# Challenges of Using Telemedicine in Hospital Specialty Consultations during the COVID-19 Pandemic in Portugal According to a Panel of Experts

# Desafios da Utilização da Telemedicina em Consultas de Especialidade Hospitalar, durante a Pandemia de COVID-19 em Portugal, Segundo um Painel de Peritos

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**ABSTRACT**

**Introduction:** The COVID-19 pandemic has accelerated the adoption of telemedicine as a means of reducing face-to-face contact and protecting professionals and patients. In Portugal, the number of hospital telemedicine consultations has significantly increased. However, the rapid implementation of telemedicine has also led to disparities in access to these services, resulting in inequalities in healthcare delivery. The aim of this study was to identify the main challenges to accessing hospital medical specialty consultations through telemedicine in Portugal during the COVID-19 pandemic. Additionally, this study aimed to establish a consensus on possible solutions for the challenges which were identified.
**Methods:** This study used the nominal group technique, which involved a panel of 10 experts. The panel generated a total of 71 ideas, which were then categorized into three groups: A) challenges relating to patients, which impact access to hospital-based medical specialty consultations through telemedicine; B) challenges relating to professionals, institutions and health systems, which impact access to hospital medical specialty consultations through telemedicine; C) recommendations to overcome the challenges faced in adopting telemedicine solutions. Each of the ideas was assessed, scored and ranked based on its relevance considering the study objectives.
**Results:** This study identified several significant challenges that impacted the adoption of telemedicine in Portugal during the COVID-19 pandemic. The challenges that related to patients (A) that were deemed the most relevant were low digital literacy, lack of information about telemedicine processes, low familiarity with technologies and distrust about the quality of services; the challenges that impacted healthcare professionals, institutions, and health systems (B) and were deemed the most relevant were the lack of integration of telemedicine in the patient's journey, low motivation to adopt telemedicine solutions, poor interoperability between systems, and the absence of the necessary technological equipment. The most relevant recommendations (C) included investing in healthcare institutions, developing clear guidelines for the safety and quality of telemedicine practices, and incorporating telemedicine into the curricula of health professions.
**Conclusion:** This study identified several challenges that impacted the adoption and implementation of telemedicine services for hospital care in Portugal during the pandemic period. These challenges were related to digital health literacy, technological and operational conditions, and reluctance in technological adoption. To overcome these challenges, training programs for healthcare professionals and patients may be necessary, along with investment in technological infrastructures, interoperability between systems, effective communication strategies and the strengthening of specific regulations.
**Keywords:** COVID-19; Digital Health; Health Services Accessibility; Portugal; Referral and Consultation; Telemedicine

