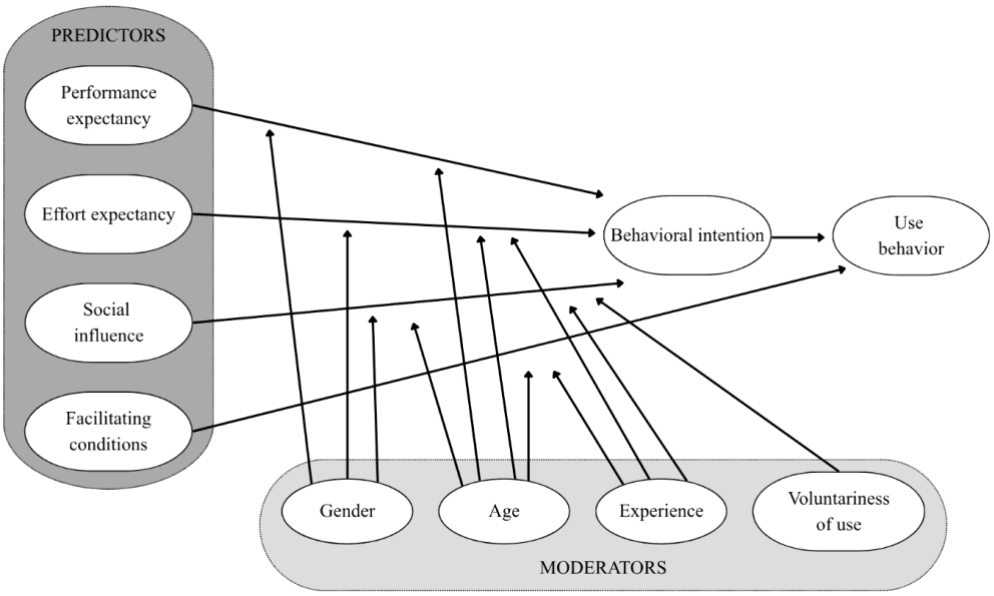
- *Effort expectancy* (EE) matches TAM's PEOU, but also includes clarity of use and intuitiveness of the system. Furthermore, UTAUT considers that the perception of effort also depends on previous experience and familiarity with the technology.

- *Social influence* (SI) refers to the degree to which usage behavior is influenced by significant others (e.g., colleagues, family members, peers). In the case of telemedicine, clinicians play an important role in their relationship with the patient, but so do caregivers.

- *Facilitating conditions* (FC) relate to the extent to which the person believes that there are adequate infrastructures, resources and technical support to use the technology effectively. This construct, together with the previous one, highlights the focus on the organizational and social environment in which the person is placed.

These factors are considered predictors and determine the behavioral intention to use the technology (Figure 2). Alongside these, factors considered to moderate the relationship between predictors and behavioral intention (BI) and between predictors and actual behavior (A) have been included, stating that they can modify the intensity of the links between variables. These moderators include age, gender, experience with technology, and voluntariness of use.

Figure 2. Unified theory of acceptance and use technology (UTAUT), adapted from Venkatesh et al. (2003).



Building on these premises, UTAUT proposes an adaptable model, considering various personal, relational and social aspects. For this reason, UTAUT is also widely used in the healthcare context (Hoque & Sorwar, 2017; Lin & Bhattacherjee, 2008; Quaosar et al., 2018; Yan & Or, 2018; Zhang et al., 2019). Its adaptability makes it effective in predicting the acceptance of technology in this field as well (Chau & Hu, 2002a, Chau & Hu, 2002b) and several studies confirm that models based on the Technology Acceptance Model and its evolutions are the most widely used in the field of digital health technologies (Garavand et al., 2016; Gücin & Berk, 2015; Harst et al., 2019; Woo & Dowding, 2018). This model is also employed in guiding the design of patient-centered interventions (Shore et al., 2018) and in assessing the acceptability of technology by both HCPs (Lin et al., 2017; Salchow-Hömmen et al., 2018) and patients (Goffredo et al., 2019). Technology acceptance is a *conditio sine qua non* for the use of telemedicine. While technological acceptance models such as TAM or UTAUT provide a valuable foundation for understanding the cognitive and behavioral determinants of adoption, their focus remains primarily on rational decision-making processes. Although these frameworks have clarified key factors influencing technology use, they offer limited attention to the psychological aspects of the patient's subjective experience. In telemedicine, however, the patient is no longer a mere recipient of medical prescription but becomes an active and competent participant in the care pathway. Moving beyond acceptance toward understanding engagement therefore requires integrating psychological constructs that explain how individuals develop motivation, confidence and the dynamic evolution of the patient-clinician relationship in digital

healthcare contexts. A *bridge* construct is that of self-efficacy. Scientific literature has shown that the successful implementation and use of telemedicine requires patients engaged in their treatment journey, which in turn requires a well-developed self-efficacy (Bandura, 2012; Cuppen et al., 2025). In this perspective, the concepts of patient activation and patient engagement take on decisive importance. They describe the degree to which individuals consciously participate in managing their own health and take responsibility for their own well-being, including through digital tools. Without a real engagement, both in terms of understanding their clinical condition and in terms of technology-mediated self-care behaviors (e.g., booking and participating in remote visits, using telemonitoring tools at home), telemedicine risks remaining an untapped potential, unable to translate into actual improvements in health outcomes. Shifting the focus from the cognitive dimensions of acceptance, this work will concentrate on some psychological dimensions that influence how people engage with and experience telemedicine. In particular, an examination will be made of three interconnected constructs that have been extensively studied in health psychology (self-efficacy, patient activation and patient engagement), which represent the motivational and behavioral processes underlying the patient's ability to take an active role in managing their own health, especially when applied to the telemedicine context.

1.5 From technology acceptance to active participation: A health psychology perspective

Self-efficacy

The concept of self-efficacy, introduced by Bandura in Social Cognitive Theory (SCT, 1986), forms the basis of patient activation and engagement processes. Bandura describes it as a person's belief in their ability to achieve a goal, the expectations of themselves, and the judgement one makes about one's capabilities to organize and implement actions aimed at achieving specific outcomes (Bandura et al., 1999). Self-efficacy potentially influences all area of a person's life (Kazemi et al., 2018), becoming an important prerequisite for a wide range of healthy behaviors and behavioral change (Graffigna et al., 2017; Kauric-Klein et al., 2017; Mirmazhari et al., 2022; Rutten et al., 2016). Over the years, self-efficacy has been broadly adopted in the healthcare context, considering it as a set of skills aimed at overcoming obstacles to implement specific self-management behaviors (Lin et al., 2012), and adopting health-promoting behaviors (Aliasgharpour et al., 2012). Literature shows that a high sense of self-efficacy is associated with greater therapeutic adherence (Wierdsma et al., 2011), better self-management behaviors (Moattari et al., 2012) and a greater sense of control and adaptation with respect to one's health condition (Wu et al., 2016). With the introduction of digital technologies, the construct has been extended to telemedicine, considering individual beliefs about their ability to perform the actions necessary to use the digital tool and improving confidence in their ability to do so (Chalfont et al., 2021; Ciere et al., 2012; Lek et al., 2024). In this

scenario, patients need to not only understand medical prescriptions, but also feel capable of using digital tools (Cuppen et al., 2025), interpreting technological feedback (Ng et al., 2025b) and integrating these practices into their daily lives (Boyne et al., 2014; Jaana et al., 2018). Furthermore, confidence in one's own abilities influences the activation phase, in other words, taking personal responsibility for managing one's health (Hibbard et al., 2005; Mirmazhari et al., 2022; Zhang et al., 2023). On the other hand, the relationship between self-efficacy and the engagement phase, which comprises cognitive and emotional engagement in one's own treatment pathway, appears complex and mediated by psychosocial and relational factors (Graffigna et al., 2015). In this case, self-efficacy appears to be a necessary but not sufficient condition for improving patient engagement, as other factors may also be involved (e.g., stages of the treatment process, type of disease, social context, doctor-patient relationship; Graffigna et al., 2015; Kooijmans et al., 2020). At the same time, several studies suggest that a high level of engagement in the treatment process improves self-efficacy, which in turn facilitates the management of one's condition, as confirmed by empirical results with both standard care patients (Cengiz & Korkmaz, 2023; Changizi et al., 2022; Omran and McMillan, 2018), and telemedicine patients (Vincente et al., 2022).

Patient Activation

The construct of patient activation was introduced by Hibbard and colleagues (2004) with the aim of understanding how patients develop the skills, motivation and confidence to make effective decisions and take an

active role in managing their own health. In this model, activation is understood as a dynamic and progressive process that develops and improved through experience, learning and growing confidence in one's own resources and skills. The activation process is modifiable and flexible, does not follow a linear path, and can increase or decrease over time (Mitchell et al., 2014; Velez-Bermudez et al., 2019). Hibbard and colleagues (2004) describe activation as a complex evolutionary process, identifying four main psychological stages:

- Phase 1 – "*My doctor is in charge of my health*": at this stage the individual is called upon to recognize their role in the treatment process. This includes beliefs about the importance of the patient role, as their health depends not only on the intervention of HCPs, but also on their own choices and behaviors. At this stage, activation is predominantly cognitive.

- Phase 2 – "*I could be doing more for my health*": the individual is called upon to acquire the confidence and awareness necessary to take care of their own well-being (e.g., knowledge of medications, lifestyle changes), ask for help when necessary, and follow the instructions given by the HCP, understanding the reasons behind these clinical choices. In this stage, the concept of self-efficacy (Bandura, 1986) becomes relevant, as confidence in one's own abilities acts as a catalyst for activation.

- Phase 3 – "*I'm part of my healthcare team"*: the individual anticipates the concrete implementation of the behaviors and measures adopted and makes responsible decisions about how to act. They are able to maintain lifestyle

changes, manage any complications that may arise and manage their symptoms autonomously.

- Phase 4 – "*I'm my own health advocate"*: the individual consolidates the care behaviors and lifestyle changes adopted in the previous phase, even in the presence of stress or difficulties. For the patient, self-care becomes an integral part of their routine.

Subsequently, to enable HCPs to tailor their support to patients' needs and level of activation along the pathway (Hibbard et al., 2007), the authors identified four levels of activation along the continuum:

- Level 1 – *Disengaged and overwhelmed*: individuals are passive and lack of confidence. They have limited healthcare knowledge, weak goal orientation, and poor adherence.
- Level 2 – *Becoming aware but still struggling*: individuals have some understanding of healthcare, but significant gaps persist. They believe health is mostly out of their control, but they can set easy goals.
- Level 3 – *Taking action and gaining control*: individuals know the key facts of their condition and are learning to implement self-management behaviors. They aim to do their best in practice behaviors and are focused on their goals.
- Level 4 – *Maintaining behaviors and pushing further*: new behaviors have been adopted by individuals, but they may find it hard to cope when faced with stress or change. A focus is on maintaining a healthy lifestyle.

Patients who show higher levels of activation more frequently engage in health prevention behaviors (e.g., health screening, immunization) and a

healthy lifestyle (e.g., exercise practices, balanced diet, self-management behaviors; Hibbard & Greene, 2009). Furthermore, increased activation is often followed by improvements in various health-related behaviors and health outcomes (Hibbard et al., 2007; Regeer et al., 2022). Although the literature on telemedicine is not yet extensively developed, some evidence suggest that digital health interventions may represent an opportunity to promote increased patient activation (Abdelraheem et al., 2024). However, not all results are consistent: the study of Bilgrami and colleagues (2020) found no improvement in patient activation levels following a telemonitoring intervention in patients with inflammatory bowel disease. On the other hand, several studies confirm that patient activation is a predictor of better clinical outcomes and appropriate use of healthcare, even in telemedicine settings (Abdelraheem et al., 2024; Paradis et al., 2024). However, to date, the extent to which patient activation can improve adherence to and acceptance of telemedicine remains largely unexplored. Certain psychological characteristics, such as a tendency toward negative self-perception or experiencing negative feelings, could reduce patients' willingness to adopt and maintain telemedicine-base care practice. According to some authors (Carman et al., 2013; Hibbard & Mahoney, 2010), these aspects are associated with low levels of patient activation, which can reduce learning abilities and personal awareness and, consequently, increase the likelihood of a lack of openness to change (Barello et al., 2016).

Patient Engagement

Although in scientific literature the terms activation and engagement are often used as synonyms (Hibbard & Mahoney, 2010), a closer look reveals a different theoretical scope (Barello & Graffigna, 2015). The former focuses on a behavioral dimension of the care experience, whose main drivers are the degree of knowledge about the disease (health literacy) and its practical management, while in the patient engagement model, the driver is the patient's daily life, in which the experience of illness is progressively integrated into the routine of their life. By patient engagement, the authors mean the multidimensional psychosocial process derived from the joint activation of the patient on three levels: cognitive (thinking), emotional (feeling) e behavioral (action; Graffigna et al., 2013; Graffigna et al., 2015):

- *Cognitive level* (what the patient thinks and knows): this concerns the patient's knowledge and understanding of their condition and how they interpret the treatment, developments and self-monitoring.
- *Emotional level* (what the patient feels): this includes the psychological and emotional aspects that lead the patient to respond to their experience when adapting to or processing their condition.
- *Behavioral level* (what the patient does): this considers the activities and behaviors that the patient engages in to manage their condition and prescription.

In this model, the patient undergoes a psychosocial process of adaptation to their clinical condition and to the different and successive roles they may assume in their relationship with the clinician. Furthermore, this distinction

highlights an additional difference compared to the patient activation model. Patient activation, in short, aims to monitor cognitive and behavioral aspects, while patient engagement also includes emotional ones. The authors have identified four possible stages in the patient engagement process, which are also arranged along a continuum:

- Blackout – "*I am in a blackout"*: this is usually a phase that patient experience at the time of diagnosis or when the disease put them in a state of psycho-emotional vulnerability (e.g., the appearance of a new symptom or a complication related to their illness). Patients feels paralyzed due to a senso of loss of control over their own bodies. In this condition, patients tend to delegate the management of their condition to HCPs, assuming a passive position.

- Arousal – "*I am an ill body"*: at this stage, the patient has developed an initial awareness and superficial understanding of their health condition and its implications. However, they are not yet able to process and accept it as part of their daily life. For this reason, they live in a constant state of emotional alert, with their attention focused on physical symptoms, engaging in disorganized and, in some cases, maladaptive behaviors that are counterproductive to clinical outcomes (e.g., poor adherence to prescribed therapy, or poor monitoring of parameters). With regard to HCPs, patients tend to delegate most actions, assuming a guardian role with respect to the appropriateness of action aimed at managing the disease

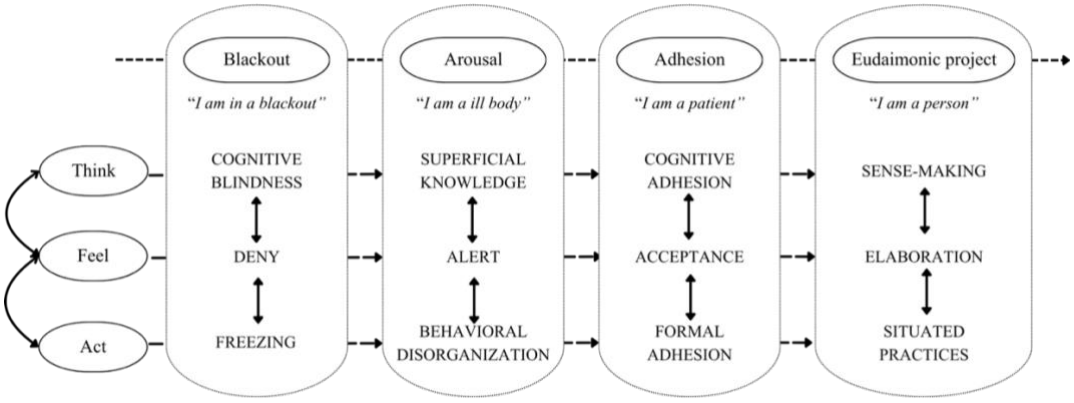
- Adhesion – "*I am a patient"*: when the shock caused by the critical moment (e.g., diagnosis or complications) decreases, the patient becomes

capable of adhering to medical prescription. In this phase, the patient is gradually able to accept their health condition. They have not yet acquired full autonomy in managing the disease (e.g., lifestyle and treatment adherence), and adapting to different daily routines can still cause some difficulties (e.g., managing the disease on vacation, when going out to dinner, etc…). What is still lacking at this stage is the full acquisition of the clinical knowledge necessary to understand how to behave in different situations. The HCP is still considered an "expert" and remains the person to refer to.

- Eudaimonic project – "*I am a person"*: at this stage, the patient acquires and maintains the role of active agent in the treatment process and, in particular, in achieving personal satisfaction and quality of life that transcend and encompass their clinical condition. They become aware of the implications of the disease in everyday life and develop effective strategies for optimal management. In addition, the patient is able to recognize when it is necessary to activate the support of the HCP. The patient shows greater acceptance of their condition, which is well integrated into their life plans, where it is just one of several aspects that characterize it.

For better understand this process, Graffigna and colleagues (2013) proposed a conceptual model illustrating its main dimensions and dynamics (Figure 3).

Figure 3. The Patient Health Engagement model (PHE), adapted from Graffigna et al., (2015).



The goal of the engagement process is to gain awareness of one's illness and autonomy in its management. This is facilitated by a good relationship with the HCPs involved (Graffigna et al., 2015; Lee & Lin, 2010). Patients with a high level of engagement not only adhere adequately to treatment and prescriptions (Gruman et al., 2010) but are also more aware of their clinical condition. This awareness and competence guide them in their choices and enable them to take action and care for themselves even when symptoms or complications arise (Barello et al., 2012; Barello et al., 2014; Barello & Graffigna, 2015). They become the first ally in partner in care, in a collaborative space between HCP and patient, highlighting the role of self-efficacy in patient engagement in the treatment of their condition. Patients are therefore not only encouraged to take care of themselves, but also recognize what is important and valuable for their overall well-being. Regarding digital healthcare context, the literature has shown that new technologies and telemedicine have good potential for promoting patient engagement (Barello et al., 2016; Graffigna et al., 2013). Through the development of integrated,

sustainable and patient-centered services, these tools promote effective exchanges between the actors involved (HCPs and patients; Eysenbach, 2001). A literature review by Barello and colleagues (2016) analyzed the main findings on patient engagement promoted by digital healthcare interventions. These studies suggest that technological tools can facilitate the monitoring of patients' illness experience and record their perception through the treatment journey, while telemedicine appears to enable patients to take on an active and relevant role in the care of their own health (Bird et al., 2020). In the following chapters, these constructs will serve as the psychological framework for the interpretation of how individuals experience, adopt and maintain telemedicine-based care.

1.6 Toward a person-centered framework for telemedicine

Within the telemedicine environment, the dimensions of patient activation and patient engagement take on particular significance. Technology-mediated interaction alters perceptions of proximity and trust, requires new communication skills, and often increases user responsibility in the daily management of their own health (Kuen et al., 2023; Montague & Asan, 2013; White et al., 2024). An active and engaged patient may be better able to leverage technology as a tool for empowerment, while a passive or unmotivated patient may perceive it as a source of stress, distance or disorientation (McGloin et al., 2020). For digital innovation to translate into real care, it is not enough to make technologies more accessible: psychological processes of participation and engagement must also be

supported. As patients significantly influence both the demand for care and clinical outcomes, there is a growing awareness of the importance of promoting a more active and competent role in managing one's own health (Graffigna et al., 2013; Greene & Hibbard, 2011). In this perspective, the focus shifts from digital health technologies and their acceptance to a person-centered approach, in which the care model integrates digital tools to coordinate care in a continuous and personalized manner (Graffigna et al., 2013). Technology, then, is not the end goal, but a means to serve the person and their needs, integrated into the care pathway to support the individual's well-being, autonomy and life plans (Graffigna et al., 2015). This section aims to serve as a guide to better understand the choices and results outlined in the following chapters. By situating the thesis within its broader context, it outlines the boundaries of what telemedicine entails and clarifies its role in the current healthcare landscape. The purpose is to provide readers, whether experts or laypeople, the conceptual and contextual references needed to navigate the following work. In doing so, this section also establishes the theoretical framework on which empirical reflection developed in this doctoral thesis.

1.7 Overall aim and studies

By examining the existing psycho-social literature focusing on telemedicine, some major lacks have been identified. Although the shift from a paternalistic to a participatory and collaborative approach in the clinician-patient relationship is now widely recognized and used, several studies have

focused on outcomes such as patient well-being (Yang et al., 2025), technology acceptance (Wan et al., 2025), or the effectiveness and impact of telemedicine interventions (Abdalla et al., 2020; Grosman-Dziewiszek et al., 2021). There has still been limited attention paid to conceptualizing the role of the patient in telemedicine. The scientific literature and practitioners emphasize the need to adopt a patient-centered approach, and then move to a person-centered approach, to focus on the individual and their integrity, rather than just the illness that characterizes them in front of HCPs (Eklund et al., 2019). It therefore appears crucial to examine how HCPs and scholars conceive of the patient, especially in telemedicine, where participation is required to make the intervention effective. Furthermore, acceptance of technology is a prerequisite for the implementation of telemedicine services (Saigí-Rubió et al., 2022; Venkatesh et al., 2003). Although the literature on barriers and facilitators promoting the adoption of these services focuses on individual, organizational and contextual factors that can explain and facilitate this process, expect for a limited number of studies (e.g., Dickey & Wasko, 2023; Khodadad-Saryazdi, 2021), limited attention has been paid to psychosocial aspects in order to understand the perspectives of all stakeholders (e.g., patients, HCPs, providers and public opinion; Cannavacciuolo et al., 2023). In conclusion, from an applied perceptive, research has rarely explored the specific contribution of patient activation to the acceptance and consistent use of telemedicine. This is despite substantial evidence supporting the predictive role of patient activation in improving clinical outcomes and the appropriate use of healthcare services (Abdelraheem et al., 2024; Paradis et al., 2024). Addressing this gap

represents a crucial step toward understanding the psychological mechanisms underpinning telemedicine. Given these premises, the current PhD research has been developed through three studies investigating telemedicine by different point of views.

Study 1 aimed to provide an overview of the state of the current scientific literature with regards to the articles published in medical and psychological fields, since telemedicine concerns both medicine and psychology, with the aim of promoting patient health from different perspective. This study focuses on the conceptualization and evolution of the patient's role in telemedicine to understand whether and how, in the adoption and implementation of these services over the years, there has been a change in the role assumed by the patient in the care pathway.

Study 2 aimed to study the social representations of telemedicine in the Italian context, examining Italian newspapers at the national and local levels to understand how public opinion discusses this emerging phenomenon.

Study 3, part of a broader longitudinal research project, presents the baseline cross-sectional analyses aimed at exploring whether patient activation mediates the relationship between symptoms monitoring and quality of life in patients with HF at the time of the proposal to adopt a telemonitoring tool.

In conclusion, this thesis aims to bridge the gap between theories of technology acceptance and approaches in health psychology by proposing an integrated understanding of digital engagement in telemedicine. The idea is to move beyond a purely technological or behavioral view of telemedicine

towards a person-centered framework that considers motivation, emotional involvement and the evolving nature of participating in digital care. This is done through the progressive articulation of three complementary studies: conceptual, social and empirical. The ultimate goal is to illuminate how psychological processes such as activation and engagement can transform telemedicine from a tool for remote care to a vehicle for patient empowerment and the creation of shared value in healthcare.

The following chapters will present each of the three studies. This will be achieved by first discussing previous and relevant literature, followed by the research questions and methods. Finally, the main results will be presented and discussed.

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Study 1

Exploring patient role from compliance to engagement in telemedicine: A Web of Science-based comparative bibliometric analysis across psychology and medicine

Piccardo, M. A.[a], Bernuzzi, C. [a], & Guglielmetti, C. [a]

[a]Department of Economics, Management and Quantitative Methods, University of Milan

Paper under review to Humanities and Social Sciences Communications

Abstract

The implementation of telemedicine in healthcare management is expanding, highlighting the need to reflect on the evolving patient role within a patient-centered approach. As telemedicine necessitates different nuances of activation, a consensus on the definition of active patient role is lacking, despite extensive literature. This study examines the evolution of this concept and explores the divergences in different fields, specifically psychology and medicine. A bibliometric analysis assessed scientific productivity using Web of Science. Comparison of usage, frequencies, and term evolution over time between psychology and medicine was performed to systematically analyse the use of different terms related to patient role (e.g., engagement, adherence) in telemedicine services. A total of 591 documents were included (psychology: 320; medicine: 271; 1990–2023). Terms describing the patient role in telemedicine are heterogeneous in both fields, revealing subtle representations of the patient held by healthcare professionals. In psychology, "engagement" is the most used term, whereas in medicine, "adherence"

persists as the predominant construct over time. However, the use of terms referring to a more active patient role is increasing in both fields, promoting close collaboration between patients and healthcare professionals in telemedicine.

