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Transformation of the physician–patient communication in the era of digital technologies

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Abstract

This qualitative study aimed to analyze the transformations in the physician–patient relationship associated with the use of digital technologies in clinical practice from physicians' perspectives. Fifteen physicians from a hospital in the Zona da Mata region of Minas Gerais were interviewed. Data analysis followed Bardin's content analysis technique. Three thematic categories emerged: barriers to interpersonal communication; impacts of technological innovations; and effects of patients' informational autonomy. The results reveal tensions between the operational gains provided by technologies and the preservation of the human bond in care. Professionals report difficulties in adaptation, point to the dehumanization of care, and highlight the ethical challenge of dealing with increasingly informed patients, though not always critically informed. It is concluded that contemporary medical practice requires integration between technological innovation and ethical commitment, with an emphasis on listening, empathy, and accessible communication.

Keywords: Medical informatics. Physician-patient relations. Clinical evolution. Interpersonal relations.

Resumo

Transformação da comunicação médico-paciente na era das tecnologias digitais

Estudo qualitativo que teve como objetivo analisar as transformações na relação médico-paciente associadas ao uso de tecnologias digitais na prática clínica pela perspectiva dos médicos. Foram entrevistados 15 médicos em hospital da Zona da Mata mineira. A análise dos dados seguiu a técnica de análise de conteúdo de Bardin. Emergiram três categorias temáticas: obstáculos na comunicação interpessoal; impactos das inovações tecnológicas; e efeitos da autonomia informacional dos pacientes. Os resultados evidenciam tensões entre os ganhos operacionais proporcionados pelas tecnologias e a preservação do vínculo humano no cuidado. Profissionais relatam dificuldades de adaptação, apontam a desumanização do atendimento e destacam o desafio ético de lidar com pacientes cada vez mais informados, porém nem sempre de forma crítica. Conclui-se que a prática médica contemporânea exige integração entre inovação tecnológica e compromisso ético, com valorização da escuta, empatia e comunicação acessível.

Palavras-chave: Informática médica. Relações médico-paciente. Evolução clínica. Relações interpessoais.

Resumen

Transformación de la comunicación médico-paciente en la era de las tecnologías digitales

Estudio cualitativo que tuvo como objetivo analizar las transformaciones en la relación médico-paciente asociadas al uso de tecnologías digitales en la práctica clínica desde la perspectiva de los médicos. Fueron entrevistados 15 médicos en un hospital de la Zona da Mata de Minas Gerais. El análisis de los datos siguió la técnica de análisis de contenido de Bardin. Surgieron tres categorías temáticas: obstáculos en la comunicación interpersonal; impactos de las innovaciones tecnológicas; y efectos de la autonomía informativa de los pacientes. Los resultados evidencian tensiones entre los beneficios operativos proporcionados por las tecnologías y la preservación del vínculo humano en la atención. Los profesionales reportan dificultades de adaptación, señalan la deshumanización de la atención y destacan el desafío ético de tratar con pacientes cada vez más informados, aunque no siempre de manera crítica. Se concluye que la práctica médica contemporánea exige la integración entre la innovación tecnológica y el compromiso ético, con valorización de la escucha, la empatía y una comunicación accesible.

Palabras clave: Informática médica. Relaciones médico-paciente. Evolución clínica. Relaciones interpersonales.

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Research

Historically, medical practice has been anchored in a paternalistic model, characterized by the centralization of technical-scientific knowledge in the figure of the physician and the consequent passivity of the patient in the therapeutic process [1]. With the advent of contemporary bioethics and the affirmation of patients' rights, a paradigm shift is evident, prioritizing individual autonomy, informed consent, and the patient's active participation in clinical decision-making. This movement has intensified in the current context, notably driven by the development of digital technologies, which have been re-signifying the traditional roles of the subjects involved in the physician–patient relationship [1,2].

This transformation process has a particularly significant effect on the physician–patient relationship, considered one of the pillars of clinical practice, directly impacting the quality of care, therapeutic adherence, and health outcomes [3]. In the context of the digitalization of medicine, there have been relevant structural changes in this relationship. Technologies such as electronic health records, artificial intelligence applied to clinical practice, telemedicine, wearable devices, and decision support systems have been altering the dynamics of clinical interactions, while expanding patients' access to information and posing new challenges to maintaining an empathetic and person-centered approach [3-5].