**RESUMO**

**Introdução:** A pandemia de COVID-19 acelerou a adoção da telemedicina como meio de reduzir o contato presencial e proteger profissionais e pacientes. Em Portugal, o número de consultas de telemedicina hospitalar aumentou significativamente. No entanto, a implementação rápida da telemedicina também levou a disparidades no acesso a esses serviços, resultando em desigualdades na prestação de cuidados de saúde. O objetivo deste estudo foi identificar os principais desafios no acesso às consultas de especialidades médicas hospitalares através da telemedicina em Portugal durante a pandemia de COVID-19. Além disso, este estudo visou estabelecer um consenso sobre possíveis soluções para os desafios identificados.
**Métodos:** Este estudo utilizou a técnica de grupo nominal, que envolveu um painel de 10 especialistas. O painel gerou um total de 71 ideias, que foram então categorizadas em três grupos: A) desafios relacionados com os pacientes, que impactam o acesso às consultas de especialidades médicas hospitalares através da telemedicina; B) desafios relacionados com os profissionais, instituições e sistemas de saúde, que impactam o acesso às consultas de especialidades médicas hospitalares através da telemedicina; C) recomendações para superar os desafios enfrentados na adoção de soluções de telemedicina. Cada uma das ideias foi avaliada, pontuada e classificada com base na sua relevância considerando os objetivos do estudo.
**Resultados:** Este estudo identificou vários desafios significativos que impactaram a adoção da telemedicina em Portugal durante a pandemia de COVID-19. Os desafios relacionados com os pacientes (A) considerados mais relevantes foram baixa literacia digital, falta de informação sobre os processos de telemedicina, baixa familiaridade com as tecnologias e desconfiança sobre a qualidade dos serviços; os desafios que afetaram os profissionais de saúde, instituições e sistemas de saúde (B) e foram considerados mais relevantes foram a falta de integração da telemedicina no percurso do paciente, baixa motivação para adotar soluções de telemedicina, pouca interoperabilidade entre sistemas e a ausência do equipamento tecnológico necessário. As recomendações mais relevantes (C) incluíram investir em instituições de saúde, desenvolver diretrizes claras para a segurança e qualidade das práticas de telemedicina e incorporar a telemedicina nos currículos das profissões de saúde.
**Conclusão:** Este estudo identificou vários desafios que impactaram a adoção e implementação de serviços de telemedicina para cuidados hospitalares em Portugal durante o período da pandemia. Esses desafios estavam relacionados com a literacia em saúde digital, condições tecnológicas e operacionais e relutância na adoção tecnológica. Para superar esses desafios, podem ser necessários programas de formação para profissionais de saúde e pacientes, juntamente com investimento em infraestruturas tecnológicas, interoperabilidade entre sistemas, estratégias de comunicação eficazes e o fortalecimento de regulamentações específicas.
**Palavras-chave:** Acessibilidade aos Serviços de Saúde; COVID-19; Encaminhamento e Consulta; Portugal; Saúde Digital; Telemedicina

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## INTRODUCTION

The COVID-19 pandemic forced healthcare systems to adapt, reorganize and innovate in healthcare delivery in order to protect patients and healthcare professionals.[1,2] Furthermore, the pandemic has pressured healthcare systems to accelerate the adoption of technology, including telemedicine.[3] In general, one of the goals of telemedicine is to expand healthcare access by providing remote monitoring and consultation to patients.[4,5] Therefore, the adoption of telemedicine increased in different countries during the COVID-19 pandemic due to a context of reduced personal contacts.[6-8]

According to the 2020 report by the Portuguese Directorate General of Health (DGS), there was a significant increase in telemedicine consultations during the initial months of the COVID-19 pandemic compared to the corresponding period of the previous year.[9] This trend was particularly clear for hospital specialty consultations (secondary care). Furthermore, the number of registered telemedicine facilities has also increased from 2020 onwards.[9] Concomitantly, the Transparency Portal of the Portuguese National Health Service (SNS) shows that, in December 2020, telemedicine consultations had a 216% increase (5188 teleconsultations more) compared to the corresponding period in 2019, and, in December 2021, there was a 2117% (73 056 teleconsultations more) increase compared to the homologous period.[10] This trend can be explained by the difficulty of accessing in-person medical services due to prevention measures, the fear of contagion, and/or the reduced availability of healthcare professionals for face-to-face consultations as required by national policies.[11]

Along with the several opportunities that telemedicine presents, such as improved healthcare access, better integration between healthcare services, and reduced hospital readmissions, many challenges remain.[12-17] These challenges include lack of access to Internet services and technological devices, geographic disparities, language barriers, inequalities across income levels, health insurance coverage, and privacy and confidentiality concerns about telemedicine use.[14,18-23] Furthermore, the rapid implementation of telemedicine can contribute to widening existing disparities due to limited technological proficiency and low literacy levels.[22,24]

In order to effectively implement telemedicine in Portugal, it is essential to accumulate evidence that supports appropriate health policies tailored to the specific Portuguese social and technological context.[25-27] To this end, the aim of this study was to address the following research questions: i) During the COVID-19 pandemic, what were the main challenges observed in accessing hospital-based medical specialty consultations through telemedicine in Portugal? ii) What are the key consensus recommendations for potential solutions to address these challenges?

