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Review Article

From Hippocrates to the Ages of Technology: A Narrative Review of the Evolution of the doctor-patient Relationship

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From Hippocrates to the ages of technology: a narrative review of the evolution of the doctor-patient relationship

Running Title: Doctor-patient through the ages of technology

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Abstract
Objectives: Thus, through a narrative review, this article analyzes how the advancement of technology, the use of digital resources, and social media have impacted the doctor-patient relationship.
Methods: We conducted a scoping review on the relationship between Digital Health Equity and Telemedicine and e-health *via* Scopus and Pubmed electronic databases. The following inclusion criteria were established: papers on the relationship between digital health equity and telemedicine and e-health, written in English and with no time limits. All study designs were eligible, including those that have utilized qualitative and quantitative methods, methodology, or guidelines reports, except for meta-reviews.

Results: With the advancement of technology and social media, a change in behavior in the population and the doctor-patient relationship was observed. Through the help of digital devices, the increased prevalence of social networks, and asynchronous consultations new opportunities were created to bring doctors and patients closer. The relationship has shifted from face-to-face and paternalistic to virtual communication with shared decisions in recent decades. It was observed that the advancement of technology and the use of digital resources have reshaped the roles of doctors and patients and their relationships.

Conclusion: Technology is the leading cause for an informed, more involved, and responsible patient. However, physicians have conflicting opinions about the use of these technologies. While recognizing its benefits for patients, they are also concerned about digital health and its impact.

Keywords: Doctor-patient relationship; telemedicine, digital technologies, social media, online interaction.

Introduction

　a) From Hippocratic Medicine to eHealth:

Historically, the doctor-patient relationship (DPR) arose with Hippocratic medicine, in which the goal was the human benefit.[1] The DPR was viewed as an interaction between a healer and a sick individual. The healer provided health-related knowledge and encouraged the sick person to agree with the doctor's decisions. With the advancement of technology, such as the development of the Internet and the increase in broadband access, patient-centered shared decision models have been discussed and observed. [2] This model considers the patient's preferences, objectives, and values. [3]

The access to technical-scientific information gave rise to a new patient, not just an empowered one, but an emancipated one. This patient is not restricted to a medical opinion but seeks information about diseases and the best treatment approach, has new expectations, and is interested in increasing the quality of life.[4,5]

When computers became widely available, the word eHealth was first used. E-health represents "internet medicine", which is any health service that provides

or enhances information via the Internet and improves the quality of life.[6] When computers could connect to networks, telemedical services began.[3]

With the advent of the Internet, Social Media (SM) emerged, which is defined as "a group of Internet-based applications that allow the creation and exchange of user-generated content".[7] SM is a group of Web 2.0-based applications, where the most popular platforms include WhatsApp, Facebook, Instagram, YouTube, and social networking sites such as LinkedIn. In recent years, SM has become popular globally, with an estimated 66% of the world's population accessing the Internet daily, up to 90% in developed countries and 57% in developing countries.[8] Through these media, society has undergone significant changes in recent years in practically all sectors, becoming indispensable in the lives of billions.[9]

A considerable impact of SM on daily life is observed, influencing behaviors and decisions and even crossing the boundaries of privacy. On average, people spend about 150 minutes daily on SM, with the European region averaging 75 minutes and the South American region averaging 205 minutes.[8]

The popularization of SM platforms has made it one of the most effective means of communication available this century. In the health area, it is no different. In recent years, SM has become an increasingly important tool for users to access and share information and communicate with health professionals both as patients and as coworkers on health-related issues. SM also enables patient empowerment as it expands their knowledge and thus puts them in a position where they can manage their own healthcare needs and care.[7] However, SM is associated with several problems, such as greater vulnerability of patient data privacy, greater spread of incorrect or outdated information, and breakdown in the relationship between the patient and healthcare professional.[10-12]

SM enabled the creation and exchange of information about health, diseases, therapies, treatment, and the search for professional services and support.[13] SM improved and changed the communication between doctors and patients and increased the satisfaction of being a patient in care.[14] With the ease of obtaining information via the internet, there is an undeniable tendency towards a more excellent search for information on health issues such as diet and nutrition, physical activity, signs and symptoms, therapy, and public health interventions, with an estimated 80% of Internet users searching for this information.[9]