Initially, technological innovations in healthcare focused predominantly on information management, evidenced by the growing adoption of electronic systems for the secure storage of clinical data. An example of this trend is the increased use of electronic health records by physicians in the United States, which rose from 48% in 2009 to 78% in 2013, reaching 74.1% in 2014 with certified systems [5,6].

Subsequently, a transition toward the patient was observed, now conceptualized as a "patient expert" or e-patient, an individual empowered by the internet who actively participates in clinical decisions and transforms the traditional model into a collaborative approach. In this scenario, the role of the healthcare professional is reconfigured to translate and contextualize technical knowledge for the unique reality of each patient [5-7].

This transition is particularly evident in the use of diagnostic and monitoring technologies, which contribute to a more precise therapeutic approach. Even so, technological sophistication does not replace the subjective and relational dimensions of care, which are fundamental to building clinical trust. The physical presence of the physician is irreplaceable, as the humanization of care, which involves actions to improve interpersonal relationships in care, remains essential for clinical effectiveness [8].

Recovery tends to be more efficient when the patient feels welcomed and respected. Therefore, the in-person consultation remains the gold standard, as it allows for more qualified listening, strengthens the therapeutic bond, and ensures care centered on individual needs. Telemedicine, therefore, should be understood as a complementary strategy, the use of which should always be guided by its suitability to the specific needs of each patient [9,10].

The advancement of digital technologies in healthcare, including electronic record systems, artificial intelligence, telemedicine, and monitoring devices, has broadened access to information and significantly reshaped the dynamics of clinical care. These transformations also occur amid increasing social medicalization and information overload, in which patients arrive at consultations increasingly informed or uninformed. However, these innovations also highlight relevant challenges for preserving the therapeutic bond, empathy, and patient-centered communication [11,12].

The increasing incorporation of digital technologies in clinical practice has raised important questions about their impact on communication, decision-making, and the strengthening of the bond between physicians and patients. In this context, it becomes pertinent to investigate how healthcare professionals perceive these transformations and how they reconcile technological advances with the preservation of humanistic principles in medical practice.

Thus, this study aimed to analyze transformations in the physician-patient relationship associated with the use of digital technologies in clinical practice, from physicians' perspectives.

Method

This is a qualitative, descriptive study conducted in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ).

The fieldwork phase was conducted between August and November 2024 at a hospital in the Zona da Mata region of Minas Gerais, whose healthcare coverage is entirely linked to the Unified Health System (SUS). Participants in the study were physicians working at this hospital, selected according to previously established inclusion criteria: professionals with at least 2 years of training. The study excluded those who were on vacation or absent from their activities for any reason.

The number of participants was determined through purposive sampling, with data collection continuing until theoretical saturation was reached, at which point the interviews began to show recurring themes and no new elements relevant to understanding the phenomenon under investigation.

Interviews were scheduled individually with each professional on days and times compatible with their routines, preferably after their working hours, to avoid interfering with their care activities. The interviews took place in private areas of the hospital to ensure privacy and confidentiality. They were conducted by members of the study team who had prior training in qualitative methods. The entire process strictly adhered to the ethical guidelines established by the CEP/CONEP System for research involving human beings.

Before each interview, the study objectives were presented to the participants, who had the opportunity to clarify any questions before signing the informed consent form (ICF). Each session lasted approximately 30 minutes. The interviews were audio-recorded using an iPhone 14 Pro and subsequently transcribed in full by the investigators. To ensure the reliability of the statements, the transcribed content was made available to the participants, allowing them to review their statements, remove information, or add relevant contributions to the study.

The interview script covered four main areas: 1) current obstacles in physician-patient communication; 2) impacts of digital technologies on clinical practice; 3) professional mastery and updating in relation to these tools; and 4) implications of patients' prior search for information on the internet.