Keywords: Telemedicine, Patient role, Bibliometric Analysis, Health, Psychology, Medicine

2.1 Introduction

Over the years, numerous studies have emphasized the importance of the relationship between patients and healthcare professionals (HCPs), underlining the need for a paradigm shift in which both parties are actively involved in the care process (Epstein et al., 2010; Graffigna, 2016; Singer et al., 2011). Initially, unquestionable directives and instructions were given by the expert HCP, adopting a paternalistic and authoritarian approach towards the patient. There was no opportunity for the latter to negotiate his or her own self-care management (Chakrabarti, 2014). Through time, the scientific literature has increasingly emphasized the need to change the approach, recognizing the active patient role in the healthcare process. In this regard, there has been a shift from a practitioner-centered to a patient-centered approach (Menichetti et al., 2016). Furthermore, communication plays an important role in the relationship between HCPs and patients. The way in which the HCP interacts with the patient determines the extent to which the patient feels engaged and can recognize the importance of optimally managing his or her health (Bigi, 2016; Graffigna et al., 2015).

Considering these issues, academics and HCPs have been questioning the centrality of the patient in the care process, with the aim of determining an approach that promotes the patient well-being and the improvement of his or her quality of life (Graffigna et al., 2017). However, when examining patient role in the care delivery experience, the terms used to describe the patient participation remain disparate and imply different approaches to patient interaction (Chakrabarti, 2014). Terms such as compliance, adherence and engagement are often used interchangeably, but on closer examination substantial differences emerge, shaping the beliefs and attitudes of HCPs (Chakrabarti, 2014; Menichetti et al., 2016). Indeed, compliance and adherence focus on different elements of the care process (Tasaduq, 2023). The term "compliance" refers to the act of taking medication under prescription, considering the patient as merely carrying out a recommendation provided by the HCP (Haynes et al., 1979; Horne et al., 2005). Compliance is a dichotomous term. The interaction, in this case, is unidirectional: the HCP takes the decision and prescribes, while the patient executes (Chakrabarti, 2014). On the other hand, with the shift to the term "adherence", a greater focus on the relationship between HCP and patient is emphasized. This term refers to the extent to which a person's behavior – taking of medication, following a diet and/or executing lifestyle changes – corresponds with agreed recommendations from a healthcare provider (WHO, 2003). The patient ends being a mere executor and becomes an active, autonomous person, with the freedom to choose to what extent he or she follows the HCP's recommendations. In contrast to compliance, adherence is a concept in which the patient can be placed along a continuum ranging from minimal adherence

to complete adherence to prescriptions, where the degree of adherence is determined by the patient's capabilities and resources and his or her willingness to comply with the HCP's recommendations (Chakrabarti, 2014; Tasaduq, 2023). Afterwards, scholars have gradually broadened their view by drawing attention to terms such as empowerment, activation and engagement (Barello et al., 2014; Bruce et al., 2020), making it possible to focus on the complex of dynamics related to patient role in care management. For instance, while patient activation refers to the patient ability to enact care management practices, considering only the behavioral dimension of involvement (Hibbard, 2009), patient engagement takes a multidimensional view, including cognitive and emotional dimensions (Graffigna et al., 2014).

The widespread adoption of telemedicine has not only transformed healthcare delivery but has also reshaped the relational dynamics between HCPs and patients (Gallè et al., 2023), necessitating an adaptation of the way HCPs manage patient care in a digital environment (Kenny et al., 2024; Sawesi et al., 2016). This shift empowers patients, giving them greater responsibility in managing their health, and requires both HCPs and patients to develop skills for effective collaboration toward patient well-being. Although these aspects have been widely studied in the scientific literature, little is yet known about their application to telemedicine, where technological innovation is taking place, and the HCP-patient relationship is mediated by the Internet (Kenny et al., 2024; Sawesi et al., 2016).

Using bibliometric analysis of scientific papers, this paper is to carry out a comprehensive mapping of the scientific literature on the representations of patient role in telemedicine system comparing two different fields:

psychology and medicine, considering the broader subject area of internal medicine since a wide spectrum of diseases is considered within it. The rationale behind comparing psychology with medicine stems from the consideration that both disciplines aim to promote the individuals' health, albeit with distinct point of views, thus rendering them as "complementary" fields. Both areas provide patient care through telemedicine where feasible, but the terminologies used to describe the patient's role may differ. Understanding these divergent terminologies is crucial, as it can lead to more effective patient care strategies in telemedicine services. Recognizing how psychological concepts like engagement can complement medical approaches such as adherence can help develop more integrated and patient-centered telemedicine interventions. This, in turn, has the potential to enhance both patient involvement and health outcomes.

Although the shift from a paternalistic to a participatory and collaborative relationship between HCPs and patients – also in the context of telemedicine – is widely acknowledged, most studies focus on patient well-being (Yang et al., 2025), technology acceptance (Wan et al., 2025), the investigation of the role and impact of telemedicine on patients (Abdalla et al., 2020; Grosman-Dziewiszek et al., 2021), or the exploration of patient engagement in the use of telemedicine tools (Boudreau et al., 2024). Given the lack of literature on the conception of the patient's role in telemedicine, neither in psychology nor in medicine, this study aims to explore these concepts to provide an initial mapping of the scientific literature. Specifically, starting from the interest in the relationship between HCPs and patients mediated by telemedicine (and not, for instance, in the relationship between patient and technology, i.e., user

experience), this study aims (1) to provide an overview of the state of the current scientific literature with regards to the articles published, the number of authors involved, and the geographical distribution of these papers, (2) to describe the conceptual evolution and disciplinary variances pertaining to the role of the patient in the care process when involved through telemedicine, (3) to highlight relevant and emerging themes in the existing scientific literature.

The paper addresses the following research questions:

RQ1. What is the current state of the scientific literature in medicine and psychology regarding the patient's role in telemedicine, in terms of publication volume, global trends and geographical distribution?

RQ2. How have the conceptualization and the frequency of use of the notion of the patient's role in telemedicine evolved over time in the fields of medicine and psychology?

RQ3. What are the most relevant and emerging themes in medical and psychological literature concerning the patient's role in telemedicine-mediate care?

2.2 Methodology

To address the aim a bibliometric analysis was conducted. The bibliometric method is based on the statistical measurement of science, scientists, or scientific activity and bibliographic data are processed through a workflow: study design, data collection, data analysis, data visualization and interpretation (Zupic and Čater, 2015). Bibliometric aims to systematically map scientific production at a given time, particularly in fields

where contributions are large and fragmented (Aria & Cuccurullo, 2017). Data collection and data analysis processes are detailed below following Aria and Cuccurullo's guideline (2017).

2.2.1 *Eligibility criteria*

Inclusion criteria encompassed peer-reviewed articles and reviews published in English exploring the patient role in telemedicine, and studies in which a construct related to patient role (e.g., adherence, compliance, etc…) was included and analyzed. Moreover, only studies under the Web of Science (WoS) categories of "psychology" and "internal medicine" were selected. This decision was driven by the need to include the broadest and most inclusive areas of psychology and medicine.

Exclusion criteria included literature reviews, background articles, protocols, studies involving non-patient subjects (e.g., HCPs, caregivers), and studies only mentioning terms related to patient role in the introduction and discussion sections without focusing on them in the results.

2.2.2 *Data collection*

Data were extracted from Web of Science (WoS) database, specifically utilizing the Science Citation Index Expanded (SCI Expanded), the Social Science Citation Index (SSCI) and Emerging Sources Citation Index (ESCI). The selection of WoS was based on its capability to yield a substantial number of high-quality journals and articles, as suggested in the literature (Aria & Cuccurullo, 2017; Ball & Tunger, 2006; Maione et al., 2024), while requiring fewer data-cleaning operations (Zupic and Čater, 2015). In addition, WoS

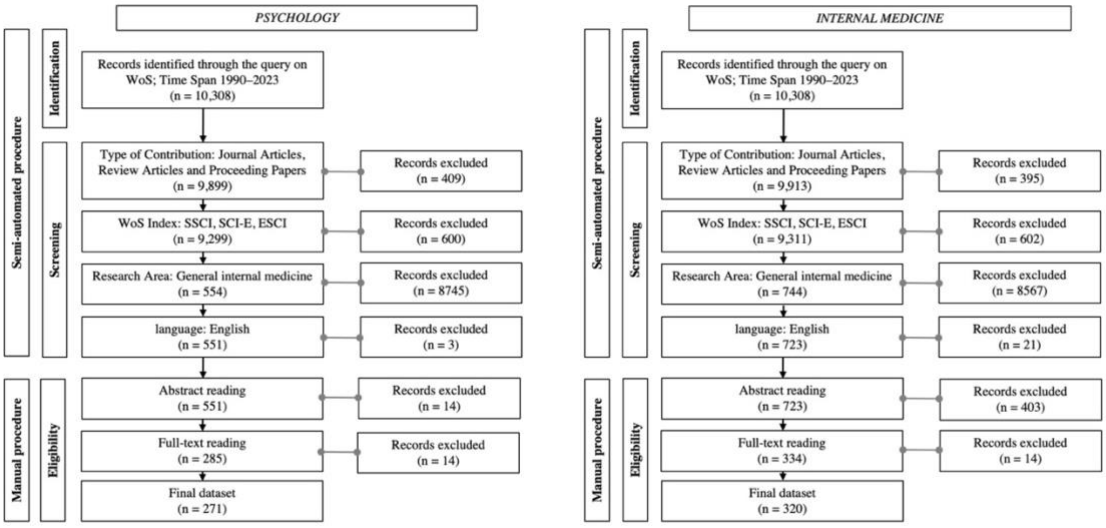
provides standardized and comprehensive metadata compatible with the bibliometric tools employed in this study (i.e., Bibliometrix/Biblioshiny), which is not fully supported by other discipline-specific databases such as PsycINFO and PubMed (Aria & Cuccurullo, 2017). Although it is known that relying on a single database can introduce potential selection bias, as highlighted in recent comparisons between WoS and Scopus (Liu et al., 2025; Stahlschmidt & Stephen, 2020), and combining both could strengthen reliability (Kraus et al., 2022; Yubo et al., 2023), the exclusive use of WoS in this study is justified by its compatibility with the selected bibliometric tool, the standardized structure of its metadata, and the need to ensure methodological consistency and replicability. A search string was created in the WoS database by incorporating several keywords related to the domain of different forms of “patient participation” AND “Telemedicine”. This was done to encompass a broad range of studies addressing the patient's role in telemedicine, facilitating the exploration of evolving terminologies describing patient role in the care process over time. The resulting string was TS=((engagement OR activation OR empowerment OR "patient-centered" OR adherence OR compliance) AND (telemedicine OR telehealth OR ehealth OR telecare OR mHealth)) in 1990–2023. The query was launched on 25 February 2024 and resulted in the retrieval of 10308 documents.

Additionally, since the aim was to compare the usage of terms in psychological and medical areas, two datasets were created respectively for these two fields from the retrieved document sample. The filtering stage produced 552 documents for the psychology area and 723 for the internal medicine area.

After completing the semi-automated procedure, two authors independently reviewed all abstracts to select the relevant papers based on the inclusion and exclusion criteria. Only those contributions unanimously deemed suitable for the study's objectives were retained, while controversial situations were resolved by including the third author for the final decision. After this stage, the dataset consists of 334 documents for psychology and 285 for medicine. A similar approach was employed during the final screening phase, involving full-text assessment against predefined inclusion/exclusion criteria to mitigate potential errors in WoS indexing (Aria and Cuccurullo, 2017). This step led to the exclusion of 14 items for each area, resulting in final dataset of 320 psychology articles and 271 medicine documents.

The graphic style of the flowchart for screening of the literature Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was used to present the selection process (Moher et al., 2009), as shown in Figure 1.

Figure 1. Data collection flow.



2.2.3 *Data analysis*

Bibliometric methods offer a systematic approach to quantitatively analyze scientific literature, enabling the identification of trends, thematic development and conceptual structures within both field of interest (Aria and Cuccurullo, 2017; Zupic and Čater, 2015). To explore the evolution of patient role in the context of telemedicine, an analysis of bibliographic "metadata" (e.g., authors, citations, keywords) was conducted using bibliometric analyses. The Bibliometrix R-package (a free open-source software, version 4.1.4, https://www.bibliometrix.org/Biblioshiny.html) was used, offering various tools for quantitative bibliometric research (Aria and Cuccurullo, 2017). This study included (1) a performance analysis to identify sample characteristics and assess the impact of scientific production (e.g., number of documents, relative citations and scientific production by countries). Additionally, (2) the frequency and use of terms related to patient role over

time were assessed, followed by (3) a co-word and thematic analyses to map the intellectual structure of the fields (Callon et al., 1991).

2.2.3.1 Co-word analysis

Co-word analysis is used to map the conceptual structure of the topic using keywords plus as the unit of analysis, identifying co-occurrences in both fields. This analysis generates semantic maps that clarify the cognitive structure of the topic (Escobar et al., 2021), delineating co-occurrence networks and defining key themes.

A co-occurrence network consists of nodes and edges indicating the relationship between pairs of nodes, where node degrees indicate the importance of nodes in the network. Furthermore, nodes with higher degrees are considered highly connected or "hub nodes". Some words seem to have a major impact on the network.

2.2.3.2 Thematic map

Using the visualization method following Cobo et al. (2011), to identify the main themes a thematic map is developed. Themes are plotted in four quadrants, based on two parameters: density, which reflects the internal strength and development of a theme, and centrality, which measures a theme's interaction with others, indicating the degree to which a network interacts with other networks and is considered "*as a measure of the importance of a theme in the development of the entire research field analyzed"* (Cobo et al., 2011).

Four quadrants emerge from the intersection of the density axis and the centrality axis. The *motor themes* (upper right, Quadrant 1) are highly developed and central, indicating key drivers of the field. Themes with high density but low centrality are referred to as *niche themes* (upper left, Quadrant 2), as they are highly developed but isolated. *Emerging or declining themes* (bottom left, Quadrant 3) show both low density and centrality, indicating limited current relevance. Finally, *basic themes* (bottom right, Quadrant 4) are underdeveloped but central, representing important yet evolving areas of research.

2.3 Results

2.3.1 *Sample characteristics*

The data collection yielded a dataset of 591 documents published from 2000 to 2023 in a total of 210 journals. In the research area of psychology, there are 1904 authors who have contributed articles, while in medicine 2138 scholars have published studies related to the investigated topic.

Table 1 provides key information on the dataset characteristics for both fields.

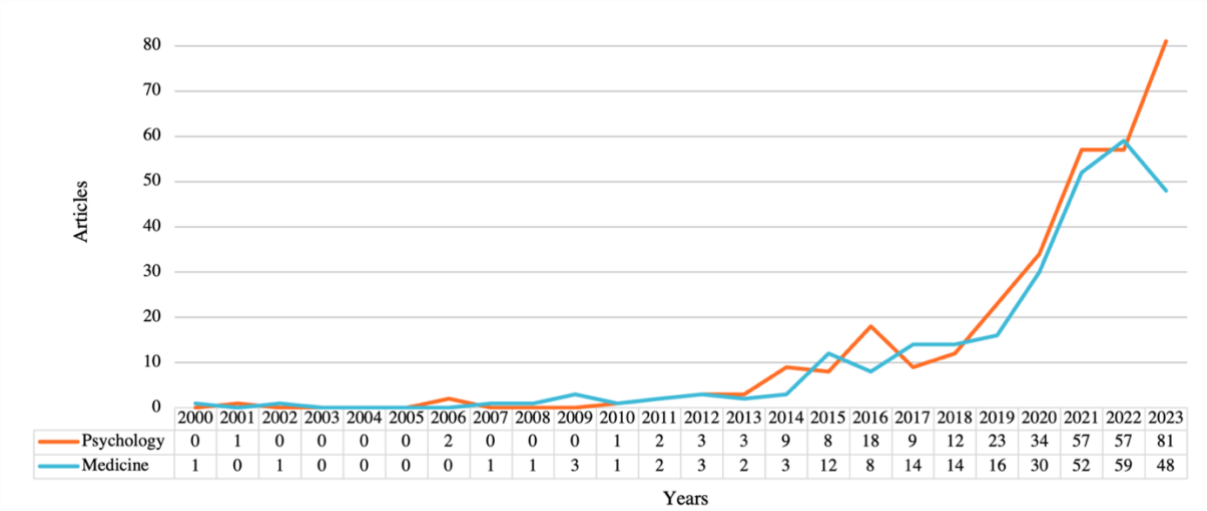
Table 1. Main information on contributions in psychology and medicine.

	Dataset features	Psychology	Internal medicine
General information	Timespan	2001:2023	2000:2023
	Journals	118	92
	Documents	320	271
	Annual Growth Rate (%)	22.11	18.33
	Average citations per document	12.80	19.27
	Average citations per year per doc	3.83	4.16
	References	12759	8741
Document contents	Keywords plus	882	643
	Author's keywords	907	620
Authors	Authors	1904	2138

2.3.2 *Global Publication Trends and Geographical Distribution*

The publication of articles related to the patient role in telemedicine tended to be limited to 2 articles until 2016 in psychology. The first peak was in 2014, with the study of Morland et al. (2014) about the use of telepsychology for rural veterans with PTSD. However, in 2019 the growing interest in this research area translated into published works. Regarding medicine, the first peak occurred in 2015, with the publication of 12 documents related to the topic of interest, but only in the last five years has the publication trend increased notably. Figure 2 illustrates the publication trend for both fields.

Figure 2. Annual scientific production in psychology and medicine.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Psychology	0	1	0	0	0	0	2	0	0	0	1	2	3	3	9	8	18	9	12	23	34	57	57	81
Medicine	1	0	1	0	0	0	0	1	1	3	1	2	3	2	3	12	8	14	14	16	30	52	59	48

Regarding the geographical distribution of papers, based on all authors' affiliations, USA and Australia dominate both disciplines, though varying degrees of difference. Scientific production is predominantly concentrated in Anglo-Saxon countries (e.g., USA, Australia, UK) along with other European nations (e.g., Netherlands, Italy). Further details on the other countries can be seen in Table 2.

Table 2. Scientific Production by Country in psychology and medicine.

	Psychology		**Internal medicine**	
Rank	Country	Frequency	Country	Frequency
1	USA	932	USA	539
2	Australia	78	Australia	116
3	Netherlands	73	UK	113
4	UK	59	Italy	98
5	Canada	51	China	80
6	Germany	28	Netherlands	48
7	Spain	25	Spain	48
8	Sweden	22	India	41
9	Italy	15	Germany	40
10	New Zealand	15	Canada	32

2.3.3 *Most Relevant Articles*

Regarding the three most relevant articles with the highest impact, measured by the number of citations, in psychology a focus on posttraumatic stress disorder emerges, and the Total Citation per Year (TC per year) is also homogeneous, while in medicine the thematic focus is more heterogeneous and the TC per year is also diversified as can be seen in Tables 3a and 3b respectively. The top ten articles can be seen in Appendix A.

Table 3a. Top manuscript by citation in psychology.

Rank	*Title*	*TC*	*TC per year*
1	Morland LA, et al. (2010) Telemedicine for anger management therapy in a rural population of combat veterans with posttraumatic stress disorder: a randomized noninferiority trial. *Journal of Clinical Psychiatry, 71*(7):855–863.	197	13,13
2	Morland LA, et al. (2014) Cognitive processing therapy for posttraumatic stress disorder delivered to rural veterans via telemental health: a randomized noninferiority clinical trial. *Journal of Clinical Psychiatry,75*(5):470–476.	151	13,72
3	Acierno R, et al. (2016) Behavioral activation and therapeutic exposure for posttraumatic stress disorder: A noninferiority trial of treatment delivered in person versus home-based telehealth. *Depression and Anxiety, 33*(5):415–423.	108	12

Notes. Ranking by Total Citations (TC), followed by Total Citations (TC) per Year.

Table 3b. Top manuscript by citation in medicine.

Rank	*Title*	*TC*	*TC per year*
1	Lilly CM, et al. (2011) Hospital Mortality, Length of Stay, and Preventable Complications Among Critically Ill Patients Before and After Tele-ICU Reengineering of Critical Care Processes. *JAMA, 305*(21):2175.	298	21,28
2	Johnston B, et al. (2000) Outcomes of the Kaiser Permanente Tele-Home Health Research Project. *Archives of Family Medicine, 9*(1):40–45.	243	9,72
3	Fortney JC, et al. (2007) A randomized trial of telemedicine-based collaborative care for depression. *Journal of General Internal Medicine, 22*(8):1086–1093.	220	12,22

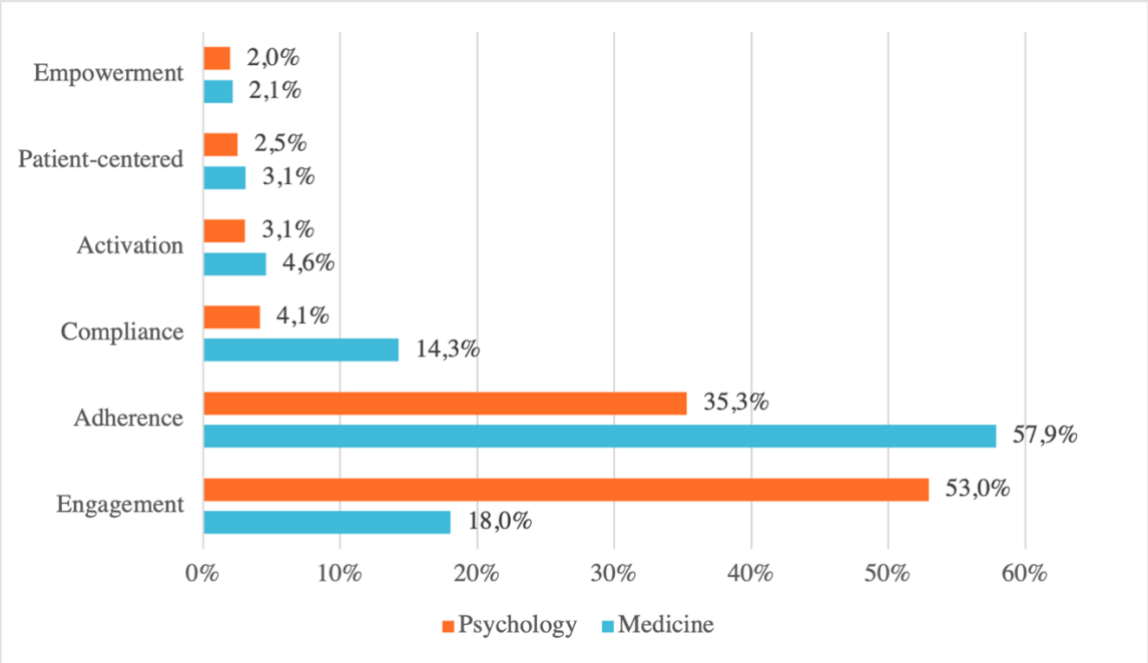
Notes. Ranking by Total Citations (TC), followed by Total Citations (TC) per Year.

2.3.4 Words Related to Patient Role and Frequency Over Time

In the analysis of psychology article abstracts (Figure 3), "engagement" was the most frequent term related to patient role, accounting for 53% of occurrences, followed by "adherence" and "compliance".

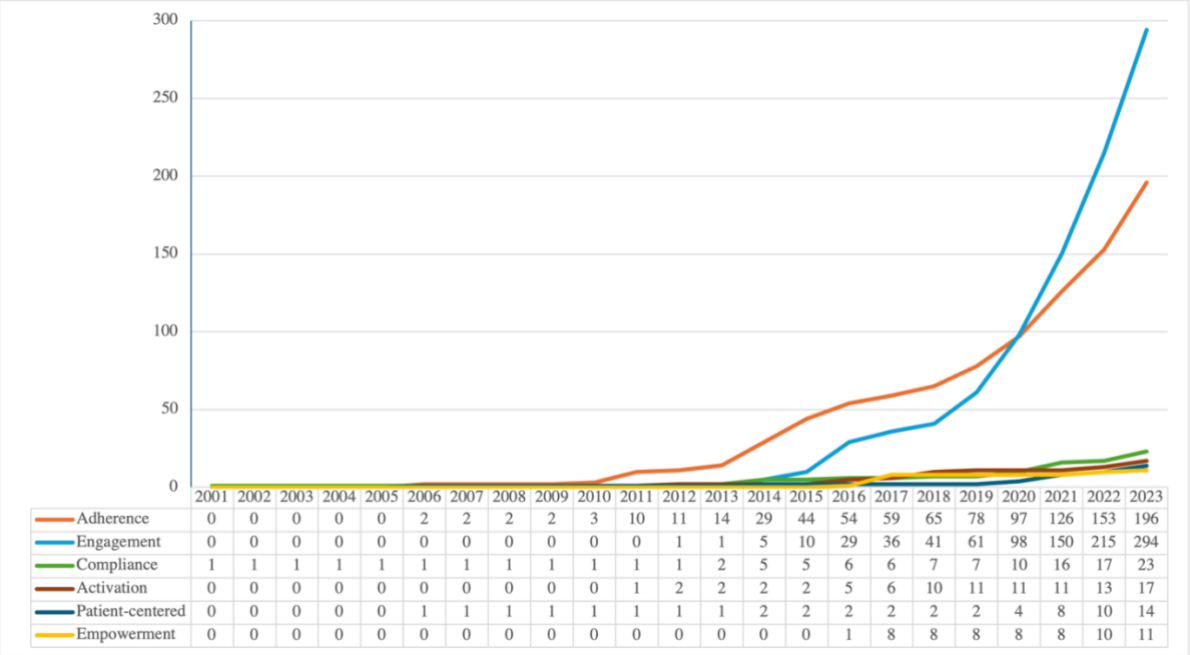
In medicine abstracts, "adherence" was the most used (57,9%), followed by "engagement". The least frequent term was "empowerment" both for psychology and medicine, representing only 2% of occurrences.