The use of SM by healthcare professionals can be for a variety of purposes, including education, professional development, job search, health promotion, self-promotion, communication with patients, colleagues, and students, dissemination of health information, discussion of public health policies, and analysis of various issues related to general health topics.[15] Where most of these professionals use SM to enhance their professional development, networking skills, and knowledge exchange, encourage learning, increase theoretical and practical knowledge of the profession, conduct research, and publish scientific information.[16] In this way, SM has also become a marketing tool to attract potential patients.[17] Just as patients also seek different types of clinical and professional treatments through SM, they often browse the internet to learn about the treatment process, becoming more aware and informed. Information available on SM may vary in content quality and may need more integrity in content.[8]

However, since the use of technology (SM and digital devices), it has been difficult for doctors to differentiate between professional and personal life.[18] The DPR can be negatively affected if patients know about their professionals' private lives. People who wait for health professionals should be an excellent role model. When knowing that a professional may not meet expectations, trust and respect for the professional may be lost. Healthcare professionals must be aware of the risks of interacting with patients through SM because of ethical issues. Inappropriate behavior can result in prosecution, professional censure, and, in severe cases, loss of ability to practice medicine.[13] Besides, inappropriate comments, photos, and videos shared damage not only the reputation of the professional but also their institution.[19]

b) Telemedicine: Advantages or disadvantages

Telemedicine is another type of technology where the consultation occurs via electronic communication, such as email or videoconference, and the diagnosis and the treatment are given remotely.[4,20] This way, Telemedicine overcomes distances and offers health care in less time, reducing cost and workload and improving patient satisfaction.[3,21]

Online doctor appointments have raised more questions concerning DPR. Firstly, patients present more autonomy but have more responsibility to share

information with the physician.[4] Another concerning question is that some patients need more quality pages to meet their information needs. Also, difficulties due to language barriers or cultural beliefs is a problematic point. It is also required that patients present a certain level of digital literacy, older people and those with minor degrees of education are mainly those who have less benefits.[22] Since the COVID-19 pandemic, use of telehealth and mobile mental health technologies has increased.

c) Digital Technologies in the context of DPR

In the '50s, the patient had to call or go through pagers to contact their doctor. Communication was one-way, needing more information, such as who was trying to contact or for what purpose and with what level of urgency.[23] Nowadays, this system is obsolete. Each day, the use of instant messaging among healthcare professionals and patients is more common. Digital technologies such as smartphones, virtual reality, chatbots, and SM are becoming popular because they offer accessible and fast-accessible interventions.[24]

The most used SM for intervention is WhatsApp Messenger. This app is so popular because it has free access, is available in different operating systems, and only needs an Internet connection.[20] WhatsApp is used for patients who need immediate contact, to submit results, or to have an urgent examination by the doctor in charge of their treatment.[20] Its benefits in healthcare have been demonstrated; however, there are concerns about the ethical breaches in confidentiality through shared electronic patient information.[25]

The use of the WhatsApp tool in telemedicine still divides opinions; some doctors reinforce that the use of the application has disadvantages, such as the excess of some patients sending messages or audio that results in the loss of privacy of the doctor and work overload.[3] A recent study also demonstrated that physicians who spend more time with this app with patients are prone to stress and burnout.[26]

Another factor predisposing to stress is the inappropriate use of videoconferences. More extended periods of screen viewing can increase fatigue and the propensity for visual problems.[27] The conversation causes physiological arousal, in which listening to a patient during a videoconference requires more mental effort. It is also necessary to be attentive to the spoken words, trying to

capture the eliminated bodily signals. An online consultation day is more tiring than a face-to-face one.[28]

Although more exhaustive, health professionals feel more secure in teleconsultations. A more authentic relationship is possible in online consultation because this allows patients to talk more openly, even about embarrassing topics. Answering truthfully in a 'virtual space' is more accessible than a face-to-face appointment.[18]

A primary concern with online consultations is privacy, a fundamental condition for the patient to develop trust in the doctor. Patient behaviors in sharing information are influenced by confidentiality and concerns about who accesses health data and how it might be used.[29] For healthcare professionals, protecting the well-being and privacy of patients has never been more complicated than in the Internet age once patient records can be stored and retried.

