

# Perception of Medical Students Regarding Implementing Telemedicine Practice Activities at a University Center in Brazil

## Percepção de Estudantes de Medicina sobre a Implementação de Vivências em Telemedicina em um Centro Universitário do Brasil

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### Abstract

**Objective:** evaluate medical students' perceptions regarding implementing Telemedicine teaching during their undergraduate studies. **Methods:** this is a cross-sectional qualitative study with 30 medical students. Three focus group sessions were conducted, and the data were analyzed using a content analysis approach. **Results/Discussion:** the students recognized the importance of digital health strategies and digital information and communication technologies (ICTs) for the healthcare ecosystem. However, some students pointed out that this area is still challenging for some doctors who oppose Telemedicine. They reported a need for training professionals and students, emphasizing the need to improve skills and competencies for teleconsultation and other Telemedicine modalities. They stated that these experiences helped them enhance their empathy skills for establishing a good doctor-patient relationship. When referring to the negative aspects of the experiences, they mentioned the dependence on reliable internet connection and digital tools. Another limitation mentioned was the difficulty in conducting specific physical examination components. **Conclusions:** the students experienced Telemedicine activities in a safe healthcare environment, learning about the bioethical principles for responsible teleconsultations, understanding the limiting factors of the method, and having the opportunity to improve skills and competencies for their future professional practice.

**Keywords:** telehealth; telemedicine; experiences; focus group.

### Resumo

**Objetivo:** avaliar a percepção dos estudantes de Medicina quanto à implementação do ensino da Telemedicina durante a graduação. **Métodos:** trata-se de um estudo qualitativo transversal com 30 alunos do curso de Medicina. Foram realizadas três sessões de grupos focais e os dados foram analisados através de uma abordagem de análise de conteúdo. **Resultados/Discussão:** os estudantes reconheceram a importância das estratégias de Saúde Digital e das Tecnologias Digitais de Informação e Comunicação (TIC) para o ecossistema de saúde. Contudo, alguns estudantes apontaram que esta área ainda é um desafio para alguns médicos que se opõem à prática da Telemedicina. Relataram a necessidade de capacitação de profissionais e estudantes, enfatizando a necessidade de aprimoramento de habilidades e competências para teleconsultas e outras modalidades de Telemedicina. Afirmaram que as vivências os ajudaram a melhorar as suas capacidades de empatia para estabelecer uma boa relação médico-paciente. Ao se referirem aos aspectos negativos das atividades, mencionaram a dependência de conexão confiável à internet e de ferramentas digitais. Outra limitação citada foi a dificuldade na realização de etapas específicas do exame físico. **Conclusões:** os estudantes vivenciaram as atividades de Telemedicina em um ambiente de saúde seguro, conhecendo os princípios bioéticos para a prática de teleconsultas responsáveis, compreendendo os fatores limitantes do método e tendo a oportunidade de aprimorar habilidades e competências para a sua futura prática profissional.

**Palavras-Chave:** telessaúde; telemedicina; vivências; grupo focal.

### INTRODUCTION

Despite not being a current modality, there is a growing trend in using Telehealth, specifically Telemedicine, in various healthcare contexts, with positive outcomes in several areas<sup>1,2</sup>. The World Health Organization has recommended that healthcare professionals be widely trained in digital health technologies, including Telemedicine<sup>3</sup>. In this regard, the integration of Telehealth into undergraduate medical education, especially outside Brazil, occurred before the COVID-19 pandemic, although it was amplified and accelerated in 2020.

Before that, half of the medical schools in the United States and Canada already included Telehealth education in various contexts, including theoretical and clinical practice activities<sup>4,5</sup>. The experience of implementing Telehealth in undergraduate education in other countries has shown that students who received training in Telemedicine during their courses believed it contributed to developing necessary patient care skills. They also expressed increased confidence in understanding the ethical, legal, and regulatory aspects related to Telemedicine<sup>4</sup>.

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In Brazil, after the temporary and emergency regulation of teleconsultations in 2020 due to the COVID-19 pandemic<sup>6</sup>, a new Telemedicine resolution was published by the Federal Council of Medicine in May 2022<sup>7</sup>. However, despite this growing implementation of Telemedicine in various healthcare contexts, only some medical schools have included practical modules on Telemedicine<sup>8</sup>. Therefore, educating undergraduate medical students on the basic concepts of Digital Health and Telemedicine has become essential. Thus, the objective of this study was to assess the perception of medical students regarding the teaching of Telemedicine.