Figure 3. Most Relevant Words in psychology and medicine.



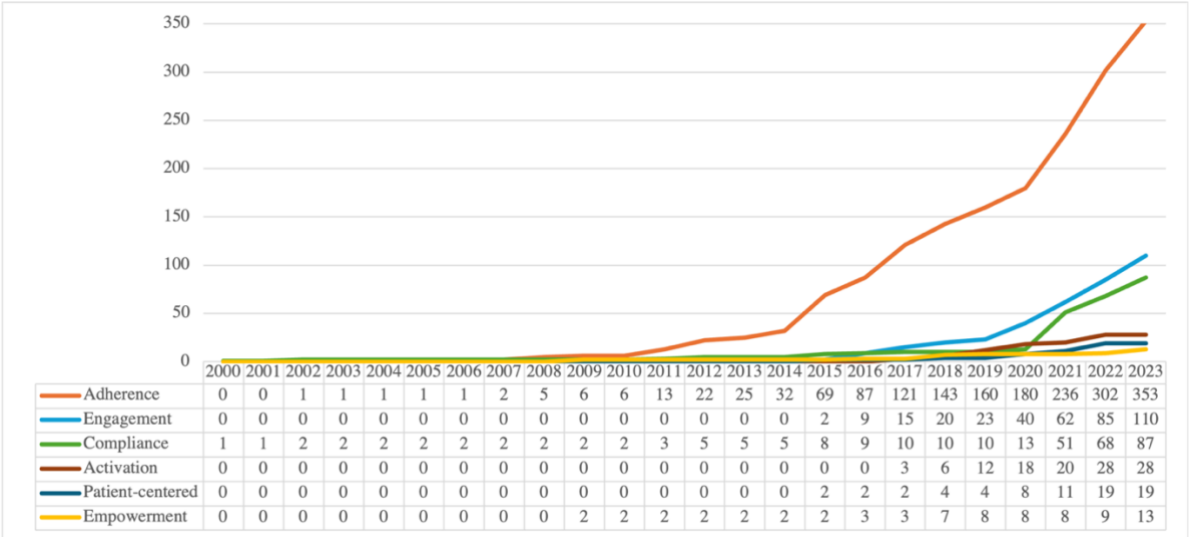
An analysis of word frequency over time in relation to the patient role in telemedicine showed a marked increase in the use of "adherence" and "engagement" (Figure 4a and 4b). "Adherence" usage has risen exponentially since 2016, while "engagement" saw a similar rise starting in 2019.

Figure 4a. Words' frequency over time in psychology.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Adherence	0	0	0	0	0	2	2	2	2	3	10	11	14	29	44	54	59	65	78	97	126	153	196
Engagement	0	0	0	0	0	0	0	0	0	0	0	1	1	5	10	29	36	41	61	98	150	215	294
Compliance	1	1	1	1	1	1	1	1	1	1	1	1	2	5	5	6	6	7	7	10	16	17	23
Activation	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	5	6	10	11	11	11	13	17
Patient-centered	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	4	8	10	14
Empowerment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	8	8	8	8	10	11

Figure 4b. Words' frequency over time in medicine.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Adherence	0	0	1	1	1	1	1	2	5	6	6	13	22	25	32	69	87	121	143	160	180	236	302	353
Engagement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9	15	20	23	40	62	85	110
Compliance	1	1	2	2	2	2	2	2	2	2	2	3	5	5	5	8	9	10	10	10	13	51	68	87
Activation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	12	18	20	28	28
Patient-centered	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	4	4	8	11	19	19
Empowerment	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	3	3	7	8	8	8	9	13

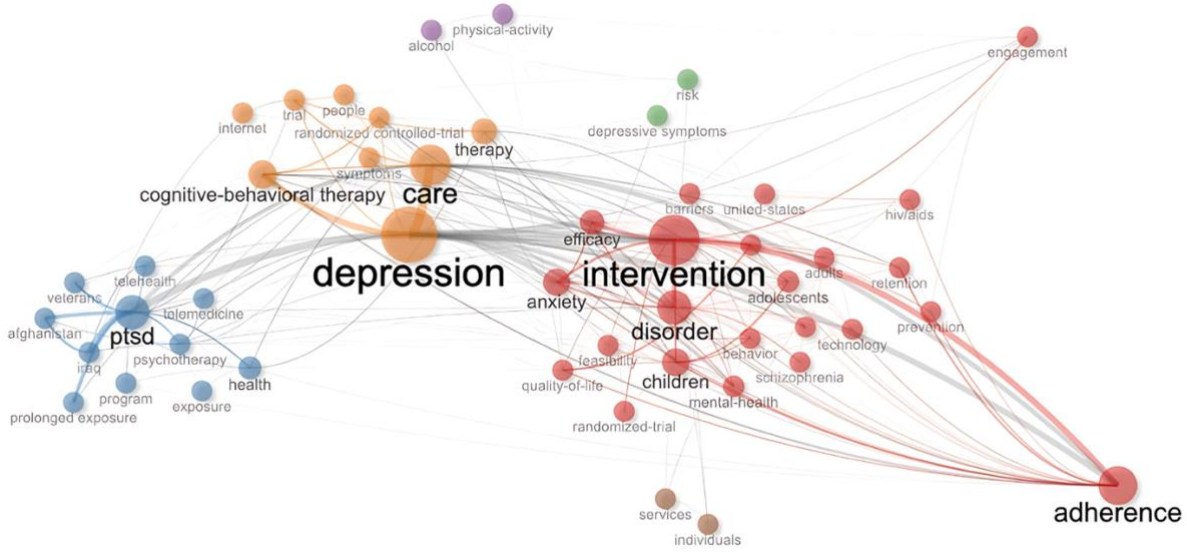
The analysis of terms frequency over time reveals that "adherence" saw the largest increase, followed by "engagement" and "compliance", both becoming more frequent after 2020, presumably related to COVID (Figure 4b). Furthermore, the 2020 peak also includes "adherence".

3.5 *Co-Word Analysis*

A co-word analysis was employed to map the conceptual structure of the topic using keywords plus as the unit of analysis, identifying co-occurrences in both fields (min. frequency = 3; number of words = 50). To enhance clarity, generic keywords and structural terms of scientific paper (i.e., scale, design, outcome) were removed, and keywords spelling was standardized (e.g., plural/singular). Statistical terms unrelated to patient involvement (i.g., meta-analysis) were also excluded. The network's topological structure is shown in Figure 5a (psychology) and 5b (medicine).

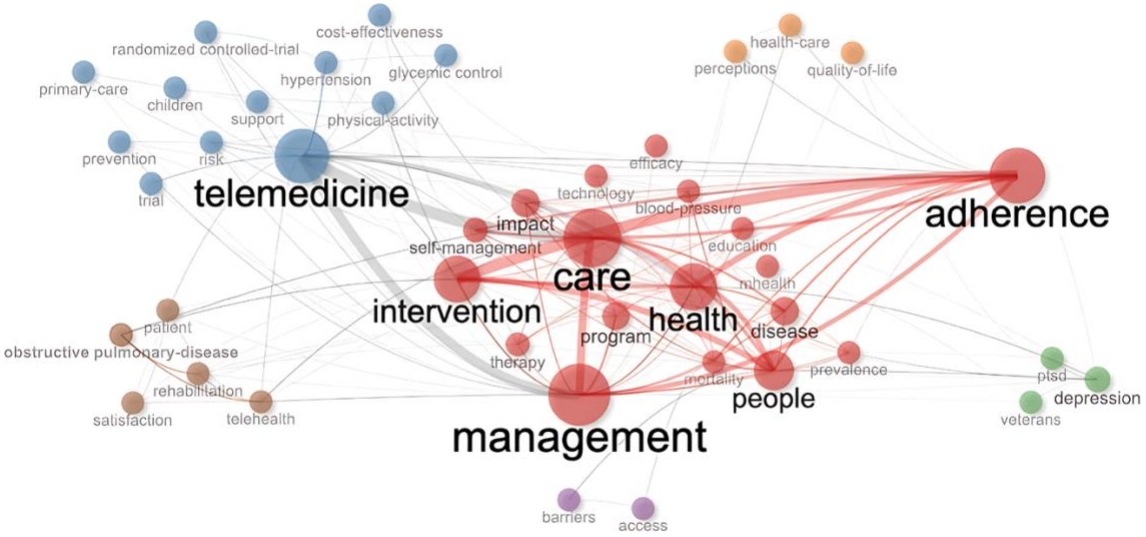
In psychology, the network comprises 49 nodes (each node represents a frequent word in keywords plus) and 6 clusters. Focusing on terms related to the patient role in telemedicine (e.g., adherence, activation, engagement), Figure 5a highlights "Engagement" and "Adherence" as the most influential words. Both belong to the same cluster, which also includes "Intervention". The second and third clusters lack patient-related terms, but "depression" and "care" emerge with higher connections in the second cluster, while "PTSD" emerge in the third one.

Figure 5a. Co-occurrence network in psychology.



In medicine, there are 6 clusters and 48 nodes. The two main clusters are represented respectively by “care”, “management”, and “adherence”, and by “telemedicine”. Figure 5b illustrates that “telemedicine” is more relevant in medicine rather than in psychology, emphasizing its role as an instrument for intervention (e.g., glycemic control, hypertension).

Figure 5b. Co-occurrence network in medicine.



2.3.6 *Thematic Map*

To further explore the conceptual structure of the scientific literature, a thematic map was developed based on co-word analysis. Figure 6a and 6b show the obtained themes for patients' experience in telemedicine. This representation allows for the identification of core, peripheral, emerging, and niche topics. For both disciplines, parameters were set as follow: 150 words, minimum frequency of 2, and 1 label per cluster. This led to the identification of 7 clusters in psychology and 16 clusters in medicine (Figures 6a and 6b), representing the thematic landscape of telemedicine in each discipline.

As far as the area of psychology is concerned, Figure 6a reveals that there are not exclusively "motor" themes in Quadrant 1 (Q1). However, straddling Q1 and Q4, the theme of "technology" appears alongside "engagement", which is seen as foundational for future studies on patient's role in telemedicine, particularly regarding active participation in managing

their own health. Themes like “intervention” and “depression” in Q4 are considered important topics for the development of future research in this field. Notably, “adherence” is part of the “intervention” cluster, highlighting its relevance to the patient’s role in telemedicine care pathways. In Quadrant 2 (Q2), “motivation” and “physical activity” emerge as niche topics with limited contribution to the overall research development, suggesting potential areas for future exploration. In contrast, at the intersection of Q1 and Q2, the theme of “risk” is found, indicating that this is a driving theme but one that can be explored in more detail in future developments in this research area.

In Quadrant 3 (Q3), the presence of “Post-Traumatic Stress Disorder (PTSD)” indicates a declining focus on this theme, with research interest shifting elsewhere. This trend is supported by the fact that the most cited papers in this cluster are over a decade old (Acierno et al., 2016; Morland et al., 2010, 2014).

The results of the thematic analysis suggest that deeper exploration of “motivation” and “physical activity” is needed to advance the understanding of the patient’s role and participation in telemedicine. This challenge is important because it would allow for more development and knowledge within telemedicine studies to ensure an increasingly engaging experience for patients that see them as active participants in their care pathways.

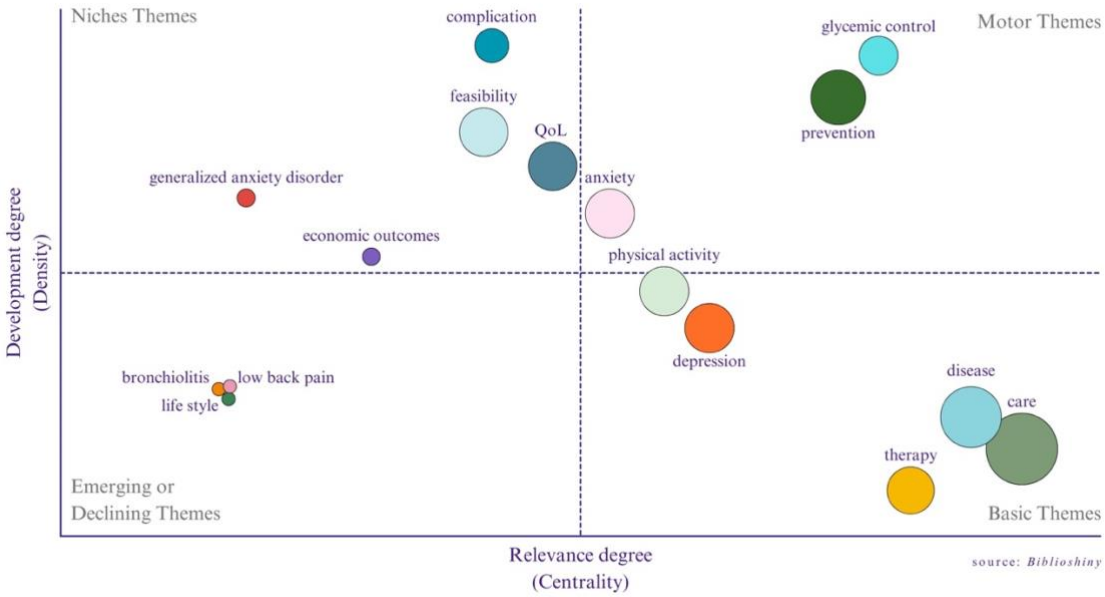
Figure 6a. Thematic map in psychology.

As regards medicine, the thematic analysis results are punctiform (Figure 6b). The different clusters will be examined, paying more attention to the most frequently cited papers. In Q1, the driving themes include "glycemic control", "prevention" and "anxiety", each with distinct characteristics. "Glycemic control" represents innovative approaches to managing diabetes via technological devices that allow continuous and remote blood glucose monitoring (Aikens et al., 2015; Kang et al., 2021). "Prevention" focuses on interventions aimed at preventing medical diseases or complications (Guo et al., 2019; Leon et al., 2015). These themes are pivotal for advancing telemedicine studies in the medical field. Q2 contains niche themes such as "complications", "quality of life", "feasibility", "generalized anxiety disorder" and "economic outcomes". These topics currently have only a marginal influence on the development of telemedicine research. Some, like "economic outcomes", are more often studied in other disciplines (e.g., health

economics and healthcare management). In Q3, emerging themes include “lifestyle” and “low back pain”, which have gained scholarly attention in recent years (Licciardone et al., 2022; Ullas et al., 2021). Another notable theme is “bronchiolitis”, which resurfaced in 2020 after a hiatus of about 20 years (Morlion et al., 2002; Wijbenga et al., 2020). In Q4, key foundational themes emerge, including “care”, “disease”, “therapy”, but also “depression” and “physical activity”. The first three, especially “care”, have high centrality and serve as pillars in the study of the patient’s role in telemedicine. The theme of “adherence” is particularly important within the “care” cluster, highlighting its role in patient involvement in the care process (O’Connor-Reina et al., 2021; Stut et al., 2015). Studies laying the foundations in these areas date back to the 2000s (Burke et al., 2012; Johnston, 2000) but have been developed in the last decade (Gordon et al., 2020; Reed et al., 2020). Themes such as “depression” and “physical activity”, though less developed, are considered basic and may serve as a foundation for future research on the patient’s role in telemedicine.

The analysis suggests several areas that warrant further exploration, including “complications”, “sustainability” and “quality of life” in telemedicine, with a focus on the patient’s role in care. These topics are crucial for advancing the integration of telemedicine into patient-centered healthcare.

Figure 6b. Thematic map in medicine.



2.4 Discussion

This bibliometric analysis aimed to provide an overview of scientific research on the patient's role in telemedicine. The findings confirmed growing academic interest in this topic over the last decade, following numerous technological innovations that have led to developments in the use of this service and coinciding with the COVID-19 pandemic (Vogt et al., 2023). A key aspect of the analysis highlighted the most frequently addressed telemedicine-related conditions in the ten most cited manuscripts in both categories. Regarding the psychological area, an emerging interest is in the use of telemedicine in the treatment of post-traumatic stress disorder (PTSD; e.g., Acierno et al., 2016; Morland et al., 2010) and other psychopathologies such as social anxiety and panic disorder. Research predominantly originates from the USA, where the PTSD treatment, particularly for war veterans, is a focal point. In the medical field, on the other hand, telemedicine

implementation is more heterogeneous, covering a wide spectrum of pathologies. There is an increasing focus on the patient's role in self-care management, reflecting heightened interest in this area. As with psychology, the USA leads in scientific output, followed by other two Anglo-Saxon countries: UK and Australia. Unlike traditional healthcare, telemedicine allows patients and HCPs to stay in touch remotely, in a renewed care space, with rules and roles that make patients more active and protagonists in their own care pathway (Rivas et al., 2025). Furthermore, despite structural differences in service delivery, several studies have shown that in some care services, telemedicine is equivalent to face-to-face care, with a high level of patient satisfaction (Andrews et al., 2020; Martinez et al., 2018; Rivas et al., 2025; Shigekawa et al., 2018).

Research in both psychology and medicine has increased, revealing changes in terminology regarding the patient's role in health management. Although there is still fragmentation in the language surrounding patient participation, the most used terms in both disciplines are "engagement" and "adherence". The first one is more prevalent in psychology, while the latter in medicine. This distinction highlights a significant trend toward adopting a patient-centered approach that considers both the personal patient characteristics and the relational dynamics between patients and HCPs (Graffigna et al., 2015; Rzadkiewicz and Chylińska, 2023). Indeed, scholars emphasize the need to adopt a participatory approach in scientific research to inform the implementation of communication strategies that enhance patient well-being and satisfaction in health management, while also improving care efficiency across the healthcare system (involving physicians, nurses, etc.;

Bigi, 2016). Over the last decade, research has reinforced this trend towards adopting “enabling” terms, positioning patients as active participant in health management. The shift from terms like “compliance, empowerment, activation” to “patient engagement” suggests a step forward in the approach of HCPs because, unlike previously used terms, engagement has an intrinsic reference to the relationship between the patient and HCPs (Bigi, 2016). In telemedicine context, the relational dimension is reconfigured by digital mediation. By ensuring personalized and coordinated continuity of care and communication between HCPs and patient, this modality allows patients to increase their level of engagement and self-care, while at the same time increasing their overall satisfaction (Rivas et al., 2025). These findings highlight the differences in the conceptual evolution of the patient’s role among psychology and medicine. In the medical field, literature still tends to rely on the concept of “adherence”, which reflects a traditional and paternalistic view of care relationship between HCP and patient (Chakrabarti, 2014). However, this approach seems unfit for the specific nature of telemedicine, an initiative that cannot reach its full potential if patients remain passive in their care journey and in their use of digital services (Gallè et al., 2023; Kenny et al., 2024). Telemedicine bridges the gap that exists between face-to-face visits (e.g., telemonitoring) and allows patients to be reached in their “here and now” in the daily and familiar context (e.g., teleconsultation or telerehabilitation; WHO, 2023). In this scenario, patient activity becomes crucial: only by being involved can the full potential of digital technologies be realized, ensuring continuity, personalization, and more timely support from HCPs (Khodadad-Saryazdi, 2021; Thompson et al., 2016). From a

psychological perspective, the results show that research has gradually shifted from concepts such as compliance and empowerment towards the more relational construct of patient engagement (Graffigna et al., 2015; Menichetti et al., 2016). These insights are particularly relevant for telemedicine, where maintaining active patient engagement is essential to ensure long-term participation in digitally mediated care and promote patient health and well-being (Chan et al., 2021; Harst et al., 2019). Due to these characteristics, low levels of engagement could represent one of the main obstacles to both the adoption and effectiveness of telemedicine services (Rivas et al., 2025). The convergence between engagement and adherence therefore emerges as a central issue: while engagement encourages active participation, adherence provides useful parameters for monitoring clinical outcomes. The integration of these two perspectives allows for the definition of a more comprehensive and truly patient-centered model of care in medicine and psychology.

Furthermore, another interesting aspect is the combination of the two predominant terms. According to the Patient Health Engagement model by Graffigna and colleagues (2015), engagement is a prerequisite to patient adherence. Although adherence still involves HCP's assessing it as “good” or “poor”, emphasizing communication strategies that educate patients about their condition and motivate self-care may considerably improve patient engagement. Consequently, well-informed and motivated patients are more likely to adhere to HCPs’ recommendations (Bigi, 2016). This shift transforms patients from mere compliance with prescriptions to recognizing their importance as active participants in managing their health, guided by HCPs. In telemedicine, this shift highlights some unique aspects. While

digital platforms enable long-term and continuous remote monitoring and feedback (Güdük, 2025), they also introduce challenges such as unequal access to technology and digital literacy (Rivas et al., 2025). Telemedicine can potentially be a tool for co-creating value and increasing patient engagement, allowing patients to actively participate in their own care journey (Carlqvist et al., 2021). However, the right conditions are needed for effective acceptance and use of technology to fully realize the benefits of these digital tools in healthcare (Rivas et al., 2025).

The evolution in the conceptualization of the patient is part of a broader revolution, the technological one, which has led to a deep redesign of economic and social processes (DeLuca and Enmark, 2000; Riva et al., 2012). In healthcare, telemedicine has emerged as a transformative force, enabling innovations in patient role. By personalizing care and restoring patient autonomy, telemedicine presents an opportunity to promote adherence to clinical recommendations while respecting patients' needs, values, and preferences (Tzelepis et al., 2015). Compared to traditional healthcare, the intrinsic characteristics of telemedicine – remote interaction, use of technology, hybrid clinical settings – make the patient's role central at every stage of the care journey, creating both opportunities (e.g., patient engagement, self-management; Rivas et al., 2025) and challenges (e.g., digital divide, access to technology, HCP-patient interaction; Carlqvist et al., 2021; Ramachandran et al. 2023). However, current research findings are still uncertain about the effectiveness of telemedicine in improving patient experience in terms of engagement and participation, as well as regarding its

impact on clinical outcomes (Bruce et al., 2020; Donevant et al., 2018; Michie et al., 2017).

Lastly, the thematic map derived from co-word analysis highlights both consolidated and emerging themes. In psychology, the analysis shows a consolidated basis in interventions and an increased interest in technology, which may guide future research and lay the groundwork for increasingly engaging patients. These insights are valuable for telemedicine, where psychological engagement strategies can improve adherence in medical settings. By integrating these approaches into telemedicine system, HCPs can promote more active patient involvement, leading to improved long-term health outcomes and more effective, patient-centered care. In the medicine field, the thematic map identified a diverse array of clusters. Among the "motor" themes, "prevention" stands out as particularly promising, suggesting the application of telemedicine to "healthy" individuals in a preventive approach, even in absence of diagnosis or disease. This expands the potential user base for telemedicine services, offering new opportunities for engagement and health management.

From the studies examined, it is interesting to note that telemedicine offers patients and HCPs several opportunities and challenges. Among the opportunities, the most significant is the change in the patient's role, who is given the possibility of greater personalization and continuity of care, as well as being asked to become more involved in the management of their health, with benefits for both self-monitoring and engagement. The challenges also include the use of technological devices through which services are delivered, as over and above patients and HCPs (e.g., digital divide, device functionality,

face-to-face interaction and relational continuity, privacy and security issues). To conclude, the studies analyzed also provide some insights into the strategies to be adopted to address the structural and relational changes typical of telemedicine. The proposals for digital literacy and accompaniment to change promoted through the co-design of services and delivery methods seem to guarantee the participation of all stakeholders from the design stage, to foster the adoption of telemedicine and reap its benefits for patient health and their engagement in the care pathway.

2.4.1 *Strengths and limitations*

As far as is known, no bibliometric analyses have compared psychology and medicine on topic related to patient role in telemedicine. This research provides an overview of the literature status to date and identifies the most productive countries and scholars on this topic, suggesting opportunities for collaborative cross-cultural studies. Most studies originate from Europe and the USA, but it is important to also consider countries in Asia and Africa, where access to care is often incomplete. In these regions, telemedicine can significantly enhance the patient's role in clinical practice by overcoming space-time barriers. Since telemedicine is an umbrella term encompassing various healthcare services (e.g., teleconsultation, telerehabilitation) and technological devices (e.g., smartphone, wearable devices), a limitation of this study is the variety of terms used (e.g., telecare) and the resulting service delivery variations. Depending on the adopted service (e.g., telemonitoring, teleconsultation), patient involvement in their interaction with HCP may differ significantly. Additionally, bibliometric analysis does not allow for an

in-depth examination of the specific ways and modalities of delivery of telemedicine services presented in the studies, or an exploration of contextual and experiential dimensions (e.g., service design, or clinician-patient relationship), as it focuses primarily on quantitative aspects of the publications rather than on detailed content analysis. These dimensions are beyond the scope of this methodology and would require complementary qualitative research approaches (e.g., content analysis, narrative review).