The data analysis was conducted according to the content analysis technique proposed by Bardin [13], which is organized into three stages: 1) pre-analysis, characterized by a floating reading and initial organization of the material; 2) content exploration, aimed at coding and identifying core meanings aligned with the research objectives; and 3) treatment, inference, and interpretation of the results.

Initially, a complete, repeated reading of the interview transcripts was conducted for familiarization with the empirical material. Then, relevant units of meaning for the study objectives were identified, highlighted, and coded.

The coding was done manually, based on the identification of significant excerpts from the interviews that expressed central ideas or patterns of meaning. These excerpts were grouped into units of meaning, which served as the basis for constructing thematic categories, following Bardin's approach [13]. Two investigators involved in the data analysis performed the coding and categorization, which were subsequently discussed until analytical consensus was reached.

Subsequently, the codes were compared and organized into broader thematic categories to identify convergences, divergences, and recurring patterns in the participants' narratives. This analytical process was conducted iteratively, with successive revisions to the categories until the final analysis structure was consolidated. Based on the research objective and preliminary readings, three thematic categories emerged, which structured the presentation and discussion of the findings.

Ethical aspects

This study was submitted for review by an ethics committee (IEC/IRB). All participants signed the informed consent form, and the institution

previously authorized the study. To preserve anonymity, the testimonies were identified by pseudonyms composed of the letter "M" followed by a sequential number corresponding to the interview order (M1, M2, and so on).

Results

The sample consisted of 15 medical professionals, with a mean age of 47.3±11.9 and a predominance of male participants (73.3%). Furthermore, among these professionals, three have relatively little time since graduation (<10 years), four have 30 or more years since graduation, and 12 hold postgraduate degrees (master's or doctoral degrees).

Coding and categorization of findings

Based on the qualitative analysis of the interviews conducted, units of meaning were identified that reveal perceptions, challenges, and transformations in contemporary medical practice. These units were grouped into three thematic categories that recurred and were relevant in the participants' discourses.

Chart 1 shows these categories systematically, along with their respective units of meaning, enabling us to visualize the main aspects addressed in relation to physician-patient communication, the incorporation of digital technologies, technical-professional mastery, and the implications of patients' growing informational autonomy.

Chart 1. Thematic categories of the physician-patient relationship

Units of meaning	Thematic categories
Lack of time in consultations, empathy, bonding, digital overload, contact outside of consultations, culture of immediacy, educational barriers	Contemporary obstacles in physician-patient interpersonal communication
Electronic medical records, telemedicine, exposure, absence of physical examination, generational resistance, training, consolidated technologies	Technological transformations in clinical practice and medical training
Informed patients, fake news, misconceptions, critical filtering, deeper dialogue	Implications of patient informational autonomy and its effects on the physician-patient relationship

Contemporary obstacles in physician-patient communication

Interpersonal communication between physicians and patients, an essential pillar of humanized clinical practice, currently faces a series of obstacles imposed by social and technological transformations. The advancement of digitalization, pressure for productivity, limited consultation time, and the use of inaccessible technical language contribute to a sense of distance in the relationship.

The following testimonials illustrate these challenges experienced in daily professional life and reveal the impacts of the mechanization of care and hyperconnectivity on the quality of the bond and medical care.

"I think the consultation time is all too rushed. People have a lot of information and want very quick answers. And this greatly harms the individual care between the physician and the patient." (M1)

The time constraints in consultations, especially in the public system, are identified as a factor that hinders the building of a meaningful bond between physician and patient:

"The consultation time, especially in public healthcare, the recommended 15 minutes, often requires the physician to rush the consultation (...), but I think the physician also has a role in ensuring that the consultation is of high quality, that this communication happens." (M5)

Another aspect highlighted was linguistic and educational barriers, which were seen as significant obstacles to effective communication between healthcare professionals and patients. The use of technical terminology, coupled with low levels of education among the population, can hinder

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the understanding of medical instructions and compromise treatment adherence, as evidenced by the following excerpts:

"I believe it is the language itself, the lack of information among the population. And the culture, in general, because today patients have difficulty understanding the physician's language and the physician has difficulty expressing themselves in a way that the patient understands what they want to say." (M2)