### METHODS

This is a cross-sectional, descriptive study with a qualitative approach. Data collection took place in the first semester of the academic year 2022. The study was conducted in the Medicine course of a university center that implemented a Telemedicine practical module for undergraduate students in the sixth (S6) and eighth (S8) semesters in 2020. The Research Ethics Committee approved the project under opinion number 4,836,417. All participants agreed to participate in the research and signed an informed consent form.

#### Participant Selection

A focus group technique was applied to analyze students' perceptions. The total sample consisted of 30 volunteer students. Invitation to participate in the research was sent via virtual learning environment to the 240 students enrolled in the Telemedicine practical module. The inclusion criteria were students of both sexes enrolled in the S6 and S8 semesters of the Medicine course who had participated in the mandatory Telehealth experiences previously offered. The exclusion criteria were non-attendance of the practical classes and non-participation in the focus group.

Practical Telemedicine activities took place in groups of 5 to 10 students, with three to four sessions per semester, supervised by a professor. Teleconsultations were conducted with patients in the specialties of endocrinology, psychiatry, and cardiology, with the active participation of the students in the consultations. An appropriate platform was used for teleconsultation practice. Additionally, students were exposed to three theoretical activities each semester on the most important topics related to Telemedicine.

#### Focus Groups

The focus groups were pre-planned with the construction of a guide containing blocks, guiding questions, and thematic areas in line with the study objectives. Three focus group sessions were conducted by five researchers and nine to eleven students each. The dynamics of the focus groups followed an approach that aimed to capture the perceptions of the different individuals involved in the study phenomenon, collecting information generated through interactions among the participants<sup>9,10</sup>.

Each session was divided into three discussion blocks, each involving the discussion of guiding questions about Telehealth and Telemedicine, and the time from the start to the end of the discussions averaged 60 minutes.

#### Data Interpretation

The focus group data were analyzed using Bardin's content analysis technique, which began with transcribing the recordings from the three focus group sessions. Subsequently, the steps of reading, rereading, and interpretation of the transcribed material were carried out. The units of analysis were then coded and organized based on the guiding questions defined by the researchers. Finally, categories were constructed by identifying elements, ideas, or expressions related to a specific concept derived from the coded units arising from the participants' statements, with internal validation of the categories created by the researchers<sup>11</sup>.

### RESULTS AND DISCUSSION

After analyzing the discourses of medical students (twenty-three females and seven males; twenty-one in their 6th semester and nine in their 8th semester), the most representative speeches from each thematic category were selected and will be presented in the following topics. The complete transcription of participants' speeches can be accessed in Supplementary Material 1.

#### Digital Health, ICTs, and Health Innovation

In this study, the students acknowledged the importance of digital health strategies and ICTs for the healthcare ecosystem, as they facilitate patient care and strengthen medical education strategies.

"The use of digital health has indeed brought innovation to healthcare professionals in general, allowing for increased communication, interaction, active knowledge-seeking, and easier access to sources that were not available to doctors in the past."

It is noteworthy that participants' perception regarding the importance of ICTs and their integration into healthcare is greatly influenced by their experience during the COVID-19 pandemic. This finding is to be expected, as there was no prior exposure to Telemedicine-focused educational activities in the included medical school setting.

Some students pointed out that the integration of Telemedicine may face resistance from certain doctors who oppose the practice, whether due to fear of not adapting to this method or apprehension about lacking the necessary skills for effective implementation. There was also a reflection on the potential

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resistance from patients themselves.

"One interesting thing is that as Telemedicine becomes an adopted practice, its importance is evident in social media. Many people may hesitate to participate in these consultations because they are unfamiliar with it and it is a new model."

#### Skills and Competencies for Telemedicine

Participants agreed that there is a need for prior and continuous training for professionals and students intending to work through Telemedicine. Additionally, they recognized that students should actively participate in integrating Telemedicine into medical education. Finally, the students acknowledged that there are specific skills and competencies related to Telemedicine that are distinct from the practice of formal consultations.

"For the professional to provide care in this manner and conduct a teleconsultation, they must be trained by the university they entered. Therefore, it is important to have prior knowledge, and universities need to open up, engage in dialogue, and provide practical and classes to students so that they can explore and see the possibilities of this approach, which is a distinctive feature of the modern physician. If I don't know something, I can't have a formed opinion about it."

On the other side, some students perceived that the difficulties of teleconsultation are not limited solely to how the doctor manages the doctor-patient relationship but also some resistance on the part of the patient. Therefore, patient education is crucial for the proper understanding that teleconsultation is a mode of healthcare service with its advantages and disadvantages. Additionally, the students recognized the importance of communication as one of the crucial domains in Telehealth, as highlighted by the authors. Numerous studies have demonstrated the benefits in health outcomes when effective doctor-patient communication is implemented, emphasizing the role of digital education<sup>11</sup>.