By its nature, bibliometric analysis does not allow for the exploration of causal relationships between external and the trends observed in the literature. Therefore, it was not possible to determine how contextual and situational factors – such as the COVID-19 pandemic or the emergence of new technologies – may have influenced the evolution of the identified terms.

It must be acknowledged that relying on a single database (Web of Science) may underrepresent some study more visible in other databases (e.g., Scopus, PsycInfo, PubMed), thereby introducing a potential selection bias (Kraus et al., 2022; Yubo et al., 2023; Liu et al., 2025). The inclusion of databases such as Scopus and PsycInfo could have influenced both the disciplinary corpus balance and the absolute number of documents retrieved. However, although the integration of multiple databases could have altered the number of documents and the relative proportions between disciplines, existing comparative studies suggest that general temporal trends and conceptual trajectories tend to remain relatively stable across major bibliographic sources, despite differences in coverage (Pranckutė, 2021; Tarazi, 2024). In the present study, the exclusive use of WoS reflects a transparent compromise between breadth and methodological consistency,

prioritizing standardized metadata and compatibility with the bibliometric tools used. Future research could extend this work by integrating more databases and using complementary bibliometric software (e.g., VOSviewer) to further test the robustness of the observed trends.

2.4.2 *Implications for future research*

Future research should focus on developing and testing interventions for HCPs to help them understand how the language describing the patient role influences patient engagement in telemedicine, consequently impacting health outcomes. Specifically, studies should explore HCPs' communication strategies within telemedicine settings and their impact on patient role and care effectiveness. Additionally, research on telemedicine implementation should also consider psychological aspects, such as patient engagement, to provide a more holistic understanding of how these elements contribute to improve health outcomes and patient satisfaction.

Moreover, this research highlights the psychological and medical terminologies used in telemedicine, suggesting several future research directions. For instance, studies could investigate how combining engagement-focused strategies from psychology with adherence models from medicine may enhance telemedicine services. Further longitudinal studies could explore the factors that facilitate or hinder a positive patient experience, particularly regarding active patient involvement in healthcare management through telemedicine. Such studies could also assess whether this involvement leads to optimized clinical outcomes and improved quality of life.

Finally, future research could focus on the relationships between various care approaches (e.g., shared decision making) and patient engagement in telemedicine contexts. A dedicated bibliometric analysis focusing on how shared decision making is addressed in digital healthcare settings could provide complementary insights into the evolving representation of the patient's role, particularly in virtual care models. Furthermore, future studies could employ qualitative approaches, such as systematic review of the literature combined with content analysis, to provide a critical synthesis of existing studies and clarify how terms related to the patient's role in telemedicine have been defined and used. This approach would help address current gaps and strengthen the reliability of existing conclusions.

2.5 Conclusion

The bibliometric analysis conducted in this study provides a comprehensive map of patient role in telemedicine in two different fields, contributing to highlight significant findings. First, over the years the patient-centered approach is gaining in importance, encouraging patients and HCPs to collaborate closely in telemedicine. Secondly, in both psychology and medicine, the focus is on the relationship and not just the "disease", ensuring a multidimensional view of the person and not just the "patient".

Ethics statement

Competing interests

The authors declare no competing interests.

Data availability

All data is available upon request from the corresponding author.

Ethical approval

Not required.

Informed consent

Not required.

Author contributions

All the authors have made substantial contribution to the manuscript. In particular, M.A.P. and C.G. conceived the study, M.A.P. performed the statistical and data analysis and wrote the first draft of the paper; C.B. and C.G. critically reviewed the manuscript to reach the current version. All authors read and approved the final manuscript.

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Appendix 1.

Most Relevant Articles, Authors, and Countries

Table 2a. Top manuscript by citation in psychology.

Rank	*Title*	*TC*	*TC per year*
1	Morland, L. A., Greene, C., Rosen, C., Foy, D., Reilly, P., Shore, J., He, Q., & Frueh, C. (2010). Telemedicine for anger management therapy in a rural population of combat veterans with posttraumatic stress disorder: a randomized noninferiority trial. *Journal of Clinical Psychiatry, 71*(7), 855–863.	197	13,13
2	Morland, L. A., Mackintosh, M. A., Greene, C. J., Rosen, C. S., Chard, K. M., Resick, P., & Frueh, B. C. (2014). Cognitive processing therapy for posttraumatic stress disorder delivered to rural veterans via telemental health: a randomized noninferiority clinical trial. *Journal of Clinical Psychiatry,75*(5), 470–476.	151	13,72
3	Acierno, R., Gros, D., Ruggiero, K., Hernandez-Tejada, M., Knapp, R., Lejuez, C., Muzzy, W., Frueh, C., Egede, L., & Tuerk, P. (2016). Behavioral activation and therapeutic exposure for posttraumatic stress disorder: A noninferiority trial of treatment delivered in person versus home-based telehealth. *Depression and Anxiety, 33*(5), 415–423.	108	12
4	Comer, J., Furr, J., Cooper-Vince, C., Kerns, C., Chan, P., & Edson, A. (2014). Internet-Delivered, Family-Based Treatment for Early-Onset OCD: A Preliminary Case Series. *Journal of Clinical Child & Adolescent Psychology, 43*(1), 74–87.	87	7,91
5	Myers, K., Valentine, J., Morganthaler, R., & Melzer, S. (2006). Telepsychiatry with incarcerated youth. *Journal of Adolescent Health, 38*(6), 643–648.	74	3,84
6	Thomas, G., & Bond, D. (2015). Behavioral response to a just-in-time adaptive intervention (JITAI) to reduce sedentary behavior in obese	74	7,4

	adults: Implications for JITAI optimization. *Journal of Health Psychology.*		
7	Comer, J., Furr, J., Kerns, C., Miguel, E., Coxe, S., Elkins, M., Carpenter, A., Cornacchio, D., Cooper-Vince, C., DeSerisy, M., Chou, T., Sanchez, A., Khanna, M., Franklin, M., Garcia, A., & Freeman, J. (2017). Internet-delivered, family-based treatment for early-onset OCD: A pilot randomized trial. *Journal of Consulting and Clinical Psychology, 85*(2), 178–186.	73	9,12
8	Ivanova, E., Lindner, P., Hoa Ly, K., Dahlin, M., Vernmark, K., Andersson, G., & Carlbring, P. (2016). Guided and unguided Acceptance and Commitment Therapy for social anxiety disorder and/or panic disorder provided via the Internet and a smartphone application: A randomized controlled trial. *Journal of Anxiety Disorders, 44,* 27–35.	73	8,11
9	Strachan, M., Gros, D., Ruggiero, K., Lejuez, C., & Acierno, R. (2012). An integrated approach to delivering exposure-based treatment for symptoms of PTSD and depression in OIF/OEF veterans: Preliminary findings. *Behavior Therapy, 43*(3), 560–569.	73	5,61
10	Kleiboer, A., Donker, T., Seekles, W., Van Straten, A., Riper, H., & Cuijpers, P. (2015). A randomized controlled trial on the role of support in Internet-based problem-solving therapy for depression and anxiety. *Behaviour Research and Therapy, 72,* 63–71.	71	7,1

Notes. Ranking by Total Citations (TC), followed by Total Citations (TC) per Year.

Table 2b. Top manuscript by citation in medicine.

Rank	*Title*	*TC*	*TC per year*
1	Lilly, C. M., Cody, S., & Zhao, H., Landry, L., Baker, S. P., McIlwaine, J., Chandler, M. W., Irwin, R. S., & University of Massachusetts Memorial Critical Care Operations Group (2011). Hospital Mortality, Length of Stay, and Preventable Complications Among Critically Ill Patients Before and After Tele-ICU Reengineering of Critical Care Processes. *JAMA, 305*(21), 2175.	298	21,28
2	Johnston, B., Wheeler, L., Deuser, J., & Sousa, K. H. (2000). Outcomes of the Kaiser Permanente Tele-Home Health Research Project. *Archives of Family Medicine, 9*(1), 40–45.	243	9,72
3	Fortney, J. C., Pyne, J. M., Edlund, M. J., Williams, D., Robinson, D. E., Mittal, D., & Henderson, K. (2007). A randomized trial of telemedicine-based collaborative care for depression. *Journal of General Internal Medicine, 22*(8), 1086–1093.	220	12,22
4	Pinnock, H., Hanley, J. A., McCloughan, L., Todd, A., Krishan, A., Lewis, S., Stoddart, A., Van Der Pol, M., MacNee, W., Sheikh, A., Pagliari, C., & McKinstry, B. (2013). Effectiveness of telemonitoring integrated into existing clinical services on hospital admission for exacerbation of chronic obstructive pulmonary disease: researcher blind, multicentre, randomised controlled trial. *BMJ, 347,* f6070.	216	18
5	De Jong, M. J., Van Der Meulen-de Jong, A. E., Romberg-Camps, M. J., Becx, M. C., Maljaars, J. P., Cilissen, M., Van Bodegraven, A. A., Mahmmod, N., Markus, T., Hameeteman, W. M., Dijkstra, G., Masclee, A. A., Boonen, A., Winkens, B., vVn Tubergen, A., Jonkers, D. M., & Pierik, M. J. (2017). Telemedicine for management of inflammatory bowel disease (myIBDcoach): a pragmatic, multicentre, randomised controlled trial. *Lancet, 390*(100898), 959–968.	209	26,12
6	Burke, L. E., Styn, M. A., Sereika, S. M., Conroy, M. B., Ye, L., Glanz, K., Sevick, M. A., & Ewing, L. J. (2012). Using mHealth technology to enhance self-monitoring for weight loss: a randomized trial. *American Journal of Preventive Medicine, 43*(1), 20–26.	206	15,84
7	Reed, M., Huang, J., Graetz, I., Lee, C., Muelly, E., Kennedy, C. J., & Kim, E. (2020). Patient Characteristics Associated With Choosing a Telemedicine	202	40,4

	Visit vs Office Visit With the Same Primary Care Clinicians. *JAMA Network Open, 3*(6), e205873.		
8	Hwang, D., Chang, J. W., Benjafield, A. V., Crocker, M. E., Kelly, C., Becker, K. A., Kim, J. B., Woodrum, R. R., Liang, J., & Derose, S. F. (2018). Effect of Telemedicine Education and Telemonitoring on Continuous Positive Airway Pressure Adherence. The Tele-OSA Randomized Trial. *American Journal of Respiratory and Critical Care Medicine, 197*(1), 117–126.	136	19,43
9	Lilly, C. M., McLaughlin, J. M., Zhao, H., Baker, S. P., Cody, S., Irwin, R. S., & UMass Memorial Critical Care Operations Group (2014). A multicenter study of ICU telemedicine reengineering of adult critical care. *Chest, 145*(3), 500–507.	126	11,45
10	Gordon, H. S., Solanki, P., Bokhour, B. G., & Gopal, R. K. (2020). "I'm Not Feeling Like I'm Part of the Conversation" Patients' Perspectives on Communicating in Clinical Video Telehealth Visits. *Journal of General Internal Medicine, 35*(6), 1751–1758.	105	21

Notes. Ranking by Total Citations (TC), followed by Total Citations (TC) per Year.

Study 2

Diverging views on healthcare co-creation: The social representations of telemedicine in the Italian press

Piccardo, M. A.[a], Zulato, E.[b], & Guglielmetti, C. [a]

[a]Department of Economics, Management, and Quantitative Methods, University of Milan

[b]Department of Psychological and Behavioral Science, London School of Economics and Political Science

Paper under review to Psychology, Health & Medicine

Abstract

Recent technological progress has led to several telemedicine services and tools. However, telemedicine is still in its early stages, and its potential has yet to be fully exploited. This study aims to analyse how telemedicine is represented by the Italian press, gauging its relevance in public discourse and investigating the frames used to communicate about telemedicine in the press. By examining social representations, the research defines the cultural context of telemedicine, highlighting its role in public health, the benefits and challenges it presents, and its impact on healthcare access. The methodology comprised qualitative and quantitative text analyses: (1) identifying the total number of Italian newspaper articles (1990–2022) on the topic through a salience analysis; (2) analyzing 5,205 representative headlines from six Italian newspapers using frame analysis. Salience analysis shows that telemedicine remains an emerging topic, often discussed in correspondence with specific issues (e.g., in 2002 and 2014, in correspondence with surgical innovations and national guidelines; during COVID-19 and consequent

healthcare access needs). Interest declined post-2020, reflecting normalization and reduced public health urgency. Framing analysis shows that telemedicine is represented through eight frames predominantly represented in terms of both clinical and economic advantages, with particular emphasis on its role in extending healthcare access and supporting public health. These frames also highlight its potential for fostering innovation, generating value co-creation among stakeholders and for the entire community, and addressing health system challenges, while acknowledging ongoing developmental hurdles and barriers to widespread adoption. Emerging representations of telemedicine within the Italian press emphasize its advantages, portraying it positively. However, as it often happens with emergent technologies, telemedicine encounters possible antecedents for resistance. Thus, the identified frames highlight how a segment of public opinion see telemedicine as a tool that improves collaboration through patients, healthcare professionals and providers to co-create value for the socio-cultural environment.

Keywords: Telemedicine; Media analysis; Social Representations; Value Co-Creation

3.1 Background

Due to the recent development and diffusion of electronic devices and digital data, a consistent part of healthcare services can be delivered using e-health technologies, namely telemedicine (Weißenfeld et al., 2021). By using information and communication technologies (ICT), this solution allows overcoming spatial and temporal constraints in healthcare practices. It

potentially facilitates access to services for citizens in rural areas (Nicolini, 2007; Scott Kruse et al., 2018).

Telemedicine is applied in various medical fields, including cardiology or diabetology, and in several ways, such as round-the-clock tracking of patients' parameters (i.e., telemonitoring), online consultations, and remote rehabilitation (Eberle et al., 2021; Severino et al., 2023). Facilitating access to healthcare services and providing on-demand clinical data, telemedicine offers "the right treatment, to the right patient, at the right time" (Battineni et al., 2021).

While telemedicine has been expanding over the past two decades, its diffusion significantly increased with the Covid-19 outbreak (Mann et al., 2020; Massaro, 2023). To adjust to pandemic constraints, healthcare systems employed e-health technologies to ensure both continuity care and patient and personnel safety (Cannavacciuolo et al., 2023; Cobianchi et al., 2020; Dorsey & Topol, 2020). The growing use of telemedicine significantly contributed to reduce contagion risks and associated mortality rates (Patel et al., 2021; Saigí-Rubió Francesc & Borges do Nascimento, 2022).

Moreover, by improving treatment adherence and strengthening the relationship with the patient (Absolom et al., 2021; Antonacci et al., 2023), telemedicine has become a consolidated practice in managing chronic conditions (Severino et al., 2023; Waters & Graf, 2018). It ensures a persistent link between doctor and patient, often challenging to maintain with regular in-person visits. Overall, telemedicine enables continuous monitoring and timely therapeutic adjustments (Severino et al., 2023; Sosa Liprandi et al., 2023).

However, despite its numerous advantages, telemedicine's implementation is not yet pervasive (Singh et al., 2022). Various barriers hinder its adoption, including resistance to change (Plaete et al., 2015), healthcare professionals limited technical skills (El-Mahalli et al., 2012; Scholl et al., 2011), legal and regulatory limitations (Stroetmann et al., 2011), and inadequate e-Health and digital literacy (Scott Kruse et al., 2018; van Deursen & van Dijk, 2011). Among these, digital grey divide is a significant barrier, encompassing issues related to digital access such as internet connection and devices availability (Frydman et al., 2022), and the patients' and professionals' skills (Kamal et al., 2020; Rho et al., 2014).

In addition to material obstacles, several psychological barriers hinder telemedicine adoption, including the overall resistance to new technologies (Safi et al., 2018) and patients' preference for in-person visits. This preference often stems from struggle in expressing oneself clearly, while facing the potential for technical issues in online interaction and the peculiarity of communicating through a computer, characterized by the latency between communication and reply and the absence of physical body (Mizrachi et al., 2020). Moreover, patients often prefer in-person visits due to the belief that these provide better examination, diagnosis, and more accurate treatment (Moulaei et al., 2023). Furthermore, limited knowledge and perception of telemedicine leads patients to disregard its use (Gallè et al., 2023; Khotimah et al., 2022). Altogether, these barriers have helped explain the challenges faced by telemedicine in achieving widespread adoption (Moulaei et al., 2023).

However, despite a few studies (Dickey & Wasko, 2023; Khodadad-Saryazdi, 2021), most of the literature focus on individual barriers (e.g., attitudes, knowledge, skills, etc.), neglecting both broader socio-cultural explanations and relational aspects within the healthcare contexts, such as the power dynamic between healthcare professionals and patients. Khodadad-Saryazdi (2021) highlights that telemedicine is not a "ready-to-use" technology but requires organizational and actor-level restructuring for implementation. In healthcare, the adoption of telemedicine necessitates collaboration among the actors involved and – in turn – is inherently directed toward the enhancement of value co-creation (Fusco et al., 2020; Marsilio et al., 2021). Value co-creation is the process through which each participant, especially the patient, actively engages in the care course, leading to concerted and positive health outcomes in terms of effectiveness and efficiency for both the healthcare system and the individuals involved (Dudau et al., 2019; Palumbo et al., 2018). Therefore, telemedicine not only improves healthcare access but also contributes to create novel outcomes in which all actors involved in the care path contribute. By constantly measuring parameters both patients and professionals can monitor the patient's daily clinical changes and adjust treatment in a timely manner (Fairbrother et al., 2014). This result is co-created since it involves both patients' and professionals' input. On the one hand, there is the patients' active effort to wear a device or actively report parameters (e.g., blood pressure, glycemia). On the other hand, it requires professionals' attention and input. In this way, co-creation assigns a more active and central role to the patients, often resulting in enhanced treatment adherence (Moretta Tartaglione et al., 2018).

To enable cooperation through different actors, it is essential to identify the antecedents that can facilitate or hinder value co-creation, including knowledge, skills, or expected benefits for both users and professionals (Fusco et al., 2023). A psychosocial perspective requires to understand the perspectives of all key stakeholders, such as patients, healthcare practitioners, providers, but also public opinion (Cannavacciuolo et al., 2023).

3.1.1 *Social representations theory: Understanding telemedicine through socio-cultural lenses*

To move beyond a materialistic and individualistic approach in understanding telemedicine, we aim to draw on social representations theory (SRT). SRT (Moscovici, 2008) addresses how groups and communities make sense of new social objects. Through two psycho-social processes, anchoring and objectification, the unfamiliar is made familiar (Bauer & Gaskell, 1999; Zulato et al., 2023) Anchoring familiarizes novelty by inserting it into known meaning-categories. For instance, in explaining GMOs, the British press deployed the "programming" metaphor, suggesting that genes are like bytes and organisms can be programmed like software (Castro & Gomes, 2005). On the other hand, objectification makes the abstract concrete by describing uncanny social objects using images and metaphors. In attempting to describe GMOs, newspapers depicted a red "healthy-looking" tomato receiving an injection from a scientist (Wagner et al., 2010).

Anchoring and objectifications allow the construction of set of beliefs, norms and practices – namely, representations – around relevant social objects. In turn, representations constitute common sense knowledge that

allow individuals to communicate about and deal with relevant phenomena in society (Sammut et al., 2015). Consequently, this approach has often been employed to investigate how different publics understand science, health, and technology (O'Connor & Joffe, 2014; Wagner et al., 2010; Zulato et al., 2021). For this very reason we employ SRT to understand how telemedicine, being both a novel technology and a relevant tool, is understood and dealt with by the public's common sense.

3.1.2 *Aims*

A fruitful research area focuses on studying social representations (SRs) is in the press outlets (see (Bauer & Gaskell, 2008). Studying SRs in mass-media allows mapping the representational content and cultural resources that laypeople use to understand relevant issue at stake (Zulato et al., 2021). The present study aims to investigate the SRs of telemedicine within the Italian press, describing the content of different representations and identifying different positionings around telemedicine. This approach seeks to delineate the cultural milieu surrounding telemedicine, informing public common-sense resources for understanding, accepting, or rejecting telemedicine.

3.2 Method

The methodology comprised two stages. First, to identify the total number of newspaper articles published in the Italian press on the topic and conduct a salience analysis (Zulato et al., 2021). Second, to select a representative set of headlines and – subsequently – analyze them through a frame analysis (Elo & Kyngäs, 2008; Gamson & Modigliani, 1989). The Ethics Committee of

University of Milan declared that no ethical approval was required for the review of secondary data published of publicly available material.

3.2.1 *Corpus construction*

Salience data. For salience analysis, the dataset was generated by retrieving all newspapers' articles on telemedicine published in Italy between January 1990 and December 2022 (N = 31,147). Articles were retrieved from the Factiva Database[1] by using the keyword "telemedicine", without specifying any newspaper but only defining geographical area (i.e., Italy) and language (i.e., Italian). All articles on this topic, published in all the available newspaper in the country and indexed in the Factiva database, were identified and counted. Moreover, in line with Okoroji and colleagues (2021)), a proxy was established for the total number of news published in Italy by searching for the word "the" (n = 62,767,219). The weighted relevance of telemedicine on the total number of articles in each year was assessed.

Frame analysis. For text analysis, six newspapers were chosen according to two stratification's dimensions: (a) national newspapers (Corriere della Sera, CdS; La Repubblica, LaR; Il Sole 24 Ore, Sole24Ore); (b) local newspapers (Florence, La Nazione, LaNa; Bologna, Il Resto del Carlino, ReCa; Bari, La Gazzetta del Mezzogiorno, GaMez).

[1] Factiva Database is a search engine, owned by Dow Jones & Reuters Company., and provided by ProQuest Library. This database aggregates contents from both licensed and free sources. It provides access to more than 32,000 sources among newspapers, journals, magazines, etc… from nearly every country worldwide in 27 languages.

Among national newspapers the two most widely read newspapers throughout Italy were selected (CdS, LaR; ADS[2], 2023), and one newspaper with an economic, politic, and financial focus (Sole24Ore). For local newspapers, the selection was based on their geographical locations (North, Central, and South Italy). These newspapers were chosen because they were the ones with the highest number of published news on the topic, being the most representative in the Italian public sphere. Articles were retrieved following the same procedure used for the salience analysis but searching for "telemedicine" only within the six selected newspapers (N = 5,205). Subsequently, to detect potential misclassifications occurring within the corpus, the selected articles were checked to ensure they fitted the research topic and to exclude duplicates (N = 772). Final corpus for analyses consisted of 5,205 articles on telemedicine from national newspapers (N = 3,141; CdS, N = 1,229; Sole24Ore, N = 1,211; LaR, N = 701) and local newspapers (N = 2,064; Firenze, North Italy, LaNa, N = 914; Bologna, Central Italy, ReCa, N = 836; Bari, South Italy, GaMez, N = 314).

3.2.2 *Data analysis*

Quantitative salience analysis (Zulato et al., 2021) and qualitative frame analysis (Elo & Kyngäs, 2008; Gamson & Modigliani, 1989) were conducted. Telemedicine's salience was calculated based on the ratio (Sr) between telemedicine articles in each year and the total number of articles for each

[2] Accertamenti Diffusione Stampa (ADS) is the company whose purpose is the certification and dissemination of data on the circulation and/or distribution of daily and periodical press published in Italy.

year. Thus, the higher the ratio, the higher the salience of the topic in the press (Okoroji et al., 2021). Annual salience from 1990 to 2022 was calculated by standardizing the results so that the peak year equals 100. Following Bauer and Howard's guidelines (2004), salience is assessed by considering the timing and peaks in news flow. We quantified these aspects by aggregating data annually from all newspapers.

Frame analysis was used to identify and quantify the frames through which telemedicine was represented in the press titles (see Zulato et al., 2021). Frames are hereby conceptualized as a selection mechanism in which certain aspects are prioritized over others in the description of an object or issue (Franks et al., 2013). Frames are a way to promote a particular representation over another, such as "a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation" (Entman, 1993; p. 52). For this reason, identifying frames allows us to explore the content of representation (Bauer et al., 2006).

Frames were identified through qualitative content analysis (Elo & Kyngäs, 2008), using newspaper titles as the analysis unit. On the one hand, titles are a convenient and identifiable unit for conducting the analysis. On the other, titles are functional to "present" and summarize the content of an article prior reading and – thus – they orient the readership towards what is most relevant for the understanding of the subject matter (Montali et al., 2013; van Dijk, 2015).