"I think physicians need to have a more humanistic training, (...) speak a language that the patient understands. They don't need to speak incorrectly, but they have to speak a language that is accessible to the patient, and they have to treat them with great respect." (M10)

The increasing mechanization of healthcare, driven by time pressure and the intensive use of technology, has contributed to the dehumanization of clinical relationships. This phenomenon compromises empathy and active listening, essential elements for a patient-centered practice, as evidenced by the following accounts:

"These are modern advancements that have certainly come to add value, but we have to set clear boundaries so as not to become dependent on them. We need time to talk, to write down information, and to examine the patient physically. We are seeing a lot of prescriptions being sent by computer or WhatsApp. I think this is being lost and even putting the professional who does this at risk." (M6)

"I think what is hindering the physician-patient relationship is that medicine has become very mechanized, and many times the physician wants to look at the lab tests and forgets to examine the patient. This has been quite disruptive." (M10)

Technological transformations in medical practice and training

Technological transformations have been impacting clinical practice and medical training. Tools such as electronic health records, telemedicine, artificial intelligence, and digital prescriptions have been progressively incorporated into the daily lives of healthcare professionals, altering care dynamics, the physician-patient relationship, and teaching methods. These changes require constant adaptation, revealing both the benefits of these innovations and the challenges they pose, especially regarding professional training, maintaining the quality of care, and preserving human contact in medical practice.

Some excerpts illustrate this perception:

"When you work with electronic health records, with digital signatures, you reduce fraud (...) you can archive this in a large quantity, in an accessible way and (...) improve patient care." (M1)

"I started in a completely paper-based medicine. (...) Today I live in a completely electronic practice. (...) have my patient's medical record in the palm of my hand through my cell phone. (...) I know the latest lab tests, I know what my last course of action was." (M4)

The use of telemedicine, while offering accessibility benefits, raises concerns about the absence of a physical examination and the limited ability to observe the patient's behavior. These limitations can compromise diagnostic quality and comprehensive care, as evidenced by the following testimonials:

"There are some points that are somewhat risky (...) concluding an entire consultation online. Because the physical examination is an integral part of the consultation." (M3)

"The online consultation (...) misses out too much. (...) the way the patient is dressed, how they are walking, their behavior during the consultation, I think (...) misses out too much." (M11)

"It's an evolution, the new technologies, but nothing surpasses the physician-patient relationship, the eye contact, the day-to-day interaction, the handshake, and the smile." (M13)

The rapid technological evolution in healthcare has posed significant challenges for professionals trained in earlier generations. The difficulty of adaptation and the lack of specific training during undergraduate studies reinforce the need for

institutional support and continuous updating, as revealed by the following testimonials:

"One of my insecurities as a professional is not mastering the technologies in the way I would like (...) this should be a relevant topic in college today, even with a specific course." (M3)

"We are not digital natives. We try to adapt, but it's still difficult. I believe that schools will have to help us with this." (M7)

"I take courses, I worked hard, you know? I master them. So, we had to improve, learn, the college also made all these resources available, and this counted very positively (...) so that we could all learn all these technologies." (M10)

Some professionals recognize telemedicine as a complementary tool to in-person consultations. When properly integrated, it can strengthen clinical follow-up and expand access to care, without replacing direct physical assessment, as the following testimonials demonstrate:

"Telemedicine is favorable in this respect as a complement to the in-person consultation (...) always strengthening (...) the in-person assessment." (M4)

"You have this possibility of electronic prescription (...) an online follow-up routine for that patient you already follow (...) who develops a crisis (...) you can provide that support." (M15)

Informational autonomy and its effects on the physician-patient relationship

The growing informational autonomy of patients, driven by easy access to medical content online, has significantly altered the dynamics of the physician-patient relationship. This phenomenon can enrich clinical dialogue and promote more shared decision-making, but it also poses challenges, such as the spread of fake news, misdiagnoses, and the need for greater professional preparedness to address questions.