"I believe that the modern physician not only has the responsibility to adapt to Telehealth but also must educate patients. At times, patients may need clarification on the efficacy of teleconsultations, perceiving them as less authentic because the doctor needs to examine them physically. Doctors should explain all the protocols, emphasizing that not all conditions require frequent physical examinations and that the doctor can provide accurate consultations with the correct data. Patients should understand that telehealth doctors possess the same expertise as in-person care. They should be assured that they will receive ongoing support and will not be abandoned, particularly in the case of chronic diseases."

It should be emphasized that the domains of competencies

required for the proper practice of Telemedicine are not limited solely to technology but also include communication and professionalism<sup>12</sup>. Understanding that the execution of teleconsultation as a medical action should be guided by all the bioethical principles that govern the physician-patient relationship is paramount and should be part of the learning objectives in these practice activities during undergraduate courses.

Furthermore, discussing the concepts of digital responsibility, particularly regarding data security and confidentiality on the network, is crucial<sup>13</sup>. In this context, the Association of American Medical Colleges has even systematized the domains of competencies related to best practices in Telehealth education in 2021<sup>14</sup>. It is essential that the teaching of Telemedicine be integrated into the curricula of medical schools based on these identified competencies, thus ensuring that medical education meets the demands of healthcare services.

#### Telemedicine Practice Activities during Medical Education

The students agreed that enhancing skills and competencies for teleconsultations and other forms of Telemedicine is necessary, which can be developed through practical classes during undergraduate education involving patient care.

"It is necessary to improve teleconsultation skills. I remember a lesson from a professor before we started the Telemedicine classes on showing the patient that we are attentive by getting closer to the camera when we have something important to say or saying, 'Look, I am paying attention to you.' I also paid attention to how you should present yourself and speak."

The knowledge acquired in practical activities in Telemedicine must be constantly stimulated for the optimal development of skills related to communication and attitudes toward good medical practice. It should be emphasized that the literature acknowledges the challenge Telemedicine educators face in promoting student engagement in patient care using ICTs in an integrated manner with healthcare.

"Through a platform, even in a limited way in terms of physical examination, you can assist, understand, communicate, and enhance your skills by developing reasoning about what has been presented. It is very stimulating and rewarding."

Some students still expressed feelings of insecurity during the practical experiences. This situation can be explained by the inherent sense of distance from the patient in virtual consultations and the limited number of practical experiences provided to students, making it difficult to add new activities to the already extensive medical curriculum. Some authors have discussed this topic and have highlighted an increase in the perception of security regarding Telehealth-related skills

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among undergraduate students exposed to Telehealth activities throughout their training<sup>15</sup>.

"I believe it is necessary to address this more and practice it in classes because since we are not face-to-face with the patient, we need that compassionate aspect towards the patient, knowing if they are listening well or not to bridge the distance with the patient. We do not learn these things in college by ourselves; we need specific lessons to practice them with excellence."

Regarding the negative aspects of the practical activities, the students reported the dependency of teleconsultation on a reliable internet connection and the digital tools required to conduct the appointment (computer, platform, audio, and camera). It is important to note that this barrier is recognized as one of the limitations of using various Telehealth modalities<sup>16</sup>.

"As for the negative aspects, I share the same sentiments as my colleagues regarding the difficulties of adapting to the applications, the occurrence of internet interruptions both for the patient and ourselves, and the need to adapt to this environment."

The students reported that, despite the existence of areas for attention and improvement, the positive aspects outweigh the negative ones. They further affirmed that the most significant benefit is the opportunity for professional training and patient care, especially for those in greater need, through consultations with specialists, without extensive travel or expenses. Another benefit mentioned was that patients with chronic diseases could maintain more consistent follow-ups with specialists.

"Regarding the positive aspects, the greatest one is providing opportunities to those who do not have them, saving people money, and reducing distances. I agree that there are negative points related to internet and microphone problems. However, I consider them insignificant compared to when the patient has an opportunity with that consultation, so it is not worth focusing on them."

The contact of undergraduate medical students with the practice of Telemedicine also allowed them to become acquainted with the limitations of this modality<sup>17</sup>, as observed through our own experience during the implementation of Telemedicine in our institution. Challenges such as patients' low digital literacy and issues with audio and video data transmission due to internet instability were addressed collaboratively with the students, and understanding these and other limitations is crucial for the proper practice of Telemedicine.