Regarding privacy, online consultations demand the same level of confidentiality as face-to-face meetings. Professional or institutional accounts must be used with privacy encryption for emails and other online patient communications.[30] It is important to note that the data shared through digital communication will not be in the medical records. This lack of consultation documentation may be problematic for the doctor or the patient if they need legal support.[20]

d) What do physicians think today?

Studies have indicated that healthcare professionals believe that positive professional behaviors and attitudes regarding patient education and health promotion can be facilitated by SM, as well as increased communication with patients and public health awareness.[11,16,31-35] The technologies can improve communication in care, positively or negatively influencing DPR and treatment adherence.[3] Physicians are ambiguous: They noted the benefits to patients but are also concerned about digital health and its implications.

SM can be a beneficial tool for improving patient-centered care as it is a practical, cost-effective, and popular means of communication that tends to meet patient needs.[9] Furthermore, some studies claim that through the media, there is a patient-centered approach that provides emotional support, advice, inspiration, and empowerment to patients, as well as allowing patients to communicate with each other.[36,37]

If, on the one hand, patients are more empowered and emancipated, on the other, they can self-diagnose and not discuss internet information with physicians, which can worsen their diseases[4]. It also can create difficulties for doctors when they must manage with wrong information or deal with unknown diseases and treatments.[3]

Another prejudice observed is cyberchondria or digital hypochondria, which means an obsessive search for diseases on the Internet and the tendency to believe that the patient might have a disease that was read. A cyberchondriac patient may associate medical factors to reach the worst conclusions. Online self-diagnoses can lead distressed seekers to conclude the worst.[27]

It is essential to highlight that it is possible that social networks, if used intelligently, can be an essential instrument to promote health care and expand the competence of health professionals, in addition to offering significant benefits in the treatment, education, and health programs provided to patients[16,37,38].

Still, on the beneficial aspects of SM regarding patients, access to health information and other educational resources can be improved with SM, allowing the patient to have better decision-making, improved experiences, greater disease control through more information, which promotes the improvement of self-care with health as well as the correction of dangerous health behaviors.[12]

Many sources must be more comprehensive in content, present quality information, or have unreliable information. "Fake news" and sensationalism make it hard to distinguish between false information and evidence-based science and medicine[7]. This way, online information could worsen anxiety and lead to more healthcare costs and more prolonged treatment.[39] In this context, some physicians feel responsible for producing reliable information and teaching as an educator in their SM.[40]

Doctors like to use SM and see it as a valuable tool to enhance their network. Also, they aim to achieve educational reach by publishing articles, sharing ideas, offering support, getting more patients, getting colleagues recognition, making money, and diversifying revenue streams.[39] Sometimes, SM has the potential to boost careers due to increased exposure, resulting in the feeling of success and personal satisfaction through the influence of the outside world, which may be dangerous and unethical.[39]

Disadvantages of the dissemination of health information through SM by health professionals include increased vulnerability to the security and confidentiality of patient records, patient agreements, employment practices, medical certification, and the potential for breaches of ethical boundaries between health professionals and patients.[41] Therefore, several studies argue that healthcare organizations need to develop ethical, legal, and technical guidelines and formalize a code of conduct for the use of SM for healthcare professionals and academic researchers.[42-46] It is worth noting that in the absence of such guidelines, it is up to the healthcare professional to make sound judgments about what should or should not be disclosed through SM, as well as the ethical relationship with patients.[9]

Another factor that emphasizes the need to regulate information disseminated on SM and the internet is the fact that the general public often bases their decisions on information without considering its reliability, authenticity, or source. It is often a challenge for healthcare professionals to convince patients to change their minds about a treatment. There is no doubt that the main benefit of SM is patient empowerment when scientifically reliable sources inform patients. Adequate information results in a more equal and successful doctor-patient relationship. This results in a greater chance of treatment success, as well as improved subjective and psychological well-being and self-management.[8,47]