Thus, the physician's role expands to that of a critical mediator between technical knowledge and popular knowledge, as observed in some testimonials:

"I think it's fundamental that the person seeks information. And it's also up to the physician to know, because a good physician (...) will be able to confirm or disagree." (M1)

"All the technology can come, but we can't forget to put our hands on the patient. (...) If they came to you, they have doubts. So, it's up to you to answer their doubts." (M10)

Misinformation and the circulation of fake news interfere with the physician-patient relationship and hinder adherence to treatment, generating insecurity and distrust, as evidenced by the following accounts:

"They might confuse fake news with true information (...) it's very common for the patient to arrive and say that they took a medicine (...) that causes cancer, for example, and it doesn't." (M2)

"The patient sometimes comes with completely erroneous beliefs from the internet (...) which ends up creating a relationship of distrust. Does my physician know?" (M4)

Faced with misinformation and new dynamics in care, physicians highlight the importance of critical filtering and patience as essential strategies to maintain dialogue and trust with patients:

"Generally, we can overcome this by talking to the patient (...) understanding why they think they have that diagnosis." (M5)

"You have to have a lot of patience (...) you can't think that you have the right to define the whole conduct type at that moment." (M6)

Building shared care requires more in-depth and well-founded dialogue, especially with patients who arrive with questionable prior information, as the following accounts point out:

"The patient is aware of the treatment they are undergoing (...) but (...) we have to explain the details of these issues much more thoroughly." (M9)

"I know there are many cases where patients have made a diagnosis using Google or generative AI, and they get here already biased, expecting

something. And dismantling that reasoning is sometimes very difficult, you know?" (M11)

"When this patient comes with a lot of information (...) what I see is that most of the sources are very poor (...) so you really have to talk more and in a more grounded way." (M15)

Discussion

The results presented demonstrate important aspects that guide discussions about contemporary obstacles in interpersonal physician-patient communication, technological transformations in clinical practice and medical training, and the implications of patient informational autonomy for the physician-patient relationship.

Interpersonal communication between physician and patient is recognized as a pillar of person-centered clinical practice. However, the testimonies analyzed reveal an increasingly challenging scenario, in which the logic of productivity, technological advancement, and sociocultural inequalities has significantly compromised the quality of this relationship [14].

The reduced time for consultations, especially in the public health system, is a critical factor, as noted in the analyzed testimonials. This time limit imposes on the professional the need to prioritize biomedical and technical issues, often to the detriment of active listening and empathetic reception. Listening is not just a work tool, but an ethical gesture that recognizes the other as a subject. The absence of this listening can contribute to a more vertical, bureaucratic, and dehumanized relationship. Recent studies show that these patterns persist in Brazil, particularly in primary health care, where users report dissatisfaction not only with access or infrastructure but also with the perception that emotional or personal demands are relegated to the background [15].

Technical and inaccessible language is a significant obstacle, especially in contexts in which a portion of the population has a low level of education. The use of medical jargon without proper adaptation to understandable language compromises both comprehension and adherence to treatment, as reported in the analyzed testimonies. Recent studies have shown that patients with reduced health literacy have particular difficulty understanding complex medical terms, which can lead to confusion, insecurity, and reduced involvement in health care. Authentic communication presupposes dialogue between equals, with appreciation for mutual listening and the shared construction of knowledge. When the professional presents themselves as the sole holder of knowledge, the power asymmetry is aggravated, and a more vertical and dehumanized relationship is favored [16,17].

Furthermore, the increasing mechanization of care, driven by the intensive use of technologies such as electronic medical records, digital prescriptions, and virtual care platforms, has fostered a more distant and impersonal medical practice. While such tools bring operational gains, as the testimonies note, they also favor a disease-centered approach rather than a person-centered one. The criticism expressed by one of the interviewees, who stated that "they look at the lab tests and forget about the patient," clearly illustrates the risk of overvaluing technology at the expense of physical examination and direct clinical observation, essential elements of traditional medicine.

This dehumanization of care is not merely a technical issue, but also an ethical and formative one. Recent studies in medium- and high-complexity clinical settings in Brazil demonstrate that healthcare professionals' empathy is significantly compromised by work overload, time constraints, and institutional demands, thereby harming the therapeutic bond and contributing to the dehumanization of care [18]. This context should not justify empathic detachment; as Pellegrino argues [19], medicine, as a moral practice, demands a posture of responsibility that goes beyond technical competence—it demands presence, listening, and commitment to the other.