Regarding the time allocated for practical experiences, many other students agreed that the allotted time is sufficient, as they could better understand how teleconsultation works and provide the necessary support to the patient during that time. They highlighted, however, that the consultations can be time-

consuming and that sometimes the patients appear fatigued from spending an extended period in front of the computer.

"The time is sufficient. Regarding the consultation time, it can be more tiring for both the patient and the student to be in front of a computer screen. In my experiences, I witnessed very long consultations."

On the other hand, some students reported that the time allocated for Telemedicine experiences was insufficient. According to them, as Telemedicine has been rapidly growing in recent years, students need to have increased exposure to this method, enabling them to practice multiple times to enhance the necessary skills for such consultations. The challenge lies in the limited time available in medical school curricula, which has been emphasized as one of the barriers to medical education<sup>18</sup>.

"It is still insufficient because practice is necessary, especially for these new technologies, professional development, and competencies. The more you practice, the more you refine and gain knowledge. There still needs to be more time allocated."

#### Physician-patient Relationship, Empathy, and Telemedicine

All participants agreed that it is necessary to have empathy for the patient during teleconsultation and that their experiences helped them enhance this skill as students and future professionals. The construct of digital empathy is already well recognized in the literature, emphasizing the need for its inclusion in medical undergraduate curricula. There is less evidence regarding the application of empathy in healthcare delivery using ICTs; however, the positive role of empathy in face-to-face healthcare encounters and its impact on health outcomes makes its benefit in remote care highly likely. Additionally, it is a recognized point of attention in teleconsultations, as the technology that mediates physician-patient interaction is considered an element that can hinder empathic communication during medical consultation<sup>19</sup>.

"... you have to be empathetic to their situation, and I think you should be even more so."

"... it is not easy for the patient to open up to the doctor about their life and feelings, especially with six other students in the room. It is fascinating that we always keep an open mind and refrain from making judgments because we are not here to judge; we are here to provide treatment."

Many students expressed concerns about the physician-patient relationship in remote consultations, as there is a risk of a certain degree of distance from the patient occurring, and the lack of physical contact can hinder the formation of a bond between the healthcare professional and the patient. The humanization of Telemedicine practice is discussed in the literature, including from the perspective of person-centered

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medicine principles, highlighting the crucial role of educators in this process. Alkureishi et al. propose a mnemonic to be used in Telemedicine teaching activities<sup>20</sup>.

"We do not have a complete sense of how the patient is doing, whether calm or sharing everything, because we do not have that eye contact, you know? When we interact through the computer, sometimes the patient does not know where to look, whether to look at the camera or the doctor's image, and as a result, intimacy is lost, and the relationship between the healthcare professional and the patient becomes fragile. I believe it even diminishes the patient's trust in the professional."

### Physical Examination in Remote Consultations

One of the limitations highlighted in the practice of Telemedicine and extensively discussed is the remote physical examination, which entails more limited elements compared to those obtained in a formal consultation<sup>21</sup>. In this study, some students pointed out that the medical professional must undergo prior training and be qualified for the physical examination to be conducted adequately during a teleconsultation. The accounts provided by the participants in this research align with the literature, which describes that teaching Telemedicine in undergraduate education enhances students' self-confidence regarding skills related to Telehealth practice, including a physical examination<sup>22</sup>.

"The physical examination part makes me very tense; not having direct contact with the patient during that moment is something that still brings me many doubts because, since the beginning of medical school, we learn that the physical examination is where we establish contact with the patient, being there physically. So, when we distance ourselves this way, I lose some confidence."

Some students further emphasized that, over the years, this modality will be increasingly perfected, and the methods of remotely examining a patient will be improved, including the use of telepropaedeutic devices. However, they highlighted the difficulty of widespread access to such technologies.

"I believe that Telemedicine will only improve over the years... like, new machines, new instruments, new things that will facilitate this remote physical examination."

On the other hand, other academics pointed out that in certain medical specialties where the physical examination does not determine the course of action, such as psychiatry, inspection, and anamnesis alone are sufficient to achieve the goals of that consultation.

"... I noticed that in some medical fields, such as dermatology, telemedicine does not significantly hinder the physical examination, as it can be conducted through photos... in psychiatry, I have seen experiences where people handle it very well."

"The lack of a complete physical examination is a limitation in teleconsultation; however, the overall benefit is more significant. Because if there is a real need, a face-to-face consultation can be arranged. However, it is not a hindrance not to perform teleconsultation."

The students included in this research had the opportunity to experience situations where in-person consultation was necessary due to the need for physical examination complementation. These experiences provided an opportunity to present the students with the limits of applying this care practice, particularly regarding the need for physical examination in some instances. In this sense, the Association of American Medical Colleges identifies patient safety as one of the competency domains related to the teaching of Telehealth<sup>14</sup>.