Therefore, the analysis was carried out by applying an inductively built codebook to the newspaper headlines (N = 600) (Elo & Kyngäs, 2008; see codebook in Appendix C in supplementary materials). First, three

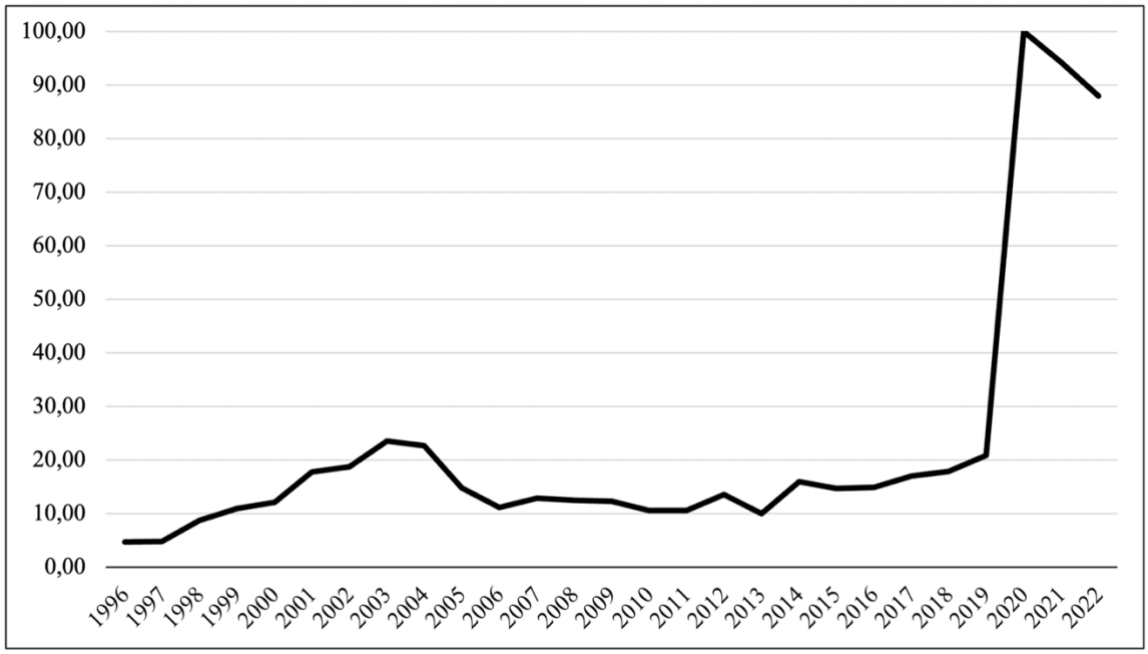
independent coders individually conducted exploratory bottom-up coding to identify frames within public discourse on telemedicine service and tools. Subcategories emerged and were assimilated into frames during this process. Frames were constructed by considering both internal homogeneity – contents that pertain to the same central idea – and external heterogeneity, which includes contents specific to each frame. Once consensus was reached on frames, their definition and coding rules, coders analyze titles following the codebook's guidelines (see Appendix B and C).

3.3 Results

3.3.1 *Media salience*

Salience analysis shows the intensity of the news coverage of telemedicine (i.e., salience) in Italy across years (Figure 1 and Appendix A).

Figure 1. The salience of telemedicine in the press coverage across time (1996-2022)



Notes: Salience index (Sr) standardized to 0–100 (i.e., the relative peak year, the one in which the proportion of focal articles relative to general articles is highest = 100 in each country).

The press has shown growing attention to telemedicine, with salience slowly increasing over time. Despite being part of public debate for several years, interest in the topic remained on the sidelines until the last decade. Telemedicine entered the press discourse in 1996 with a few articles published on the topic (n=2). Between 1996 and 2002, attention grew, peaking in 2002 (n=48). This first peak might be explained by the introduction of the first applications of telemedicine in surgery (e.g., "techno-surgeon"; Eadie et al., 2003). After 2002, salience decreased till 2014 (n=106) when telemedicine interest started gradually increasing, coinciding with the publication of the first telemedicine National guidelines in Italy, and in 2020 it is possible to notice the highest peak recorded (n=1183), driven by the outbreak of the COVID-19 pandemic[3], which, among the preventive measure to reduce the risk of

[3] Key moments in the pandemic management in Italy:

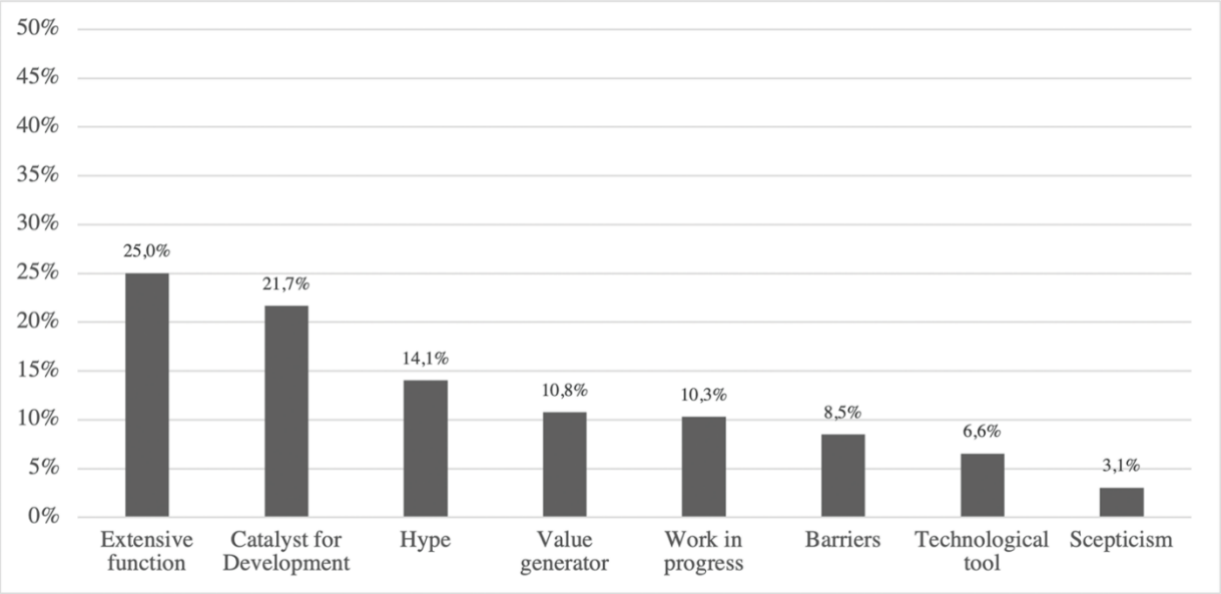
contagion, required several lockdowns with prolonged periods of stay indoors without the possibility of going outside. The focus on telemedicine remained high over the following two years, potentially explained by the fact that the COVID-19 pandemic continued to be a focal point of interest. However, a downward trend began after 2020, likely reflecting telemedicine's normalization in daily practice and a loss of interest at the end of the public health emergency. The raw frequencies of analyzed titles per year is presented in Appendix B.

3.3.2 *Media framing of telemedicine*

According to framing analysis, the Italian press represented telemedicine through eight common frames (Figure 2, see Appendix B). News' titles presented telemedicine by framing it into a different set of meanings. Some illustrative headlines for each frame are presented in Table 1.

First outbreak: March-Mary 2020. Second phase of restrictive measure: October 2020-January 2021. Third phase: March-April 2021.

Figure 2. Media framing of telemedicine.



Notes: Percentages (Y-axis) were calculated by dividing the frequencies of each frame by the total number of titles (n=5,205).

Table 1. Frames and illustrative headlines.

Frame	Illustrative headlines	Newspaper
Extensive function	"After bypass surgery, it is possible to recover well even at home"	CdS
	"From community house to "community centers": Proposal for the territory"	Sole24Ore
Catalyst for development	"Alzheimer's: practising with a tablet at home to defeat "anomia""	LaR
	"The lesson from COVID: rethinking and reorganising the healthcare system"	GaMez, Bari
As a value generator	"Faster neurology interventions with telemedicine"	GaMez, Bari
	"Innovation: An opportunity for employment and entrepreneurship"	LaR
Telemedicine as a hype	"Healthcare: New business accelerates with digital"	Sole24Ore
	"The telemedicine project is now ready to take off"	LaNa, Firenze
As a work in progress	"Telemedicine "lagging behind""	LaNa, Firenze
	"Healthcare challenges in the coming months"	ReCa, Bologna
Barriers to dissemination	"Ultra-fast network and Recovery Funds are needed for the digital transformation"	CdS
	"The post-pandemic healthcare system. Innovation produces savings but more resources are needed"	Sole24Ore
Scepticism	"Telemedicine (alone) is not enough"	CdS
	"Telemedicine is an advantage, but the human relationship must be preserved"	LaR
As a technological tool	"Hi-Tech coming to the aid of future centenarians"	Sole24Ore
	"Informatics in the operating room"	LaR

The majority of titles framed telemedicine through its *Extensive function* (25,0%), presenting it as a tool that extends access to traditional healthcare services, by overcoming spatial and temporal barriers, assisting people from home, and facilitating their return to a "normal" daily life despite illness. It also fosters a multidisciplinary approach that extends participation and dialogue among various stakeholders, such as between patients and healthcare professionals, or between healthcare professionals and providers.

Another relevant section portrayed telemedicine as a *Catalyst for development* (21,7%), highlighting its potential to drive socio-economic and cultural development and holding potential for drastically change healthcare (e.g., creating new job opportunities, and coping with crisis such as COVID-19 pandemic emergency). This frame also introduces new care models reconfiguring the patient's role in the care process and disease management. Telemedicine was represented as promoting an emancipatory healthcare model in which patients actively participate in managing their own health.

Likewise, another significant portion of titles frames telemedicine *As a value generator* for the entire healthcare system (10,8%), emphasizing its role in promoting sustainability, reducing costs and risks, and enhancing care processes. It stressed the idea that telemedicine yields benefit through novel outcomes while cutting unnecessary expenses. Titles describe telemedicine as an opportunity to generate Big Data from citizen, facilitating new discoveries in scientific fields. Moreover, these titles highlight a reduction in hospitalization durations, ensuring continuity of care at home through telemedicine tools, and a decreased workload for healthcare professionals.

In sum, these three frames portray telemedicine as offering significant advantages and driving positive social change. Telemedicine extends existing services, making them more capillary and accessible, while also generating new value by radically changing and developing procedures that were not yet present. Together, these frames account for a consistent portion of the press discourse, representing the 57,5 % of the analyzed corpus.

On another note, the next two identified frames represent telemedicine by highlighting two opposite sides of an emerging phenomenon. On the one hand, titles expressed optimism, encouraging potential investors to catch a runaway train. On the other, titles expressed caution, representing telemedicine as still being in an embryonal stage, a developing but still "immature" opportunity.

Telemedicine as a hype frame (14,1%) described telemedicine as a increasingly spreading tool, and – thus – as an opportunity for financial investment by companies and private individuals. In particular, this category includes headlines that enthusiastically emphasize the benefits of telemedicine, thereby generating increased interest among audience and influencing the investment decision and trends of companies and service providers. The emerging idea is that telemedicine is a runaway train that needs to be capitalized on now.

Conversely, the latter frame represented telemedicine *As a work in progress* (10,3%), highlighting that – despite its potential – telemedicine is still developing. Titles in this category describe it as being in an experimental phase, awaiting approval and law regulation before broader use. Moreover, titles depicted telemedicine as challenge and a tool that is lagging behind.

Frames highlighted so far depict telemedicine as a potentially useful and innovative tool with the potential to spread widely, though it is not yet widely adopted. However, a small portion of titles that promoted a different perspective. A former frame presented telemedicine in terms of Barriers to its dissemination (8,5%). A latter frame highlighted Scepticism (3,1%), raising doubts and issues about telemedicine diffusion and benefits.

Titles within *Barriers to its dissemination* frame emphasised the hurdles telemedicine need to be overcome. On one side, telemedicine implementation and adoption are hindered by material barriers, such as funding, skilled workers and users, and broadband connectivity, particularly problematic in rural areas where telemedicine is most needed. On the other side, telemedicine is described as a temporary practice driven by contingencies of the COVID-19 pandemic.

Likewise, *Scepticism* presented telemedicine by raising open doubts concerning different dimensions of care: privacy and cybersecurity, patient-clinician relationship, and its role among other healthcare services. Titles in this frame raised doubts on possible data leaks, particularly sensitive in case of patients' health-related information. Moreover, telemedicine is described as a supplementary but not a substitute tool for the usual healthcare practices that involve face-to-face relationships. In particular, telemedicine is described as incapable of replacing the traditional doctor-patient relationship.

Finally, the last identified frame – rather than explaining what telemedicine does – attempted to make telemedicine tangible, describing it *As a technological tool* (6,6%). This was done in a two-fold way. On the one hand, the technology enables the use of telemedicine. On the other, telemedicine a

technological artifact itself. Thus, this frame describes the antecedents of telemedicine, such the scientific innovations and technological progress that enable its use.

3.4 Discussion

Technological innovation has led to a plethora of telemedicine tools, and it is now an institutionally recognized practice in Italy and overseas (Bestsennyy et al., 2021; Massaro, 2023). However, telemedicine is still taking off and its potential has not yet fully developed and deployed (Singh et al., 2022). While prior research has focused on individual barriers and facilitators in telemedicine adoption, few studies have examined its socio-cultural and historical dimensions. The present study addresses this gap by exploring how telemedicine was represented in national and local newspapers.

The salience analysis showed that SRs of telemedicine are still emergent (see Brondi & Neresini, 2018), being telemedicine only recently discussed, having fluctuant interest, and being mostly a low-intensity news item if compared with other topics (see Bauer, 2015; Zulato et al., 2021). Media interest in telemedicine has primarily coincided with key events, such as the publication of national guidelines (2014) and the COVID-19 pandemic (2020), when telemedicine ensured continuity of care while minimizing contagion (Omboni et al., 2022; Severino et al., 2023). However, with the resolution of pandemic, media interest has declined, raising concerns about its capacity to attract both media attention and funding beyond contextual events, such as crisis and technological innovations. However, this trend

resonates with other technological, or health topics resurface during new controversies (see Bauer, 2015; Zulato et al., 2021).

The frame analysis identified eight frames through which newspapers' titles represented telemedicine (see Figure 2).

Telemedicine was mainly discussed in terms of advantages with the 57,5% of titles highlighting positive social change and novel beneficial outcomes. Title emphasized its *Extensive function*, describing telemedicine's potential to overcome spatial-temporal barriers and foster to the chronic diseases management. As *a Catalyst for development*, the press stressed economic opportunities and development for both the private and public sector. Finally, *as Value generator*, titles identified a set of novel and co-created assets, such as the generation of big data. Thus, these three frames inform on what can be considered as positive antecedents and – in turn – on favorable and common-sense reasons to adopt telemedicine.

These frames partially resonate with previous empirical evidence, showing continuity between the positions expressed in the press and those of potential users. For instance, survey research (Benis et al., 2021; Call et al., 2015) evidenced that telemedicine is valued when considered convenient, highlighting that the acceptance is also based on its potential of overcoming physical barriers. Moreover, previous literature (Kindle et al., 2019) emphasized the pivotal role of the exponential growth in digitally shared, aggregated and anonymized clinical data. This surge has been crucial in fostering new clinical insights, facilitated by the application of artificial intelligence, and in enhancing patient adherence to treatment (see Lilly et al., 2011; 2017). These findings are in line with what emerged from the analyzed

headlines that focused on the role of big data in scientific and medical development (e.g., disease prevention and screening through artificial intelligence trained algorithms).

Apart from indicating optimism, the frames also describe telemedicine as creating value: either expanding previous functions or creating new outcomes, such as big-data or 24/7 monitoring. In particular, some titles highlighted how this added value is co-created within a multidisciplinary and emancipatory relationship between stakeholders, patients, and caregiver. This is well exemplified by the title: "*From community houses to "community centers": Proposal for the territory*" (Sole24Ore). Common sense describes telemedicine as a mediating transformative technology that both stems from and result in a relationship. This resonates with the value co-creation model (Fusco et al., 2023), which sees health outcomes as the result of resource integration and collaboration among various actors involved (e.g. laypersons, patients, healthcare professionals, stakeholders).

Conversely, a small proportion of the headlines are sceptical about telemedicine (11.6%). As is often the case with new technologies (Bauer, 2015), some question its feasibility and benefits, raising concerns like "where are we?". It emerges that a minority of titles, about one in ten, view telemedicine with scepticism, suggesting that it may not take off or replace standard care. Again, it is possible to read these two frames through the value co-creation model. For instance, *scepticism* and *barriers to implementation* can be interpreted as antecedents hindering telemedicine (Fusco et al., 2023). According to these headlines, material barriers and concerns about both privacy and the doctor-patient relationship can prevent the adoption of

telemedicine in everyday clinical practice and care services. Titles highlight how – despite potentially useful – telemedicine cannot replace the traditional doctor-patient relationship. This evidence resonates with previous literature on the topic. Ebneter and colleagues (2022) have shown professionals' concerns about the impact of telemedicine on the doctor-patient relationship. Specifically, professional working in palliative care, clinicians emphasized the importance of a warm and compassionate communication, elements that may be neglected and hindered when interacting through technology. However, literature on users shows a different scenario. Gordon and colleagues (2022) systematic review revealed satisfaction among most patients who had used telemedicine, showing no significant differences from standard care. This contrasting evidence highlight how the concerns on the doctor-patient relationship might be context-dependent, warranting further investigation of the impact of telemedicine in different relational contexts. Nevertheless, coherently with the co-creation model (Fusco et al., 2023) both the current study and prior research identify the relational element as a central dimension in *thinking* of and *using* telemedicine.

On another note, *Work in progress* and *hype* frames (24,4%), rather than focusing on positive or negative aspects of telemedicine, provide information about telemedicine's diffusion and development stage. On one hand, telemedicine is depicted as promising but still under development, requiring further advancement before widespread adoption, a view supported by several studies (Cannavacciuolo et al., 2023; Massaro, 2023; Weißenfeld et al., 2021). On the other, telemedicine is described as a ready-to-use tool. As in previous literature on novel technology, telemedicine can be described as a run-away

train (see Bauer, 2015). These frames offer novel insights into the possible perception of telemedicine within common sense, emphasizing its development stage as a key antecedent for adoption. Before using telemedicine, potential users might want to make sure it is fully developed, as exemplified by titles: “Telemedicine “lagging behind” (LaNa, Firenze).

Finally, a minority of headlines (6.6%) focus on explaining telemedicine recurring to two socio-cognitive processes that enable the construction of SRs (Sammut et al., 2015): objectification and anchoring. First, telemedicine is objectified through technological metaphors, such as the “robot dog” or “computer” indicating the teleconsultation. Second, telemedicine is understood through the rules of technology, such as the use of artificial intelligence for clinical insights or digital transformation. Thus, rather than being objectified through traditional medical imagery (e.g., doctor) or anchored in familiar concepts of medicine and patient-doctor relationship, telemedicine is placed in the realm of technology. In sum, telemedicine is framed within familiar technologies (e.g. computers, smartphones), enhancing accessibility and reducing abstraction (Wagner et al., 2010). On the one hand, placing telemedicine as a technology underlines its proximity, as users deploying technological devices daily. On the other, de-anchoring telemedicine from the doctor-patient relationship may increase a perceived distance, potentially undermining one of the most valued elements in the care path (Antonacci et al., 2023).

To conclude, emerging representations within the Italian press are predominantly positive, highlighting its advantages. However, as it often happens with emergent technologies (Bauer, 2015), also telemedicine

encounters potential resistance due to scepticism and perceived barriers. Beyond this judgments, common sense shows opposite positions on whether telemedicine is fully developed or holds future potential. All identified frames resonate with the value-cocreation model (Fusco et al., 2023) and highlight how telemedicine is not a technology appearing in a social vacuum. Instead, as results stress, telemedicine potential and resistance stems from and results in a complex socio-cultural environment.

Moreover, analysis showed that the Italian press has framed telemedicine within three overall topics: medical, economic and technological. However, Batel and Castro (2018) suggest highlighting what is missing in qualitative data. Neglected topics include its possible application in mental health (e.g., psychotherapy and online wellness interventions). A recent bibliometric analysis (Piccardo et al., *under review*) shows a growing scientific focus on online psychological support interventions (e.g., treatments for PTSD, depression or anxiety). In line with SRT, this lack further corroborates how often there is a cleavage between common sense and expert knowledge. What is relevant for expert is not necessarily relevant for the broader public.

Limitations and future research

Our study brought a socio-cultural and relational perspective into analyzing telemedicine through th Italian press but has limitations. First, while showing a temporal evolution of salience, we could not compare an evolution of frames over time due to limited articles available. Second, analyzing newspapers titles maps SRs but doesn't reflect readers' opinions (Gamson & Modigliani, 1989). Future studies could focus on potential users to investigate how SRs are shaped in different contexts. Third, our focus on

Italian public healthcare system, may differ from private models like the USA's. Comparative studies across different National Healthcare Systems could be insightful. Rather than investigating the content of representations in different countries, future research should compare salience and gauge whether the interest in the topic is synchronous or not in different geographical areas. Finally, implementing annual monitoring system could reveal changes in SRs of telemedicine, new phenomena and trends in newspapers content over time.

Ethics statement

The manuscript adheres to ethical guidelines specified in the APA Code of Conduct. The research was exempted from Ethics Review Board of University of University of Milan approval.

Declaration of contribution of authors

MAP. Conceptualisation, investigation, writing – original draft and review & editing, methodology, formal analysis, data curation.

EZ. Conceptualisation, investigation, writing – original draft and review & editing, methodology, formal analysis, supervision.

CG. Conceptualisation, writing – review & editing, formal analysis, supervision.

Data Availability Statement

The data used in this study is publicly available being newspapers titles.

Disclosure statement

The authors declare that they have no conflict of interest whatsoever that is relevant to the publication of the current article.

Competing interests

The authors declare that they have no competing interests.

Funding statement

The present research did not receive funding.

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Appendix A

Salience analysis

Table a1
Articles devoted to Telemedicine (S) in Italy over time

Date	Telemedicine
1996	2
1997	11
1998	30
1999	43
2000	50
2001	107
2002	151
2003	171
2004	152
2005	167
2006	248
2007	351
2008	390
2009	367
2010	349
2011	375
2012	557
2013	423
2014	680
2015	747
2016	848
2017	1124
2018	1211
2019	1539
2020	7385
2021	7147
2022	6522
Total	31147

Table a2
Total amount of published articles in Italy over time

Date	Italy
1996	29550
1997	159985
1998	240042
1999	273930
2000	287890
2001	420733
2002	562883
2003	506851
2004	468589
2005	787125
2006	1552112
2007	1897202
2008	2182525
2009	2090287
2010	2311510
2011	2470293
2012	2875134
2013	2959306
2014	2987077
2015	3538654
2016	3988862
2017	4606941
2018	4747425
2019	5157414
2020	5169643
2021	5307863
2022	5187393
Total	62767219

Table a3
Salience index (Sr) in Italy over time

Date	Italy
1996	4,74
1997	4,81
1998	8,75
1999	10,99
2000	12,16
2001	17,80
2002	18,78
2003	23,62
2004	22,71
2005	14,85
2006	11,19
2007	12,95
2008	12,51
2009	12,29
2010	10,57
2011	10,63
2012	13,56
2013	10,01
2014	15,94
2015	14,78
2016	14,88
2017	17,08
2018	17,86
2019	20,89
2020	100,00
2021	94,26
2022	88,01

Notes: Salience index (Sr) is based on the ratio between the number of articles devoted to Telemedicine (S) in each year and the total amount of articles published in each year. Sr varies between 0 and 1 and it has been standardized.