Health misinformation is defined as "any health-related claim of fact that is false based on current scientific consensus"[10]. Studies point to SM as the primary source of health misinformation across a variety of health topics and issues.[48-50] Since misinformation about health is already considered a threat to public health.[51]

Through CFM resolution nº 2,336/23, the Federal Council of Medicine (CFM) updated its rules for medical advertising. This resolution ensures that doctors can show the population the full range of their services, respecting market rules, but preserving medicine as a secondary activity.[52]

The resolution came into force in March 2024 and allows doctors to publicize their work on SM, advertise the equipment available in their workplace, and, for educational purposes including the use of patient's images. Regarding images, these cannot be manipulated or improved, and the patient still cannot be identified. Before and after demonstrations are permitted if they are presented

together with images containing indications, satisfactory and unsatisfactory developments and possible complications from the intervention.[52]

Another advertisement that is permitted for doctors is to disclose their qualifications, such as: attendance at conferences, courses and specializations, and master's and doctorate degrees.[52]

Selfies, either individually or with team members, are also now valid. And to patients who post thanks to the professional who helped them on their social networks, the doctor now may repost these compliments and testimonials.[52]

Considerations

Technology has been transforming all kinds of relationships through access to health information or establishing contact with colleagues and between doctors and patients. Although there are many concerns about the adoption of technology in health, the global scenario demonstrates investments and growing representation in research on its use to improve care, as well as the analysis of its limitations and benefits.

As an advantage, technology diminishes distances, responds to patient expectations in a short space of time, improves efficiency, and manages unmet demand. As said in this paper, WhatsApp is the most common SM used by patients to contact their doctors. Petrizzi & Benedittis[53] found that the primary purpose of this app is immediate contact and to have answers to urgent doubts. As a disadvantage, this app presents a loss of privacy in doctors' lives and work overload. Leão et al.[20] also appointed the trivialization of health caused by patients through WhatsApp.

Although teleconsultation can save resources and be beneficial, its implementation must aim to improve the quality of care in a non-harmful way, favor patients' autonomy, and ensure security in sending and storing data. Without due protection, personal data can be sold without prior authorization from their holders. According to Ozzair et al.,[54] the disclosure of health data can influence the perception of that person's life expectancy or the possibility of developing certain diseases or disabilities. As said, the patient's behavior in sharing information is influenced by the confidentiality of the doctor and the technological devices used by them.

Leão et al.[20] highlighted the danger that data shared solely through the application will not be included in medical records. So, it will be difficult for professionals and patients to have legal protection in the event of legal developments. The same concern is shared by Sidhoum et al.[55]

In relation to teleconsultations, sometimes, it was also said that the meeting is slightly shorter and has a greater chance of patients speaking more. Both doctor and patient sometimes needed to make explicit things that were usually implicit in a face-to-face meeting. Another problem is that many patients wish to avoid going to face-to-face medical consultations after receiving care via teleconsultation. Fridgant et al.[4] and Leão et al.[20] pointed out that in some cases, the lack of physical environment can make adequate diagnosis difficult and increase the possibility of error.

Conclusion

The use of SM as a means of expanding medical practice through online interaction with patients or making money from these online platforms is very recent. The new SM model helps recruit patients and create more revenue streams.

Although there are some concerns about the quality and equal access of technology to data security, in the future, new forms of technology are expected to emerge and become increasingly popular and efficient as a tool for promoting public health. Governments should also create more laws on data security and better devices to protect shared data. Finally, technologies are expected to spread reliable knowledge about health and prevention, as well as gather information in databases that aid research on health and social development.

Limitations: Most articles focus on the advantages of technology in relation to doctor-patient and mainly deal with how patients gained autonomy empowerment and improved their knowledge about health. More work needs to be done on how doctors view this new form of relationship and the discomfort resulting from using technology. Another limitation is that few studies address the ethical problems resulting from these changes. These facts demonstrate the need to discuss and develop new studies.

Conflict of interests: The authors declare no conflicts of interest.

This survey was developed using ethical principles and was approved by the Research Ethics Committee of the Institute of Psychiatry of the Federal University of Rio de Janeiro (CAAE: 29048920.1.0000.5263).

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