Therefore, contemporary obstacles to interpersonal communication between physician and patient reflect structural tensions in the health system, deficiencies in medical training, and a

care model still marked by productivist logics. It is urgent to rethink clinical practice to promote more humanistic training and institutional policies that value the time spent in care and strengthen communication skills, so that physicians can once again see and listen to patients as whole people.

Technological innovations have profoundly reshaped clinical practice and medical training. Tools such as electronic health records, digital prescriptions, artificial intelligence, and telemedicine offer operational gains, including improved data access, efficiency, and broader care reach, but also pose challenges to preserving the human bond and the comprehensiveness of care. For example, recent telemedicine studies show that the absence of physical examination and nonverbal cues is perceived as a significant limitation by family physicians and specialists [20,21].

Professionals recognize the benefits of these technologies but criticize the possibility that the consultation may become merely technical, to the detriment of direct observation of the patient, a risk to the trust and humanization of care that has been pointed out in recent reviews [22,23].

Telemedicine is valued as a complementary resource, but not a substitute for in-person consultation, especially in cases that require physical diagnosis or in-person assessment. In addition, physicians trained in previous generations report difficulties adapting and point out that medical training still lacks specific preparation to address these digital transformations, whether in technological skills or virtual communication [21,24].

On the other hand, the expansion of patients' informational autonomy, driven by easy access to the internet, has significantly transformed the physician-patient relationship. Although this autonomy can enrich therapeutic dialogue and favor more shared decision-making, it imposes on the physician the role of a mediator between technical and lay knowledge. Recent reports indicate that misinformation, fake news, and self-diagnosis generate insecurity and distrust, affecting treatment adherence. Patients often arrive with mistaken beliefs, requiring the physician not only to have clinical competence but also to be patient, attentive, and willing to explain procedures and evidence in detail [25].

In this scenario, physicians highlight the importance of building more dialogical and well-founded care models—which recognize the patient's protagonism without abandoning technical rigor or ethical responsibility.

Final considerations

Technological transformations in healthcare have reshaped the physician-patient relationship, bringing significant advances, but also ethical and communicational challenges. The professionals interviewed recognize the benefits of these innovations, such as greater accessibility and agility, but warn of the risk of a more technical, distant practice that undermines empathy, listening, and the humanization of care.

Furthermore, the growing informational autonomy of patients requires physicians to act as mediators between technical and popular knowledge while addressing phenomena such as misinformation and fake news. In this scenario, the need to train professionals capable of integrating technological competence with ethical and relational sensitivity stands out, ensuring that innovation goes hand in hand with the preservation of the human bond and clinical responsibility.

Among the study's strengths, the qualitative approach stands out, enabling an in-depth understanding of physicians' perceptions and experiences amid the technological transformations permeating contemporary clinical practice. The use of semi-structured interviews enabled the capture of nuances in physician-patient communication and the identification of tensions between adopting digital technologies and preserving the human bond in care. In addition, content analysis enabled the systematization of various dimensions of this relationship, contributing to a broader understanding of technology's impact on medical practice.

However, some limitations should be considered. The study was conducted at a single hospital, which may limit the generalizability of the results to other institutional contexts or regions of the country. Furthermore, the investigation considered only physicians' perspectives,

excluding those of patients and other healthcare professionals involved in care, which could have broadened the understanding of the phenomenon under study.

As a future perspective, a suggestion is to conduct studies that include diverse actors in the care process, such as patients, nurses, and other professionals from the multidisciplinary team, as well as investigations across different levels of health care. Comparative studies between different institutional contexts or regions can also contribute to a deeper understanding of the transformations in physician-patient communication in the era of digital technologies.

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Isaac Guedes de Oliveira: conceptualization; data curation; research. Agnes Pegorim Martins de Oliveira Freitas: conceptualization; data curation; research. Pedro Augusto de Almeida Albuquerque Damasceno: conceptualization; data curation; research. Thiago Casali Rocha: formal analysis; data interpretation; writing – original draft; writing – revision and editing; Angela Aparecida Peters: formal analysis; data interpretation; supervision; writing – revision and editing.

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