Appendix B

Raw frequencies of analysed titles and frames

Table b1

Raw frequencies of analysed titles (n=5205)

Date	Telemedicine
1997	1
1998	5
1999	8
2000	5
2001	42
2002	48
2003	42
2004	41
2005	46
2006	99
2007	109
2008	75
2009	73
2010	80
2011	86
2012	89
2013	75
2014	106
2015	120
2016	151
2017	192
2018	222
2019	335
2020	1183
2021	1041
2022	931
Total	5205

Table b2
Raw frequencies of frames

Frame	Italy
Extensive Function	1303
Catalyst for Development	1129
Hype	732
Value Generator	561
Work in Progress	536
Barriers	444
Technological Tool	341
Scepticism	159
Total	5205

Appendix C

Codebook

Table c1

Codebook: qualitative content analysis

Macro-category	Sub-categories	Sub-categories	Definition	Example
1. Barriers to the diffusion of telemedicine	*1.1 Telemedicine requires adaptation/gap to be bridged*	1.1.1 Lack of technological / IT infrastructure	This category includes all titles that emphasize the lack of technologies enabling the development and extension of telemedicine in everyday life	*"Network and Connections: The Missing Bandwidth"*
		1.1.2 Lack of economic resources	This category includes all the headlines emphasizing the lack of human and economic resources that hinder the spread of telemedicine / that make telemedicine a practice that is not yet sustainable	*"Caregivers 'On Their Knees': Increasing Workload, Stress, and Burnout"*
		1.1.3 Lack of personnel and/or training (expertise for both patients and professionals)	This category includes all titles that emphasize the need for training for both patients and health professionals to enable the correct use of telemedicine tools and consequent dissemination	"Training Course on Teleconsultation"
	1.2 Telemedicine as an exclusionary practice	1.2.1 Digital (*grey*) divide [competence]	This category includes all titles referring to the fact that not all segments of the population (e.g. the elderly) have the means to access and use telemedicine services	"Telemedicine Is Not (Exactly) the Same for Everyone. A Digital Literacy Plan Is Needed"
		1.2.2 Access divide	This category includes all titles that refer to the fact that some	"Telemedicine: Opportunities but Also Disparities"

			individuals do not possess the technology (e.g., computer, technological device)	
	1.3 Telemedicine as a temporary practice	1.3.1 Contextual to Covid	This category includes all titles referring to the fact that telemedicine was a temporary service delivery mode and contextual to Covid	*"Post-Lockdown Health: Returning to the Doctor"*

2. Telemedicine is still taking off	*2.1 TM in development*	2.1.1 TM as a tool to be regulated	All titles referring to the fact that TM is still being regulated	*"The Telecardiology sets "rules" for more reliable devices and data"*
		2.1.2 TM as tool to be defined	All titles referring to the attempt to define TM and its various types (e.g., teleconsultation, telemonitoring)	*"Digital medicine is not just "tele": Too many misunderstandings to overcome"*
		2.1.3 TM still experimental	All titles referring to the fact that TM is still in the experimental stage	*"Telemedicine and diabetes: First National Study to verify its benefits"*
	2.2 Telemedicine as a Tool still in its early stages	2.2.1 TM as a challenge to overcome	All titles referring to TM as a challenge to overcome	*"Devital and Bocconi Webinar; Healthcare Challenges: Home care and Telemedicine"*
		2.2.2 TM as a tool struggling to take off	All titles referring to TM as a tool struggling to take off	*"Digital Healthcare more widespread but the health record remains «on the shelf»"*

3. TM as hype	*3.1 TM as a tool in the process of spreading*	3.1.1 Ready to use (patients)	All titles presenting TM as a tool used by a wide audience	*"Digital Healthcare becomes Popular"*
		3.1.2 TM as a tool that is spreading / defined as part of everyday life	All titles referring to the use of TM by various actors (e.g., patients, insurers)	*"Telemedicine adapts well even to the Maori"*
	3.2 TM as opportunity to seize	3.2.1 Economic investment by	All titles framing TM as an investment opportunity	*"Reale Mutua; Blue Assistance includes*

		companies and invidiuals		*Telemedicine in the policy"*
		3.2.2 Runaway train (companies and provider)	All titles referring to TM as an opportunity to seize before it's too late	*"Marriage between Reale and Intesa San Paolo: A new company for High-Tech health insurance is born in Turin"*

4. Scepticism, doubts and issues to resolve in the use of TM	*4.1 TM as an integrative but not substitute tool*	4.1.1 TM as a tool with a limited scope	All titles referring to TM as a tool that can address only a limited portion of health problems	*"Technology? It's Not the Solution to All Health Care Problems'"*
		4.1.2 TM as a tool that needs to be integrated and complemented by other forms of care (used integratively/complementarily)	All titles referring to TM as a useful tool when integrated with traditional forms of care	*"TM (on its own) is not enough"*
	4.2 Open doubts about TM	4.2.1 Doubts about cybersecurity and privacy	All titles referring to TM as a tool that poses risks of privacy breaches and cybercrime	*"Cybercrime targets Italian healthcare: 35,000 X-Ray files seized"*
		4.2.1 Doubts about reliability in the use of TM	All titles referring to errors arising from the use of TM and doubts about the reliability of practices	*"In America abortion pill are arriving by mail"*
		4.2.3 Doubts about the doctor-patient relationship	All titles referring to open questions about how the doctor-patient relationship is configured in the use of TM tools	*"The psychologist's perspective: but it the "touch" of the doctor still essential?"*

5. TM as an expansive function	*5.1 TM as a catalyst for participation and dialogue*	5.1.1 Doctor-patient relationship	All titiles referring to the role of TM in facilitating and improving communication, supporting and	*"Telemedicine, Many Ongoing Projects but More Patient Engagement Needed"*

			enhancing the therapeutic alliance	
		5.1.2 Doctor-doctor / other professionals	All titles referring to the possibility of communication between doctors and professionals using TM (e.g., teleconsultation, telediagnosis) that can lead to more comprehensive and holistic patient care	*"COVID, the Comeback of Pharmacies: Diagnoses and More Than Just Medications. One Million Tests in 2021"*
		5.1.3 Promotion of a multidisciplinary approach	All titles referring to the collaboration among various professionals to improve TM tools	*"Smart Glasses: At Sant'Ambrogio Institute, the Surgeon Operates with the Engineer"*
	5.2 TM facilitating access to care	5.2.1 Easy access	All titles referring to the need to ensure easy and prompt access for those in need	*"Chronic Patients 'Forgotten' and Telemedicine: The Fragile Segment"*
		5.2.2 Overcoming barriers	All titles referring to the possibility of overcoming geographical, architectural, and social barriers through TM	*"TM and the fight against COVID-19: Now the doctor comes via the Web"*
		5.2.3 Home Care Design	All titles referring to the importance of ensuring continuity of care for patients who are also monitored at home	"*A home adapted to the needs of Parkinson's patients"*
		5.2.4 Restoring a senso of normality	All titles referring to the assistance TM provides in maintaining daily routines and independence for patients to restore their normality	"*With the wireless mini pacemaker: A normal life for a young person"*
6. TM as a catalyst for development	*6.1 TM as an opportunity for socioeconomic*	6.1.1 Socioeconomic restart (PNRR)	All titles referring to TM as a lever for socioeconomic recovery and growth	*"Zingaretti (PD): 'The Government Can No Longer Delay on the MES; Unprecedented*

	and cultural development			*Resources for Healthcare on the Table'"*
		6.1.2 Professional opportunities	All titles referring to new career paths and job creation through TM using digital technology, remote management	*"With PNRR funds, we are hiring staff"*
		6.1.3 TM to overcome the COVID-19 pandemic crisis	All titles referring to TM's role in addressing the challenges of the COVID-19 pandemic using remote consultations, improving healthcare access and safety and alleviating pressure on physical healthcare services	*"The 'Lessons' COVID-19 Has Taught Us (Including About Digital Health)"*
	6.2 TM as an opportunity for developing new models of care	6.2.1 Innovativeness of Care Models / Modernizing the Country	All titles referring to TM as a revolutionary tool in modernizing healthcare delivery	*"Rare Chronic Diseases: Appeal Letter to Minister Schillaci for a Permanent Consultation with Patient"*
		6.2.2 TM as an emancipatory tool for patients	All titles referring to TM as empowering patients through person-centered and personalized medicine	*"Alzheimer's: Practicing with a Tablet at Home to Overcome 'Anomia'"*

7. TM as a value generator for the system	7.1 Sustainability, cost and risk reduction	7.1.1 Reduction in hospitalization and care time	All titles referring to TM's role in decreasing the duration of hospital stays and care processes	*"Children's Hospital, telemedicine 'shortened admissions' kicks off'"*
		7.1.2 Reduction in infection risk (protection)	All titles referring to TM's impact on minimizing infection risk by facilitating remote consultations and monitoring, protecting both patients and healthcare professionals from potential exposure	*"Our doctors pioneer anti-Covid home care"*

		7.1.3 Reduction in workload for the Nation Health System	All titles referring to TM's effect on lowering the workload for NHS	*"With digital slides, precise and immediate tissue examinations"*
		7.14 Sustainable practice	All titles referring to TM as a sustainable practice promoting more efficient and environmentally friendly healthcare delivery	*"Digital care for 'energy-hungry' hospitals"*
	7.2 Enhancement of the care process	7.2.1 Early diagnosis and timely interventions	All titles referring to TM's role in enabling early diagnosis and prompt interventions, improving patient outcomes and potentially preventing more severe conditions	*"Smartwatches? Now also useful for disease prevention"*
		7.2.2 Generation of useful data for the care community	All titles referring to TM's contribution to co-creating value through data sharing and improve Big Data analysis	*"Italy's unexploited data heritage"*

8. TM as ICT	8.1 Technology is an enabler of TM	//	All titles referring to technology as essential for TM (technology enables the development of TM)	*"AI against the Pandemic"*
	8.2 TM is technology	//	All titles identifying TM as a product of technology (TM is a "product" of technology)	*"In ER, visited by a Robot Dog"*

Study 3

Patient activation as a mechanism between self-care and quality of life in heart failure: Insights from the AZIMUSA telemonitoring project

Piccardo, M. A.[a], Bernuzzi, C.[a], Marcoli, S.[b], Gorini, M. [b], Fenici, P.[c,d,e], Guglielmetti, C.[a]

[a]Department of Economics, Management and Quantitative Methods, University of Milan

[b]Healthcare Innovation, AstraZeneca, Milan

[c]Medical Innovation, AstraZeneca, Milan

[d]Catholic University of the Sacred Heart, School of Medicine and Surgery, Rome

[e]Biomagnetism and Clinical Physiology International Center (BACPIC), Rome

Manuscript in preparation for submission to Applied Psychology

Abstract

Heart failure is a chronic and complex condition that affects patients' daily lives and requires continuous care. Adherence to self-care behaviors is not sufficient in itself to ensure long-term improvements, despite the fact that self-care has been identified as a key factor of disease management and quality of life. In this scenario, telemedicine, especially telemonitoring, appears to provide an opportunity for more effective symptom management and consistent clinician-patient communication, thereby promoting patient activation. However, these aspects have not yet been widely studied in scientific literature. Within the AZIMUSA project, which investigates the use of a telemonitoring app (Healthentia®), this study, grounded in patient activation literature, explores how activation may mediate self-care behaviors

and quality of life. A total of 194 patients diagnosed with heart failure completed questionnaires measuring self-care behaviors, patient activation and perceived quality of life. Mediation analyses revealed that self-care behaviors were positively related to quality of life indirectly, thorough the mediation of patient activation. These findings demonstrate the central role of patient activation as a psychological mechanism that connects self-care and well-being in patients with heart failure. Unless strategies that support patients' awareness, motivation and active engagement in their care are also employed, promoting self-care alone may not be sufficient, according to the results. A promising approach to enhancing outcomes in chronic care may be to support patient activation through personalized educational and digital interventions, such as telemonitoring. Further longitudinal analyses will shed light on the causal pathways and evaluate the effective use of digital tools and their long-term impact.

Keywords: Telemonitoring; Patient Activation; Self-care; Quality of Life; Mediation analysis

4.1 Introduction

Over the past decades, advances in medicine have improved the management of cardiovascular diseases. Nevertheless, heart failure (HF) continues to represent one of the major global public health challenges (Luiso et al., 2022). Recent global data estimates report that approximately 56 million individuals worldwide are affected by this condition (Khan et al., 2024) most of whom are elderly (Lippi & Sanchis-Gomar, 2020; Tapak et al.,

2025). However, with the increase in the population's average age and improved survival rates, recent studies indicate that the prevalence of HF diagnoses could increase 2-3-fold in Europe (Danielsen et al., 2017; Gouveia et al., 2019). HF is a complex chronic disease with significant symptomatic manifestations, high mortality and comorbidity with other diseases, requiring extensive use of healthcare services (Vellone et al., 2020; von Lueder & Agewall, 2018). In addition, hospitalizations are frequent, often followed by a worsening of the disease that requires further readmission to hospital (Johansson et al., 2021; Metra et al., 2023). In an effort to breaking this cycle of discharges and hospitalizations, it is required not only effective medical and treatment adherence, but also a reconceptualization of the patients' participation in their care pathway (Miyata, 2025; Olofsson et al., 2025). Traditional approaches have emphasized the necessity of self-care skills for managing heart disease appropriately that promote a good quality of life (including the patients' ability to follow prescription, monitor symptoms and adopt recommended health behaviors; Pereira Sousa et al., 2021; Riegel et al., 2019b; Vellone et al., 2020). However, several studies shows that self-care alone is often insufficient to sustain long-term behavioral change and to respond proactively to the fluctuating course of HF (Graffigna et al., 2015; Hibbard et al., 2004; Liljeroos et al., 2020; Sahebi et al., 2015). In this context, the widespread use of digital technologies offers the opportunity to implement solutions that could enable early detection of HF symptoms and to provide timely intervention (Lee et al., 2023; Miyata, 2025). Telemedicine, as defined by the World Health Organization (WHO, 2022), consists of healthcare services delivered using new digital technologies, in which the patient and

healthcare professional (HCP) are not in the same place during the healthcare service, allowing the exchange of clinical data and self-reported symptoms (e.g., telemonitoring), remote consultations, telerehabilitation, and other forms of care delivery (Senbekov et al., 2020). This method of healthcare services' delivery improves the quality of care offered and ensures equal access to care in both urban and rural areas, supporting the management of chronic conditions such as HF (Bente et al., 2023; Clemente et al., 2024; Zheng et al., 2024). In particular, within the macro area of telemedicine, telemonitoring involves the patients' self-collection of clinical data (e.g., blood pressure, body weight, heart rate) and its transmission to HCPs for continuous tracking over time, offering the opportunity for better management of the clinical condition without necessarily requiring an outpatient visit (Scholte et al., 2023). Numerous studies highlight the effectiveness of these technological tools on patient clinical outcomes (Azizi et al., 2024; Cahn et al., 2018; Clemente et al., 2024). Furthermore, Blum and Gottlieb (2014) state that telemonitoring provides patients with a structured disease management process and can actively involve patients in monitoring their health and lifestyle. The role assumed by the patient therefore becomes crucial in telemedicine, where the paradigm shift is reflected not only in the patient's role, but also in the autonomous exercise of their abilities and skills, to be an essential part of the care pathway (Bruce et al., 2020). Although telemedicine does not replace outpatient visits (Anawade et al., 2024; Waller & Stotler, 2018), it is becoming a useful tool for the delivery of healthcare services, allowing those with chronic clinical conditions maintain continuous communication with HCPs who can then offer remote support in a non-

invasive way (Lee et al., 2023). This study, part of a broader longitudinal research project, presents the baseline cross-sectional analyses aimed at exploring whether patient activation mediates the relationship between symptoms monitoring and quality of life in patients with HF at the time of the proposal to adopt a telemonitoring tool. Within this context, participating patients used a mobile app to collect clinical data to support daily self-care and share it with the clinical team. However, the primary focus lies on the psychological and behavioral factors that influence HF management. While prior research has demonstrated the benefits of self-care and the enabling role of telemonitoring, little is known about the psychological processes, in particular patient activation, through which these behaviors influence patients' quality of life. Addressing this gap is crucial, especially in the early phase of telemonitoring adoption. Therefore, the following section presents the research hypotheses (Figure 1).

Awareness and monitoring of HF symptoms and quality of life

Drawing on the Situation-Specific Theory of Heart Failure Self-Care (Riegel & Dickson, 2008; Riegel et al., 2016; Riegel et al., 2022), self-care is a multidimensional process that requires not only the successful acquisition of practical skills (self-care maintenance), but also the involvement of cognitive and motivational processes (symptom perception). In fact, symptom perception plays a pivotal role as it is the cognitive-behavioral mechanism through which patients monitor, detect and recognize bodily changes and early signs of worsening HF. This awareness supports the decision to take appropriate action depending on the symptoms that arise and

to manage them effectively (self-care management; Vellone et al., 2015). Several studies have found that adequate self-care skills are associated with a better quality of life (Dunbar et al., 2015; Koirala et al., 2020; Seid, 2020; Seid et al., 2023), while low levels of quality of life are associated with inadequate or poor levels of self-care (Seid et al., 2023; Sedlar et al., 2017; Vellone et al., 2017). Among the components of self-care, the present study specifically considered symptom perception, as this construct was selected on the basis of the Situation-Specific Theory of Heart Failure Self-Care (Riegel & Dickson, 2008; Riegel et al., 2016; Riegel et al., 2022). Within this theoretical framework, symptom perception is conceptualized as a theoretically antecedent process that underpins patients' awareness and monitoring of HF symptoms and enables subsequent self-care management behaviors. By shaping how patients recognize, interpret and respond to physical changes, symptom perception may influence patients' subjective evaluation of their health status and, consequently, their perceived quality of life.

Hypothesis 1: Self-monitoring of HF symptoms will be positively related to quality of life.

Awareness and monitoring of HF symptoms and patient activation

Self-care depends not only on behavioral skills, but also on psychological abilities and resources that enable patients to actively manage their own health (Luciani et al., 2022). The patients' level of knowledge, skills, confidence and motivation determines their ability to effectively manage their own health and treatment pathway. This construct, known as patient

activation, reflects the individual's ability to participate in an informed and responsible role in the management of their chronic condition, such as HF (Hibbard et al., 2004; Greene & Hibbard, 2011). Within the Situation-Specific Theory of Heart Failure Self-Care (Riegel & Dickson, 2008; Riegel et al., 2016; Riegel et al., 2022), symptom perception represents a fundamental cognitive process that support and sustain patients' engagement in self-care over time. In the present study, the assumption is that by increasing patients' awareness of their health status and their perceived ability to interpret and respond to bodily chages, symptom perception may contribute to the development of knowledge, confidence and motivation that characterize patient activation. In addition, numerous studies have shown that greater patient activation is associated with better self-care monitoring and management (e.g., medication adherence, fewer hospitalizations, blood pressure monitoring; Greene et al., 2005; Greene & Hibbard, 2012; Mosen et al., 2007; Skolasky et al., 2011). Patient activation, which integrates the cognitive and behavioral dimensions of patients' attitudes towards healthcare and their own treatment pathway (Graffigna et al., 2015), could represent a key construct closely associated with effective self-care and better quality of life in patients with HF.

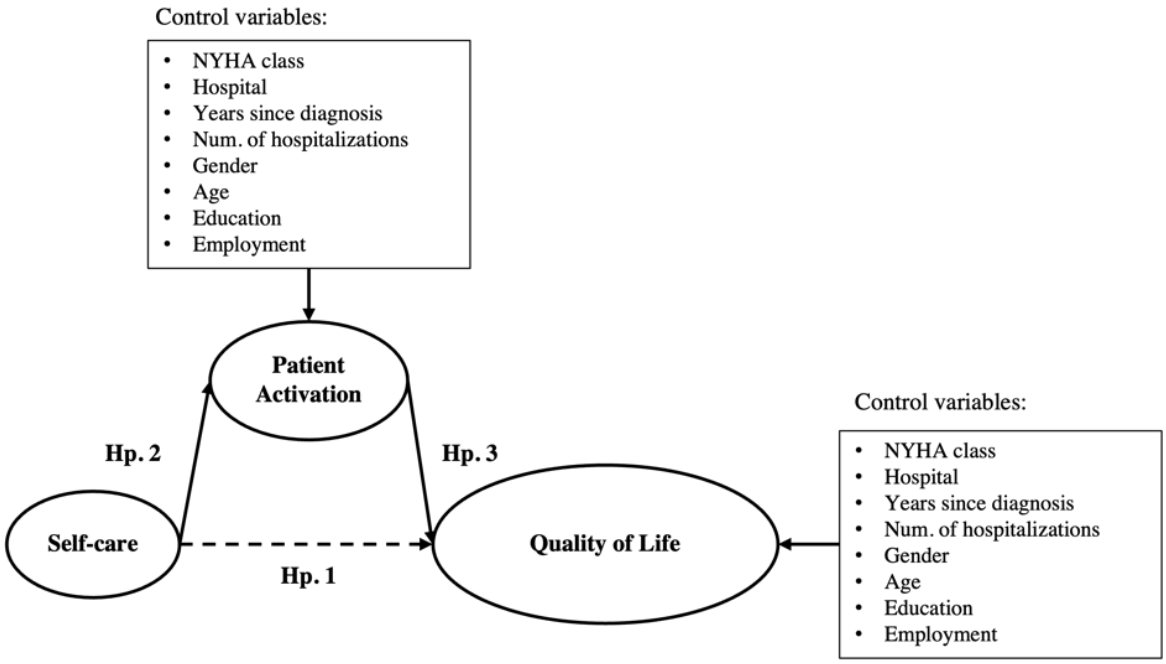
Hypothesis 2: Self-monitoring of HF symptoms will be positively associated with patient activation.

Patient activation as a mediator between awareness and monitoring of HF symptoms and quality of life

Based on the theoretical framework outlined above, patient activation is examined as a psychological mechanism linking symptom perception of HF to quality of life. The contribution of self-care and patient activation has traditionally been studied independently, while the mechanisms linking the two constructs to quality of life remain an under-researched area. Patient activation could act as a psychological mediator, explaining how self-care elicits an improvement in patient quality of life by increasing awareness and skills for effective management of HF over time (e.g., medications adherence, symptom monitoring; Caggianelli et al., 2024; Frosch & Elwyn, 2011; Hibbard et al., 2007). Patients with higher levels of activation are able to comprehend their symptoms and are capable of make informed and clinically appropriate decisions, factors positively associated with better quality of life (Frosch & Elwyn, 2011; Hibbard et al., 2007). However, to date, there are no studies exploring the mediating role of patient activation in HF population. To address this gap, drawing on research on patient activation (Hibbard et al., 2004) and the Situation-Specific Theory of Heart Failure Self-Care (Riegel & Dickson, 2008; Riegel et al., 2016), the present study examines whether patient activation mediates the relationship between self-care (specifically, self-monitoring of HF symptoms) and quality of life.

Hypothesis 3: Patient activation will mediate the association between self-monitoring of HF symptoms and health quality of life.

Figure 1. Conceptual model regarding the relationships between self-care and quality of life and the mediating role of patient activation while controlling for NYHA class, hospital, years since diagnosis, number of hospitalizations, gender, age, education, and employment.



4.2 Methods

4.2.1 *Research design*

The current study is part of the multidisciplinary "Evolving Azimuth in MUSA Context" (AZIMUSA) project, a non-pharmacological, longitudinal, randomized, prospective, and multicenter interventional trial involving patients with HF diagnosis. The project is funded within the MUSA (Multilayered Urban Sustainability Action) program and data collection is still ongoing. Participants were asked to complete a questionnaire for three administration timepoints (T0; T1; T2). The present paper reports the cross-sectional baseline analysis (T0), collected before group allocation and prior to exposure to the telemonitoring intervention.

4.2.2 *Setting and participants*

Two of the main hospitals in Lombardy (Italy) with inwards and outwards specializing in HF were involved. 200 patients who met the inclusion criteria were recruited from October 2024 to July 2025: (i) age 18 years or older, (ii) diagnosis of HF (iii) availability of a smartphone compatible with the application (Android or iOS), (iv) Wi-Fi connection or 3G coverage at home, and (v) ability to provide written informed consent. Exclusion criteria concern (i) the presence of severe psychiatric disorders, (ii) inability to use mobile technologies or the equipment provided, and (iii) refusal to give consent to participate in the study. For each center, randomization was performed using the online randomization tool Research Randomizer20 (http://www.randomizer.org) with a 1:1 allocation ratio (50% standard care; 50% telemedicine group). To minimize imbalances in prognostic factors (gender, age, NYHA functional class and left ventricular ejection fraction LVEF), assignment to groups was performed using a covariate-adjusted minimization procedure (Pocock & Simon, 1975). Baseline questionnaires (T0) were administered before group allocation was revealed to patients, thereby avoiding expectation bias.

4.2.3 *Overview of the study procedures and recruitment process*

The following section illustrates the procedures implemented in the overall research project, however, only the baseline (T0) data collected before randomization are analyzed in the present study. For patients in the control group, the request to participate in the study included completing questionnaires, with the sole instruction to continue managing their clinical condition as normally, as guided by their HCPs (e.g., continuing to monitor weight and blood pressure, keeping track of their measurement in a notebook or on their smartphone). For the telemedicine group, after completing the first questionnaire, training was provided to explain how to use the app on their smartphones. In this study, a remote monitoring service was implemented, supported using the Healthentia platform developed by Innovation Sprint as a Class I EU-MDR approved Software as Medical Device (SaMD) at the time of the study initiation, and today a Class IIa MDR-certified SaMD, delivering the AZIMUTH model of care specifically designed to address the needs of HF care pathways (D'Amario et al., 2025). The Healthentia mobile app was downloaded in the outpatient clinic, and the first compilation was done together with the researcher. For this group, the request was to manually enter their daily body weight, blood pressure, and heart rate values into the app after measurement. To ensure accurate data recording, patients had to have a scale, and a blood pressure monitor at home. The app recorded this data and provided the patient with a monitoring chart showing the daily, weekly, and monthly trends of these values. This data was monitored remotely by HCPs through the clinical dashboard. Recruitment and randomization process was

illustrated following the CONSORT 2025 guidelines (Hopewell et al., 2025; see Appendix 1).

The sample size was estimated using G*Power 3.1.9.6 software, following guidelines and previous studies. Based on an expected effect size of .43 for changes in Patient Activation Measure scores (PAM-13; Hibbard et al., 2005; Anderson & Wallace, 2018) between baseline and six months, a total of 73 participants per group would provide 95% power ($\alpha = .05$, two-tailed, 1:1 allocation). Accounting for a 25% drop out rate, the final required sample size was set at 184 patients (92 per arm).

4.2.4 *Measures*

Sociodemographic characteristics, patient activation, self-care monitoring and health status measures were included during data collection. Sociodemographic characteristics included gender, age, education level, employment status. While the clinical characteristics included New York Heart Association class (I–IV class; NYHA), left ventricular ejection fraction (preserved, mildly reduced, reduced; LVEF), time since diagnosis, number of rehospitalizations.