### Data Security in Healthcare

The transmission, storage, and handling of data in healthcare is one of the critical points when it comes to health IT and Telemedicine. The students stated that the patients might have concerns about maintaining confidentiality in these situations where they are unsure if the only person listening during the consultation is their doctor. Consequently, patients may withhold or hide important information out of fear that personal data may be accessible to unauthorized individuals involved in their healthcare. Therefore, the students agreed that this aspect should always be clarified to patients. Data security is crucial for conducting teleconsultations responsibly while preserving the patient's fundamental right to confidentiality. The findings of this study are consistent with the literature: the Association of American Medical Colleges identifies ethical and legal aspects as another domain related to the teaching of Telehealth<sup>15</sup>.

"One of the foundations of medical ethics is patient-doctor confidentiality, ensuring that the information provided by a patient to a healthcare professional during a consultation remains completely confidential and secure... One concern I have, and I believe many professionals have, regarding Telehealth is how secure my patient will be. How can I ensure that the data recorded in the electronic medical record will remain confidential, especially considering the frequent reports of cyberattacks and data breaches?"

### Telehealth, Telemedicine, and the Democratization of Healthcare

Most students agreed that Telehealth could reduce the distance between doctors and patients. Many pointed out that one of the positive aspects is that less complex appointments, such as follow-up consultations for chronic patients, evaluation of routine tests, and prescription renewals, can be quickly conducted through a teleconsultation. They state that the delay in reaching a medical office, long waiting times, and transportation difficulties discourage people from seeking medical help and that this can be facilitated through telehealth and telemedicine strategies. These observations align with one

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of the functions attributed by various authors to Telehealth: the contribution to the democratization of healthcare. Because the various modalities of remote healthcare services promote convenience and cost reduction in healthcare as benefits associated with their integration into healthcare systems<sup>22,23</sup>.

"I used to think Telemedicine was only valid for remote or inaccessible communities. Nowadays, I see it completely differently. There are many reasons for patients not to attend an appointment, and facilitating their interaction with the doctor is extremely important."

Regarding the advantages students attribute to Telemedicine, many agree that this modality can particularly benefit populations with limited access. In this context, we find individuals from rural regions with limited availability of healthcare centers with specialized physicians and individuals with limited financial means who often need broader access to adequate healthcare conditions.

"Today, Telemedicine brings doctors closer to their patients, especially those who live far away, in rural areas or a municipality with limited access... Telemedicine bridges the gap between doctors and their patients. When discussing reducing distances, it is as if Telemedicine reaches places our legs cannot."

On the other hand, other students reported many barriers to using various Telemedicine modalities related to the difficulty of accessing ICTs. Many mentioned that the Internet and digital tools are not equally accessible to all citizens. This aspect is widely discussed in the literature as one of the barriers to implementing various Telehealth modalities, and the disparity in internet access has been described among racial minorities and individuals with chronic illnesses in the American population<sup>24</sup>.

"...people sometimes have difficulty because they do not have a stable internet connection, and this democratization of healthcare that requires a high-quality internet, equipment, better image, better sound, and a comprehensive set of information may not be

accessible to all people in Brazil, mainly because we live in a very heterogeneous country."

Furthermore, another participant highlighted the importance of an approach considering different age groups, as older patients face difficulties during teleconsultations, often due to inexperience in using technology. A systematic review in the literature on barriers to using Telehealth among elderly individuals recognizes numerous factors that hinder this population's widespread use of various Telehealth modalities, especially those related to internet access and digital literacy<sup>25</sup>.

"...I believe older people have more difficulty adapting to this new style, like Telemedicine. It is a situation that is not good for that population because they do not feel comfortable there and do not know how to deal with that medium..."

## CONCLUSIONS

Currently, no evidence supports the superiority of any specific method for teaching Telemedicine in undergraduate education. However, a combination of different methods, such as the approach applied in this study, involving both theoretical and practical activities, should likely be implemented to more effectively explore the competencies and skills related to Telehealth, including access to care, the cost-effectiveness of this practice, and the patient experience<sup>26,27</sup>.

With the implementation of the practical module, students had the opportunity to experience hands-on Telemedicine activities. The students learned in a safe healthcare environment about the bioethical principles for responsible teleconsultations, understanding the limiting factors of the method, and having the opportunity to enhance their skills and competencies in Telehealth, which are crucial for their future professional practice. Lastly, the recent update of Telemedicine regulations in the country reinforces the need to adapt medical school curricula, as medical education should reflect the competencies capable of meeting the demands of healthcare systems.

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