Self-Care of Heart Failure Index

Self-Care of Heart Failure Index, version 7.2 (SCHFI v. 7.2) is a validated self-reported tool developed by Riegel and colleagues (2019a) to measure self-care in patients with HF by HCPs. The scale was translated into Italian by Vellone and colleagues (2020). Although SCHFI v. 7.2 consist of 29 items, divided into 3 distinct scales (self-care maintenance, symptom perception and

self-care management). Given its psychometric independence and theoretical relevance (Riegel et al., 2016; Riegel et al., 2019a; Santos et al., 2021; Yu & Li, 2023), only the "symptom perception" subscale was used in the present study. Within this theoretical framework, this construct is conceptualized as a prerequisite and integral component of self-care, capturing the cognitive and behavioral processes through which patients monitor and interpret bodily changes related to HF. Focusing on this dimension allowed for a specific exploration of patients' awareness and monitoring of HF symptoms, which are key elements underlying effective self-care processes. This subscale consists of 11 items that investigate the frequency with which patients monitor specific signs and symptoms (e.g., pay attention to changes in how you feel) of HF. Each item is rated on a 5-point Likert scale (1 never, 5 always). The 2 items relating to how quickly patients recognize and interpret signs and symptoms as related to HF (e.g., how quickly did you recognize that you had symptoms?) were not excluded because they assess decision-making processes rather than routine monitoring behavior. A standardized score from 0 to 100 is then calculated, with higher scores indicating a better level of self-care. Scores of 70 or above are considered indicative of adequate self-care behavior (Riegel et al., 2009). In the present study, the scale demonstrates good internal consistency (T0: Cronbach's $\alpha = .82$).

Patient activation measure

Patient activation was assessed using the 13-item Patient Activation Measure (PAM-13), a validated self-reported scale developed by Hibbard and colleagues (2004) and translated into Italian by Graffigna and colleagues

(2015). The scale evaluates patients' knowledge, skills, and confidence in managing their health. Each item is rated on a 4-point Likert scale (1 strongly disagree, 4 strongly agree), with "not applicable" responses recorded as 0. PAM-13 was used under license from Insignia Health, and raw scores were converted to a 0-100 scale according to the official scoring procedure provided by the license holder. The higher scores reflecting greater activation. Based on these scores, patient activation was classified into four levels: low (≤ 47 points), medium-low (47.1-55.1 points), medium (55.2-72.4 points), and high (≥ 72.5 points). In the present study, the scale demonstrates good internal consistency (T0: Cronbach's α = .85).

Quality of life

The European Quality of Life 5-Dimensions 5-Level scale (EQ-5D-5L; EuroQoL Group, 1990) is a standardized tool designed to measure health-related quality of life. Although the scale consists of five dimensions (mobility, self-care, daily activities, pain/discomfort, depression/anxiety) and a visual analogue scale (EQ-VAS) ranging from 0 to 100 (lower scores indicate poorer perceived health status, while higher scores indicate better perceived health status), only the global EQ-VAS item ("indicate on this scale what you consider to be your current health status") was used in this study to obtain an immediate measure of the patients' perception. This choice is consistent with prior literature highlighting the practical advantages and psychometric validity of the EQ-VAS when used as a stand-alone measure of self-rated health. Furthermore, the simplicity, reliabilty and sensitivity of the tool minimize respondent burden, and captures individual variability in real-

world clinical settings (Wang et al., 2020; Zrubka et al., 2019; Åström et al., 2023).

4.2.5 *Ethical considerations and procedure*

The study was approved by the Territorial Ethics Committee Lombardy 3 (Approval number: 4372_22.05.2024_P_bis) and adhered to the principles of the Declaration of Helsinki. The study procedure was explained to participants orally and in writing, using leaflets. In addition, their right to withdraw at any time without consequences was explicit. To ensure anonymity, no personal data were recorded. Each participant was assigned a unique code for longitudinal analyses across at the three assessment points (T0, T1, T2). The number was sequential from 1 to 100 for each hospital.

During data collection, researchers were present in the hospital outpatient units, and all medical staff were informed about the study objectives, inclusion criteria and enrollment procedure for identifying eligible patients. Once the clinician identified the patients and briefly presented the study, eligible patients were verbally informed about the study, its objectives and the commitment required of them. Those who expressed interest in participating signed the written informed consent and the related policy for data processing prior to enrollment. Data collection process for each participant took approximately 30 minutes.

4.2.6 *Statistical analysis*

All analyses were conducted using SPSS version 29.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were computed for all study variables (means and standard deviations) and correlational analyses. Cronbach's alpha coefficients were used to assess the internal consistency of the instruments. Moreover, the normality of data distribution and the necessary assumptions for subsequent linear regression analyses were evaluated, including kurtosis and skewness. Continuous variables with normal distribution were described using mean±standard deviation (SD). Subsequently, the PROCESS macro in SPSS (Model 4; Hayes, 2018) was used to test mediational analyses to investigate the study hypotheses. The model aimed to examine the mediating role of patient activation in the relationship between self-care and quality of life. All analyses were performed on baseline (T0) data collected prior to randominzation and before any exposure to the telemonitoring intervention. As such, the mediation tested in this study was exploratory and cross-sectional. It examined associations among variables but did not allow for causal inference. Indirect effect was estimated based on 5,000 bootstrap sample, and its statistical significance was inferred when the 95% confidence intervals (CIs) did not include zero. A significant mediation effect was inferred when the corresponding interaction or indirect effect was significant ($p < .05$) and the bootstrap CI excluded zero. A significance level of $p < .05$ was adopted for all statistical analyses.

4.3 Results

4.3.1 Demographic and illness-related characteristics of participants

After data cleaning process, six participants were excluded (three participants died during the study period, and three provided incomplete date). The final sample consisted of 194 adult patients diagnosed with HF, recruited consecutively during routine outpatient visits. Socio-demographic data indicated a prevalence of male patients (74.2%; *N* = 144), with an average age of 64.32±13.16 years. Nearly half of the sample (49.5%; *N* = 96) had completed secondary school, and the majority (60.8%; *N* = 118) were unemployed or retired. As for the clinical characteristics, more than half of the patients were classified as NYHA class II (66.5%; *N* = 129), whereas 22.7% (*N* = 44) were in class I and 10.8% (*N* = 21) in class III. None were classified as NYHA class IV. In terms of LVEF, one-half of the sample (50.0%; *N* = 97) had reduced function, while 30.9% (*N* = 60) fell into the intermediate (mildly reduced) range and only 19.1% (*N* = 37) showed preserved function. Most patients (71.6%, *N* = 139) had been diagnosed with HF more than three years prior and had been hospitalized more than twice (42.8%; *N* = 83), while 17% (*N* = 33) of the sample reported never having been hospitalized due to their cardiac condition (Table 1).

Table 1. Sociodemographic and clinical characteristics of patients with HF (*N* = 194).

Characteristics	*n* (%)
Age (years)	
29–58	69 (35.6)
59–70	58 (29.9)

71–90	67 (34.5)
Gender	
Female	49 (25.3)
Male	144 (74.2)
Other	1 (0.5)
Education level	
Below secondary school	70 (36.1)
Secondary school	96 (49.5)
High school and above	28 (14.4)
Employment status	
Employed	76 (39.2)
Unemployed or retired	118 (60.8)
NYHA	
I	44 (22.7)
II	129 (66.5)
III	21 (10.8)
IV	0 (0.0)
LVEF	
Preserved	37 (19.1)
Mildly reduced	60 (30.9)
Reduced	97 (50.0)
Years since diagnosis	
Less than 6 months	15 (7.7)
6 months to 1 year	7 (3.6)
1 year to 3 years	33 (17)
More than 3 years	139 (71.6)
Number of hospitalizations	
Never	33 (17)

Once	49 (25.3)
Twice	29 (14.9)
More than twice	83 (42.8)

4.3.2 *Descriptive characteristics and group comparisons among self-care management, patient activation and quality of life*

The mean score of the symptom perception subscale of SCHFI v. 7.2 was 71.42±19.08 (ranging from 5.56 to 100; median = 75). Based on the cut-off score of 70, 56.7% (*N* = 110) of participants showed adeguate self-care, suggesting that a substantial proportion of patients scored in the medium-to-high range of the scale. Moreover, a one-way ANOVA was conducted to examine group differences in symptom perception across the four NYHA classes. Post-hoc comparisons using Tukey's HSD test showed that patients in III NYHA class (*M* = 82.64) reported significantly higher symptom perception scores compared to those in NYHA class I (*M* = 69.74, *p* = .028) and NYHA class II (*M* = 70.16, p = .014), with no difference between classes I and II (*p* = .991). This pattern suggests that patients with more severe functional impairment tended to display greater awareness and self-monitoring of their symptoms compared to those in less severe classess. No significant differences in symptom perception were observed across the different levels of LVEF.

The mean overall patient activation score was 61.61±16.14 (ranging from 33 to 100). The distribution across PAM levels indicates that participants generally reported medium levels on patient activation measure (levels 2: 32%, *N* = 62; level 3: 30.4%, *N* = 59), with relatively fewer individuals

achieving the lowest (level 1: 14.4%, $N = 28$) or highest (level 4: 23.2%, $N = 45$) possible scores. No significant differences in PAM scores were observed across the different NYHA classes and LVEF levels.

Regarding the Quality of Life, the score was 67.16±17.75 (ranging from 30 to 100), suggesting that the sample tended to report moderate-to-high levels on the quality-of-life measure, with considerable variability and a broad coverage of the scale's range. No significant differences in QoL scores were observed across the different NYHA classes and LVEF levels.

Table 2 presents the descriptive statistics for each presented variables, including mean, standard deviation, median, skewness and kurtosis. According with Hair and colleagues (2014) and Byrne (2016), all variables showed acceptable levels of skewness (ranging from -2 to +2) and kurtosis (ranging from -7 to +7), indicating no severe deviations from normality and confirming the appropriateness of applying parametric statistical analyses.

Table 2. Item-level descriptive statistics (Means, SD, Median, Skewness and Kurtosis; $N = 194$).

Variables	Mean (SD)	Median	Skewness (S.E.)	Kurtosis (S.E.)
SP–SCHFI				
Item 1	54.27 (35.1)	50.00	-0.22 (.18)	-1.25 (.35)
Item 2	82.86 (24.0)	100.00	-1.24 (.18)	0.83 (.35)
Item 3	80.15 (27.1)	100.00	-1.33 (.18)	1.10 (.35)
Item 4	82.47 (25.2)	100.00	-1.64 (.18)	2.51 (.35)
Item 5	70.21 (30.2)	75.00	-.85 (.18)	-0.05 (.35)
Item 6	80.57 (25.6)	100.00	-1.40 (.18)	1.63 (.35)
Item 7	80.44 (30.3)	100.00	-1.50 (.18)	1.22 (.35)
Item 8	80.93 (29.7)	100.00	-1.51 (.18)	1.32 (.35)
Item 9	30.80 (37.8)	.00	0.76 (.18)	-0.95 (.35)

PAM				
Item 1	3.36 (.77)	3	-1.85 (.18)	5.55 (.35)
Item 2	3.31 (.74)	3	-1.97 (.18)	6.99 (.35)
Item 3	3.06 (.98)	3	-1.70 (.18)	3.27 (.35)
Item 4	2.78 (1.07)	3	-1.25 (.18)	1.34 (.35)
Item 5	2.87 (.93)	3	-0.98 (.18)	1. 43 (.35)
Item 6	3.26 (.60)	3	-0.61 (.18)	1.72 (.35)
Item 7	3.31 (.71)	3	-1.75 (.18)	6.32 (.35)
Item 8	3.08 (.92)	3	-1.52 (.18)	3.10 (.35)
Item 9	2.72 (1.09)	3	-1.14 (.18)	0.96 (.35)
Item 10	3.02 (.91)	3	-1.68 (.18)	3.65 (.35)
Item 11	2.83 (1.10)	3	-1.41 (.18)	1.62 (.35)
Item 12	2.53 (1.14)	3	-0.86 (.18)	0.20 (.35)
Item 13	2.92 (.94)	3	-1.45 (.18)	2.69 (.35)
QoL				
Single item	67.16 (17.75)	70.00	-0.28 (.18)	-0.66 (.36)

Note. SP-SCHFI, Symptom Perception, subscale of Self-Care Heart Failure Index v. 7.2; PAM-13, Patient Activation Measure; QoL, European Quality of Life.

4.3.3 *Correlational patterns among self-care, patient activation, quality of life and socio-demographic and clinical characteristics*

Correlational analyses among all study measures were conducted using Spearman's correlation coefficients. Results revealed that symptom perception, as a component of self-care in HF, demonstrated a significant positive association with patient activation ($r = 0.27$, $p < 0.001$). In turn, patient activation was positively associated with quality of life ($r = 0.190$, $p < 0.010$). However, no significant correlation emerged between symptom perception and quality of life. Correlations with socio-demographic and clinical characteristics are also reported in Table 3.

Table 3. Correlation matrix between self-care, patient activation and quality of life, socio-demographics and clinical characteristics of patients with HF ($N = 194$).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) SP–SCHIFI	–										
(2) PAM	.27***	–									
(3) Quality of Life	-.01	.19**	–								
(4) NYHA	.16*	-.04	-.12	–							
(5) HOSP	-.04	.06	.07	.10	–						
(6) Y_HF	.08	.03	-.08	-.01	.19**	–					
(7) N_hosp	.19**	.24***	-.14	.22**	.10	.40***	–				
(8) Gender	-.01	.01	-.02	.11	-.10	-.01	-.15*	–			
(9) Age	.01	-.14*	.07	.07	-.54***	.01	-.01	.07	–		
(10) Education	-.18*	.12	-.01	-.11	.09	-.02	-.08	-.00	-.20**	–	
(11) Employment	-.08	.17*	.08	-.17*	.31***	-.01	-.09	-.03	-.56***	.35***	–

Note. SP-SCHFI, Symptom Perception, subscale of Self-Care Heart Failure Index v. 7.2; PAM-13, Patient Activation Measure; QoL, European Quality of Life; Y_HF:1 less than 6 months, 2 6 months to 1 year, 3 1 year to 3 years, 4 more than 3 years; N_hosp: 1 never, 2 once, 3 twice, 4 more than twice; gender: 1 male, 2 female; age: 1 29–58, 2 59–70, 3 71–90; education: 1 below secondary school, 2 secondary school, 3 high school and above; employment: 0 unemployed or retired, 1 employed.

**p <.05; **p <.01; ***p <.001*

4.3.4 *Testing the mediating role of patient activation on the association between self-care and quality of life*

The mediation analysis, through Hayes' PROCESS model 4, tested the hypotheses while controlling for socio-demographic and clinical characteristics (e.g., NYHA class, number of hospitalizations, years since diagnosis, gender, age, education, employment status). Based on correlation results, only socio-demographic and clinical variables showing a statistically significant correlation with the study measures were included as covariate in the model (i.e., NYHA, number of hospitalizations, age, education and

employment status). The results of the mediation model (see Table 4 and Figure 2) showed that symptom perception was positively and statistically significantly associated with patient activation (β = .26 *SE* = .06, *p* <.001, *95% CI:* .11; .35). Patient activation was positively and statistically significantly related to quality of life (β = .24, *SE* = .08, *p* = .002, *95% CI:* .09; .42). The direct effect of symptom perception on quality of life was not statistically significant (β = -.04, *SE* = .07, *p* = .64, *95% CI:* -.18; .11), while the indirect effect of symptom perception on quality of life through patient activation is statistically significant (β = .06, *SE* = .03, *95% CI:* .01; .12). These results confirmed Hypotheses 2 and 3 and highlighted a full mediation, suggesting that patients' awareness and recognization of HF symptoms influence quality of life only through their level of activation. Among the covariates, the number of hospitalizations was statistically significantly associated with both variables: it was positively associated with patient activation (β = .19, *SE* = 1.02, *p* = .01; *95% CI:* .64; .4.67), and negatively related to quality of life (*B* = -.17, *SE* = 1.16, *p* = .02; *95% CI:* -4.95; -.35). No additional socio-demographic or clinical variables demonstrated significant associations with patient activation or quality of life.

Table 4. Path coefficients for the mediation model having patient activation as mediator in the relationship between self-care and quality of life, including covariates.

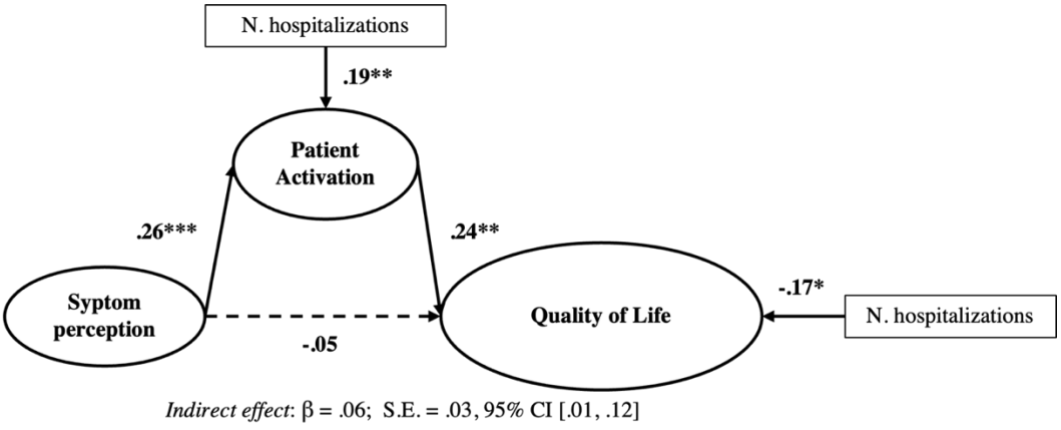
				95% CI	
Dependent variable	*Predictor*	*β*	*S.E.*	Lower bound	Upper bound
Patient Activation					
	SP-SCHFI	.26***	.06	.11	.35
	NYHA	-.04	2.07	-5.27	2.92
	N. hosp	.19**	1.02	.64	4.67
	Age	-.03	.11	-.24	.17
	Education	.12	1.78	-.56	6.45
	Employment	.13	2.89	-1.25	10.19
Quality of Life					
	SP-SCHFI	-.04	.07	-.18	.11
	Patient Activation	.24**	.08	.09	.42
	NYHA	-.10	2.32	-7.70	1.46
	N. hosp	-.17*	1.16	-4.94	-.35
	Age	.15	.12	-.03	.43
	Education	-0.9	2.00	-6.25	1.65
	Employment	.11	3.26	-2.60	10.28
Total effect		.03	.07	-.12	.17

Note. β = Standardized Effect; S.E. = Standard Error; 95% CI = bootstrapping lower and upper limit bias-corrected 95% confidence intervals. SP-SCHFI, Symptom Perception, subscale of Self-Care Heart Failure Index v. 7.2; NYHA: 1 class I, 2 class II, 3 class III, 4 class IV; N_hosp, Number of hospitalizations: 1 never, 2 once, 3 twice, 4 more than twice; age: 1 29–58, 2 59–70, 3 71–90; education: 1 below secondary school, 2 secondary school, 3 high school and above; employment: 0 unemployed or retired, 1 employed.

To examine changes in patient activation according to the number of hospitalizations, a one-way ANOVA was conducted. The analysis found a significant effect on patient activation ($F(3,190) = 3.62$, $p = .014$, $\eta^2 = .054$). Given that Levene's test was borderline ($p = .054$), Welch's test was conducted ($F(3,82.7) = 4.55$, $p = .005$), which confirmed the effect. Post hoc

comparisons (adjusted according to Games-Howell) showed that patients without hospitalizations (*M* =54.89) reported statistically significant lower PAM scores than those with three or more hospitalizations (*M* = 65.28; *M difference* = 10.39, *p* = .01). Regarding quality of life, a one-way ANOVA was conducted. In this case, the overall analysis did not reach statistical significance ($F(3,181) = 2.22$, $p = .088$, $\eta^2 = .035$). However, Levene's test indicated a violation of the homogeneity of variances assumption ($p = .001$), therefore Welch's test was also conducted and confirmed significant differences among groups ($F(3,83.37 = 3.63$, $p = .016$). Post-hoc Games-Howell comparisons revealed higher quality of life in patients with no hospitalizations (*M* = 74.03), compared to those with three or more hospitalizations (*M* = 64.58; *M difference* = 9.45, *p* = .012).

Figure 2. Model analysing the mediation role of patient activation in the relationship between symptom perception and quality of life.



4.4 Discussion

The present study examined the mediating role of patient activation in the association between self-care and quality of life among patients diagnosed with HF. Drawing on the situation-specific theory of heart failure self-care (Riegel & Dickson, 2008; Riegel et al., 2015) and the patient activation model (Hibbard et al., 2004), the findings underlining the bridge role of patient activation, providing insights into the psychological mechanisms behind patients' abilities to manage their chronic condition. Consistent with previous literature (e.g., Greene & Hibbard, 2012; Riegel et al., 2019b; Vellone et al., 2020), self-care was found to be positively associated with patient activation. In other words, individuals with greater ability to monitor and manage HF-related symptoms also report greater confidence, motivation and activation to their care journey. This supports the theoretical assumption that behavioural and cognitive dimensions of health management are closely interconnected and reinforce each other (Olofsson et al., 2025; Riegel et al., 2019b). Moreover, the results show that patients who have developed greater awareness and self-care skills tend to perceive themselves as more competent in managing their condition and that, therefore, this has an impact on adherence to medications and clinical recommendation, leading to a better perceived quality of life (Graffigna et al., 2015; Niu et al., 2025). In this regard, consistent with several previous research (e.g., Mosen et al., 2007; Skolasky et al., 2011), this study corroborates the positive association between patient activation and quality of life, indicating that higher levels of activation relate to better well-being. However, in this study, the absence of a direct association between self-care and quality of life shows that patient

activation would work as a key mechanism linking self-monitoring processes to improved well-being. These findings suggest that, for an effective management and comprehensive care of HF, fostering patient activation is crucial. Indeed, the presence of conscious patient activation is associated with a better quality of life, while self-care behaviors alone may not be sufficient to enhance patients' well-being (Jacobson et al., 2018; Son et al., 2023). As such, the perception of control, disease awareness and self-care abilities that patients exercise in their daily lives becomes a crucial psychological resource through which practical self-care translate into an improvement in their quality of life (Graffigna et al., 2015; Hibbard et al., 2004). This interpretation is guided and supported by previous theoretical models, which show how the effect of self-care on quality of life is contingent upon motivational and cognitive mechanisms (Graffigna et al., 2015; Riegel et al., 2019b). Patient activation turns into an adaptive resource that allows patients to actively participate in their own care pathway and effectively cope with the challenges of living with a chronic disease such as HF (Hibbard et al., 2004; Riegel et al., 2019b). Patient activation has the potential to become a psychological bridge that can connect self-care practices with health-related outcomes (Jacobson et al., 2018; Son et al., 2023). Indeed, it appears that consistent and effective health improvement over time is not achievable without developing awareness, but it becomes possible if patient is actively engaged in self-care, knows their condition, and manages symptoms that may occur on an ongoing and consistent basis (Graffigna et al., 2015). Another noteworthy finding concerns to the number of hospitalizations, which was negatively associated with patients' quality of life, but positively associated with patient activation.

This dual pattern might indicate that repeated hospitalizations, while worsening clinical and emotional status (Miyata, 2025), may also increase patients' knowledge and familiarity with their condition through repeated and prolonged contact with HCPs in the hospital ward (Kolasa et al., 2021; Nozawa et al., 2024; Riegel et al., 2009). This interpretation is supported by Hibbard's patient activation model (2004), in which activation is a dynamic and progressive process. Patients become increasingly engaged and learn competence through ongoing experience, even when facing physical decline or emotional distress (Hibbard & Greene, 2013). However, in contrast to the present findings, a systematic review and meta-analysis by Anderson and colleagues (2022) reported that high levels of patient activation are significantly associated with a lower risk of hospitalization, while Greene colleagues (2015) found that a higher level of activation is predictive of better clinical outcomes and self-care behaviors. These apparent discrepancies could be explained by differences in the study samples, which do not reflect the specific characteristic of patient with HF, in whom the disease may lead to different activation trajectories. Therefore, further studies are needed to clarify the activation processes in this target population. From a clinical and psychological perspective, these results emphasize the importance of patient participation in chronic disease management. Because of these findings, supporting patient activation in clinical practice is essential, as is considering intervention strategies that involve patients in daily management. Clinical and health education programs (e.g., Greene & Hibbard, 2012) and initiatives that raise awareness of one's condition and associated symptoms (e.g., self-monitoring of HF symptoms) could effectively improve self-care behaviors

and, consequently, enhance patients' quality of life (Graffigna & Barello, 2018; Niu et al., 2025; Son et al., 2023). As a complementary intervention area, digital health tools offer new opportunities to extend patient activation beyond traditional clinical settings. Telemonitoring solutions, such as the mobile app employed in this project, may facilitate this process by providing continuous feedback, supporting symptom tracking and strengthening communication between patients and HCPs via remote consultations. This approach ensures active and informed engagement in patients' care journey (Athilingam et al., 2017; Clemente et al., 2024; Lee et al., 2023; Wei et al., 2021).

Limitations and further research directions

Some limitations should be acknowledged. The cross-sectional design of the current study prevents the identification of causal relationships among the examined variables. However, the project is still ongoing, and longitudinal data collection will allow for further analysis to examine whether improvements in self-care and patient activation using the Healthentia app over time lead to an enhanced quality of life. In addition, the baseline questionnaire and the related analyses presented in this study are based on self-reported measures, which may be susceptible to social desirability or recall bias. Moreover, collecting date from only one instrument (questionnaire) increases the potential for common method bias. In order to reduce these biases, the integration of objective measures and indicators (e.g., clinical data measured a stored in the app, and usage data) will be performed at the end of the data collection (T1 and T2), strengthening the results

obtained at baseline (T0). Furthermore, the cross-sectional design is suitable for identifying associations between variables, it does not allow for the establishment of cause-and-effect relationships. For this reason, the mediation model tested in this study was interpreted as an exploratory analysis of theoretically driven associations rather than as evidence of causal mechanisms. Consequently, the observed associations require confirmation through longitudinal analyses planned for later stages of the project. To conclude, the current study did not take into consideration the acceptance of the proposed telemedicine tool, which is an important factor influencing adherence and engagement in digital health interventions. Evaluating user experience and monitoring the adoption on the Healthentia app will be crucial steps in subsequent phases of the project.

4.5 Conclusions

Overall, the present paper contributes to the growing body of literature on HF management by highlighting the mediating role of patient activation in the relationship between self-care and quality of life. These findings underscore the importance of considering psychological constructs, such as patient activation, as key target for interventions aiming to improve chronic disease management, suggesting that symptom monitoring alone is not enough to improve well-being unless accompanied by the cognitive aspect that characterizes activated patients. It is therefore important to support patients not only in developing practical skills, but also in promoting awareness of their condition and actively participating in their own care

pathway. In this context, telemonitoring could be a promising strategy for improving patient engagement, including through the support of HCPs. Enhancing patient activation through tailored educational and technological support may promote a more autonomous and resilient approach to living with heart failure, ultimately contributing to better health outcomes and quality of life.

AZIMUSA project: A longitudinal study, the extension of the cross-sectional study

As mentioned above, this cross-sectional study represents the first stage of the larger longitudinal AZIMUSA project investigating the implementation of a telemonitoring service. Data collection is still ongoing and is expected to be completed by January 2026. The analysis of data collected at subsequent time points (time-one and time-two) will allow us to explore how psychological and behavioral variables change over time. Furthermore, in the subsequent extended phase, aspects related to technology acceptance will also be investigated, integrating the theoretical model of the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003; Venkatesh et al., 2012) already presented in this thesis, together with data on the actual use of the telemonitoring app. This broadening of perspective will allow us to observe how the predisposition to use technology and the concrete experience of telemonitoring translate into care-related behaviors and well-being outcomes over time. Some of the research questions (RQs) that will guide the next phases of the AZIMUSA project include:

RQ1. *How do patient activation, self-management and quality of life change over time for patients using the telemonitoring service?*

RQ2. *What factors predict greater activation and sustained use of telemonitoring app over time?*

RQ3. *How does the acceptance of technology relate to actual app usage data?*

Caregiver contribution to heart failure patients using telemonitoring apps

Considering that caregivers are often actively involved in the management of cardiac disease, with the adoption of telemedicine tools by patients it would be interesting to investigate how their contribution impacts both self-care and patient activation capabilities, as well as the quality of life perceived by patients with HF (Caggianelli et al., 2024; Locatelli et al., 2023). Vellone and colleagues (2019) developed the Situation-Specific Theory of Caregiver Contributions to Heart Failure Self-Care, which recognizes the same dimensions identified for patients (self-care maintenance, monitoring and management) and defines the contribution of caregivers as the process through which the caregiver supports the patient in the three self-care processes. Caregiver contribution could therefore be introduced into the model that investigates the mechanisms of mediation between self-care, patient activation and quality of life. The literature already shows that better self-care behaviors are associated with a higher quality of life, observing that the contribution of caregivers affects self-care and, indirectly, quality of life (Caggianelli et al., 2024). The support provided by caregivers appears to

facilitate self-management behaviors, which in turn improve quality of life. The AZIMUSA project increases the complexity by introducing the use of a smartphone app for telemonitoring and, therefore, a technological dimension. For this reason, special attection should be paid to the digital mediation carried out by caregivers, who could help support patients in using telemedicine applications and promote better management of HF. To investigate these processes and dimensions, longitudinal and dyadic studies (collecting data from both patients and their caregivers) would need to be conducted, allowing for the testing of hypotheses of mediation and moderation between self-care, patient activation, technology use and the patient's perceived quality of life.

Appendix 1. Recruitment and randomization process (with indication of timing of survey administration) following the CONSORT 2025 guidelines (Hopewell et al., 2025).

Declarations

Data availability statement

The data research may be available upon a reasonable request to the authors.

Ethical approval

The study was approved by the Territorial Ethics Committee Lombardy 3 (approval number: 4372_22.05.2024_P_bis) and adhered to the principles of the Declaration of Helsinki. Written informed consent will be obtained from all participants prior to enrollment.

Consent to participate

Study procedures were explained verbally and in writing, and participants were explicitly informed of their right to withdraw at any time without consequences. All the participants provided written informed consent.

Competing interest

M.G., S.M. and P. F. report being employees of AstraZeneca. All other authors have no conflict of interest to declare for the present work.

Funding

This research was funded by MUSA—Multilayered Urban Sustainability Action—project, funded by the European Union—NextGenerationEU, under the National Recovery and Resilience Plan (NRRP) Mission 4 Component 2 Investment Line 1.5: Strengthening of research structures and creation of R&D "innovation ecosystems", set up of "territorial leaders in R&D".

Authors' contribution

MAP: Conceptualization, Methodology, Formal Analysis, Writing – original draft; Writing – Review & Editing, Data curation.

CB: Conceptualization, Methodology, Writing – Review & Editing, Data curation.

SM: Writing – Review & Editing, Resources, Project administration, Funding acquisition.

MG: Writing – Review & Editing, Resources, Project administration, Funding acquisition.

PF: Protocol & Writing – Review & Editing, Resources, Project administration, Funding acquisition.

CG: Conceptualization, Writing – Review & Editing, Supervision, Project administration, Data Curation.

All authors have read and agreed to this version of the manuscript.

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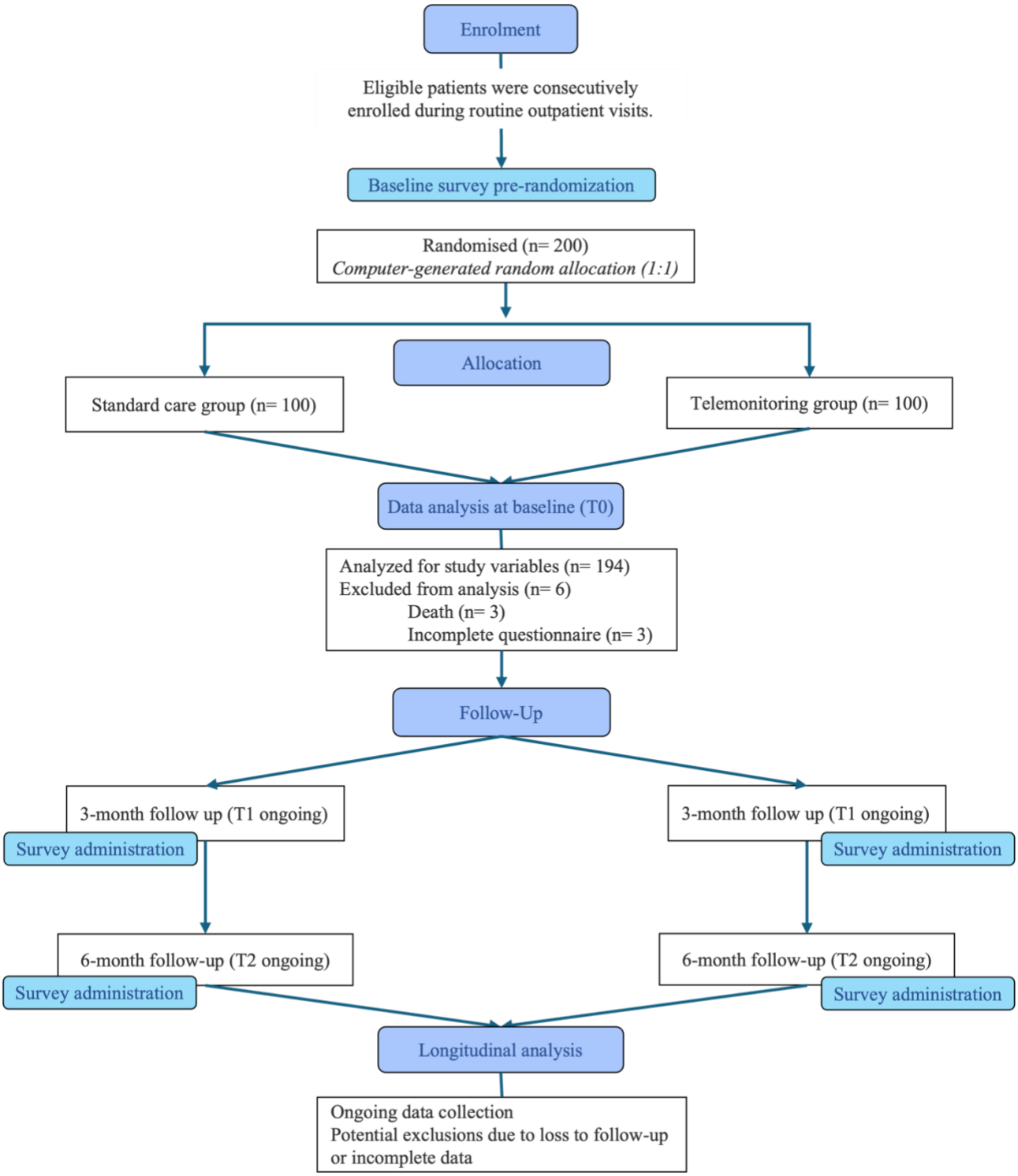
Appendix 1. CONSORT 2025 Flow Diagram

Flow diagram of the progress through the phases of the randomised trial of standard care and telemonitoring groups (enrolment, intervention allocation, data analysis at baseline, follow-up)



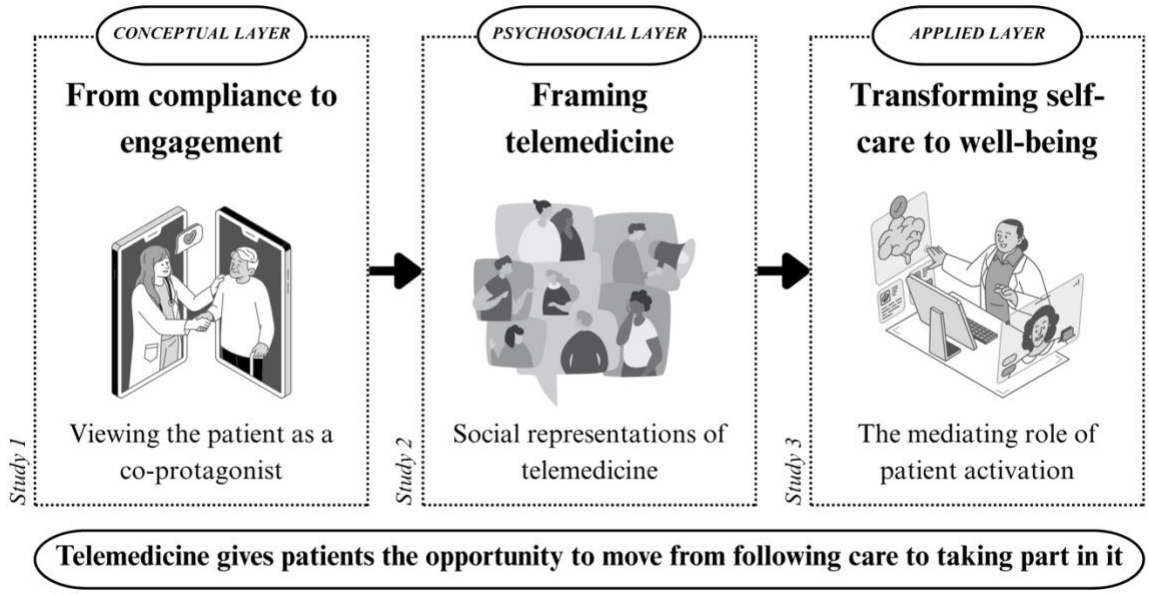
Hopewell S, Chan AW, Collins GS, Hróbjartsson A, Moher D, Schulz KF, et al. CONSORT 2025 Statement: updated guideline for reporting randomised trials. BMJ. 2025; 388:e081123. https://dx.doi.org/10.1136/bmj-2024-081123

Conclusions

This thesis aimed to investigate telemedicine through a psychosocial perspective, exploring the patient role in their treatment journey, the perspective of potential users and laypeople, and the concrete experience of patients diagnosed with heart failure. In this work, to study the telemedicine phenomenon, I employed different methodologies and approaches, adapting them to specific research questions and allowing for a more comprehensive and articulated understanding of the topic. This choice attempted to address the need to grasp the complexity of the theme, which involves technological, psychological and social aspects. The use of different methodologies, therefore, is not purely technical in nature, but reflects a specific epistemological position: the awareness that understanding telemedicine requires a perspective capable of spanning multiple levels. Each contribution to this thesis has provided a deeper understanding of telemedicine from the perspective of both health and social psychology. First, by conducting a bibliometric analysis, *Study 1* examined the scientific production about the concept of patient role in telemedicine and how it has evolved over time (1990-2023), comparing two different disciplines (psychology and medicine). This analysis highlighted different conceptualizations about the patient role, showing a gradual shift from a passive idea of the patient to one that considered them more active and collaborative in the care pathway in telemedicine (Bigi, 2016; Gallè et al., 2023; Kenny et al., 2023). *Study 2,* by analyzing Italian newspaper coverage (1990-2022), investigated how telemedicine is represented in the national press. This study explored the relevance of the topic in public discourse and identified the main frames

through which telemedicine is described. While most headlines describe telemedicine in positive terms, highlighting its clinical, economic and social advantages, the barriers and challenges to its large-scale implementation in Italy are also recognized. Taken together, *Study 1* and *Study 2* offer insight into the representation of telemedicine from a scientific and social perspective. Finally, conducting a study on patients diagnosed with heart failure, *Study 3* examined the mediating role of patient activation in the relationship between self-care and quality of life. Building on established theoretical models, it emerges that patient activation is a psychological mechanism that mediates the relationship between self-management and improved personal well-being, underscoring its importance for the effective and sustainable management of patients with chronic diseases. The funnel-shaped focus, from the general to the specific, has made it possible to contribute to health psychology and the implementation of telemedicine services in real-world settings (Figure 1).

Figure 1. Graphic summary of the studies.



In summary, a preliminary integrative framework can be outlined that connects the different layers of analysis of the three studies focused on telemedicine. At the conceptual layer, Study 1 focuses on scientific representations of patients in the use of telemedicine tools, noting how the concept of adherence is gradually giving way to a concept of patient engagement. Study 2 examines how telemedicine is portrayed in public discourse, highlighting the media coverage of the phenomenon at the psychosocial layer, contributing to a grater understanding and awareness of what telemedicine is, what it involves, and what its strenghts and weaknesses might be. Finally, Study 3 focuses on individual psychological processes related to patient activation through the use of telemedicine tools, self-care skills, and perceived quality of live at an applied layer. From this perspective, patient activation can be conceptualized as a fundamental construct that mediates between broader representations of telemedicine and the concrete

experiences and practices of patients. Future research could empirically test this multilevel framework by jointly examining how representations in scientific literature and social representations influence patient activation and, in turn, engagement with telemedicine services over time.

5.1 From adherence to engagement: Towards a new patient role in telemedicine

The first study shed light on the concept of patient role in telemedicine and its evolution over time. From a conceptual point of view, the findings of this study offered a systematic and up-to-date interpretation of how the patient is conceived in two different disciplines (psychology and medicine). Although there is now a widely recognized trend in both fields to move from a passive model of patient involvement to an active and participatory one, in medicine the use of terms such as *adherence* is still frequent, while psychology has shifted its focus to engagement, introducing a more relational and collaborative dimension to care, including in digital healthcare interventions (Chakrabarti, 2014). With the appropriate adjustments (e.g., psychological, technological, relational), telemedicine seems to be able to act as a catalyst for redefining the clinician-patient relationship, where the patient is active and co-participant with HCPs as a key player in the care pathway. Furthermore, by exploring two different domains, this study highlights both the divergent aspects and the emerging touchpoints. One of the major features of this multidisciplinary approach is that it could promote the development of theoretical and intervention models that are suitable for digitalized healthcare

settings, where the combination of medicine and psychology with new technologies can serve the patient well-being. Finally, from a methodological point of view, bibliometric analysis is a methodology that is still not widely used in psychology. In this thesis, it has been employed to map scientific production from 1990 to 2023 in telemedicine, as well as to explore the conceptual evolution of the patient role. This has allowed implicit representations and evolutionary trends in the scientific construction of the concept of the active patient to emerge.

5.2 Framing telemedicine: Between innovation and representation

The second study focuses on social representations of telemedicine as conveyed by Italian newspapers. The focus of the work begins to shift to the general Italian context, moving beyond a technical or clinical view of telemedicine and showing it from a sociocultural perspective. In this work, telemedicine is described through the lens of public discourse, observing its social representations to understand its different multifaceted nature in public opinion. From a methodological point of view, to date this study is one of the few to use media analysis in the field of telemedicine, combining quantitative (salience analysis; Zulato et al., 2021) and qualitative (frame analysis; Elo & Kyngäs, 2008; Gamson & Modigliani, 1989) methods. This study proposes a socio-cultural perspective on telemedicine, assuming that its acceptance and normalization are not only dependent on technological processes, but also on how it is communicated and, consequently, perceived within the common sense of knowledge (Sammut et al., 2015). The media also contribute to

generating an image of telemedicine that can either encourage or hinder its adoption among users, conveying representations that promote an optimistic attitude towards it or, conversely, highlighting problematic aspects or concerns related to the depersonalization of care, privacy issues, and a decrease in the value attributed to the clinician-patient relationship. However, to fully understand this trend, it is necessary to explore personal opinions, and not just social representations of telemedicine (Gamson & Modigliani, 1989). Furthermore, this approach made it possible to map the historical evolution and semantic structure of public discourse in telemedicine. The findings showed that digital healthcare interventions are an emerging and fluctuating topic, which gains public attention at certain critical moments, such as the publication of national guidelines (2014) and the Covid-19 pandemic (2020). The public relevance of this phenomenon is still mainly event-driven and is not structurally integrated into the national discourse on health, although in recent years it has been gradually gaining ground in newspaper media coverage.

5.3 Transforming self-care into well-being: The role of patient activation

While the second study investigated social representations of telemedicine in public discourse, the third study examined its psychological and behavioral implications by conducting an applied research project. This project involved proposing a telemonitoring app to patients diagnosed with heart failure. This study focuses on measurements collected at baseline, i.e., when patients were introduced to the telemedicine service. Due to time constraints, the

AZIMUSA research project is still ongoing, and data collection has not yet been completed (it will end in January 2026). For this reason, longitudinal data on the use of the telemonitoring platform at time-one (after three months of use) and time-tow (after six months of use) could not be considered for analysis in the current thesis. Although it does not include data on the actual use of this technology, preliminary analyses have identified some key factors that can be used to guide interventions to support patients so that they can be more active, aware, and experience an improved well-being. The integration of the Situation-Specific Theory of Heart Failure Self-Care (Riegel & Dickson, 2008; Riegel et al., 2016) and Patient Activation Model (Hibbard et al., 2004) led to the development of a mediation model that considers the behavioral and cognitive aspects underlying disease management and provides a multidimensional picture of patients with chronic conditions. The findings show that treatment alone is not sufficient to improve patients' quality of life. For care practices to have a positive impact on well-being, patients need to be consciously engaged and activated. This study is part of a larger longitudinal project and has provided insight into the psychological and behavioral conditions that predispose patients to the effective use of telemedicine. Subsequent studies will also explore the actual use of telemedicine among these patients to investigate whether and how it affects the variables examined. Given what we know from the scientific literature, it's likely that patients with a high level of activation will use the telemonitoring app more often, but what we would like to understand is whether frequent use of the app can also potentially support patients who are

less activated at baseline to take a more active role in their own care journey, both from a behavioral and cognitive perspective.

5.4 Limitations and future research

The leitmotif of this thesis is *telemedicine*, with the aim of contributing to the psychosocial understanding of the phenomenon. To provide a comprehensive overview of telemedicine, this work was conducted on several levels of analysis: theoretical, social and psychological. Nevertheless, some limitations remain, leaving several questions open that may guide the development of future research in this field. Each level analyzed has offered a specific contribution, but each study stands alone, albeit with various shared aspects, highlighting the difficulty of fully integrating the layers. The interconnections between them remain only partially explored, suggesting the possibility of further theoretical and analytical integration to understand how, for instance, social and scientific representations affect the subjective experience of patients and their behavior in telemedicine settings. Another conceptual limitation concerns the lack of observation and consideration of the caregiver in the analyses conducted. The literature in health psychology and social sciences agrees on recognizing the role of caregiver, both formal and informal, as crucial in supporting the management of chronic disease (Schulman-Green et al., 2020; Watt et al., 2022; Antonacci et al., 2023). Future research should further explore their role in facilitating the use of telemedicine. A systematic exploration could contribute to understanding whether and how caregiver involvement can affect patient activation and

acceptance of healthcare technology. A promising approach could be to develop a conceptual model involving the patient-caregiver dyad in telemedicine, which has been little explored to date (e.g., Jin et al., 2024). This relationship has been extensively explored through the lens of social psychology in a standard care context (Bidwell et al., 2023; Graven et al., 2020; Strömberg, 2013). An innovative contribution would be to apply established knowledge to a new perspective: digital healthcare. From a methodological point of view, the main limitations of the third study concern the cross-sectional nature of the analyses, and the sample size. This study represents the initial phase of a longitudinal project. The data presented in this thesis were collected at baseline, when patients were introduced to the telemedicine service. As a result, the analyses cannot yet allow for the examination of longitudinal evolution or establish causal relationships between telemedicine use, patient activation and well-being processes. The longitudinal design of the AZIMUSA project will enable a dynamic observation of how activation and well-being processes evolve through sustained use of telemonitoring. This is not a limitation of the research study itself, but rather reflects the fact that data collection at later stages (time-one and time-two) is still ongoing and the longitudinal data will be available from January 2026. As for the size and characteristics of the sample involved, patients with HF from two hospitals in Milan, limit the generalizability of the results to other populations and healthcare context. In future research, it would be advisable to expand the sample to different healthcare and cultural settings to investigate the influence of sociocultural factors on the acceptance and impact of digital technologies in medical care. A further limitation relates

to the current lack of methodological triangulation between quantitative and qualitative approaches. The various studies use heterogeneous methodologies (bibliometric analyses, content analyses, and psychometric models), but there is no integration of the findings into a mixed-methods design. Further studies could then develop multi-method approaches to integrate empirical data with subjective and contextual meanings (e.g., through semi-structured interviews), allowing individuals to describe their experiences and personal standpoints.

5.5 Insights for the design and implementation of telemedicine services

The findings of this thesis provide significant insights to support the design, implementation and evaluation of telemedicine services, as well as for the promotion of active patient participation. Evidence shows that the effectiveness of telemedicine does not depend solely on the quality and complexity of the technology adopted, even though this promotes a good user experience and facilitates the usability of the technological tool, but also on the degree of activation and awareness of the patients who use it. The healthcare context should promote understanding, commitment, and shared responsibility in health management among patients, so that when the use of a telemedicine service is proposed, it is provided adequately to improve the patients' well-being (e.g., reduced travel, greater autonomy, better control and communication between clinician and doctor). In this direction, to translate these insights into practice, it is essential to design interventions that actively strengthen patients' self-management and self-efficacy skills in standard care

and digital settings. This will help them develop the digital literacy and confidence needed to manage health data and use digital devices effectively. Alongside this, telemedicine could become a tool for promoting a sense of agency and participation in the care pathway, encouraging patients to see themselves as active partners rather than passive recipients of care. However, this vision still needs to be explored through field research, engaging patients and identifying the factors that can act as drivers of change. In this perspective, a person-centered and participatory approach should be adopted in the design of digital healthcare services and tools, involving various stakeholders from the early stages of technological development, while also ensuring that digital tools are inclusive, accessible and responsive to user needs. In conclusion, the findings of this work emphasize the need for an integrated vision of telemedicine, which complements technological innovation with psychological and social dimensions of care. Building an effective and equitable digital healthcare ecosystem requires coordinated, interdisciplinary effort that brings together clinical, technological and psychological expertise. This collaborative approach has the potential to transform telemedicine from a purely technical service into a human-centered model of care that aligns digital progress with empowerment, inclusion and patient well-being. Only through concerted and multi-level interventions will it be possible to build a telemedicine system that enhances both patient agency and quality of life.

5.6 References

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