## METHODS

### Nominal group technique

To achieve the objectives of this study, we employed the nominal group technique (NGT), which is a methodology used in qualitative research to gather and prioritize information on a specific topic or issue to facilitate decision-making and consensus on potential solutions.[28,29] This technique involves a structured meeting with the participation of experts with a solid knowledge base in the field being studied (including professionals who work daily with telemedicine as well as those with differentiated training in telemedicine or in applied health technologies) and who have established credibility and recognized expertise.[28-30] The NGT generates a set of ideas that the group subsequently evaluates and prioritizes to reach consensus.[29,31]

Performing NGT involved four fundamental steps[28,29,31]:

1. Idea generation: The moderator presented the question or problem to the group and instructed all group members to write up to three ideas in short sentences, both individually and in silence.

2. Idea registration: Each group member verbalized their ideas without discussion, and the moderator took note, in plain view, of each of them; all ideas were presented on a screen, excluding duplicates. If the group felt that a particular idea was distinguishable from a similar one due to the emphasis or variation it places on the matter being addressed, it was included.

3. Idea discussion: The annotated ideas were individually discussed to determine their clarity and importance. Participants had the opportunity to express their understanding of each idea and provide comments or questions. Any member of the group could clarify and discuss an idea, not just the author.

4. Idea voting: At the end of the session, participants received a link to a form (via Microsoft® Forms®) to individually vote on the perceived relevance of each idea.

### Expert identification

A panel of 10 experts in multidisciplinary areas relevant to the study topic was assembled through convenience sampling. The panel included a medical specialist in Ophthalmology, a medical specialist in Public Health, a medical specialist in Family Medicine, a health economist, two hospital managers, an administrator in charge of data protection in a hospital, an academic specialist in the field of telemedicine, and two experts in the field of digital health systems. Therefore, both primary health care and hospital

care perspectives were included in this panel.

Geographical representation was ensured by including experts who work in professional settings in urban areas such as Lisbon and Porto, as well as in a comparatively more rural area like Guarda.

## Procedure

Prior to the virtual session (Zoom platform) held on June 28, 2022, all the members of the NGT panel received a support document outlining the session's structure, topic introduction, issues to be discussed and the respective questions to be asked.

After obtaining verbal informed consent for participation and data collection, the first question was posed, which was for experts to identify three challenges that restricted or limited access to telemedicine services. These services encompass all forms of telemedicine, including remote monitoring, storage and referral, real-time interactive services, and mobile health platforms. Subsequently, the moderator collected and recorded all the individual responses in an Excel file, shared on screen with all panel members.

The second question asked experts to identify recommendations to address the previously identified challenges, and the idea generation, recording, and discussion phases were repeated.

After collecting all ideas, the idea voting phase was conducted through a Microsoft® Forms® form, using a Likert scale of 1 to 4, with 1 corresponding to "not relevant" and 4 to "very relevant". Participants anonymously and confidentially scored the ideas according to their perceived level of relevance. The scores were then aggregated by the researchers. The maximum score for each idea was 40 points and the minimum 10 points, considering the panel's composition of 10 experts.

## Content analysis

The ideas were recorded in a table and categorized into two groups:
  A) Challenges relating to patients, which impact access to hospital-based medical specialty consultations through telemedicine;
  B) Challenges relating to professionals, institutions and healthcare systems, which impact access to hospital medical specialty consultations through telemedicine.

## Ethics approval

Since this is a non-clinical study, the approval by the Ethics Committee for Health is neither mandatory nor binding, according to Decree-Law no. 80/2018. However, all methods were performed in accordance with the relevant Portuguese and European guidelines and regulations, according to the ethical self-assessment based on the assumptions for the identification of ethical issues and respective requirements adopted by the Fundação para a Ciência e a Tecnologia (FCT). Informed consent was obtained from all study participants.

## RESULTS

After completing the idea generation, registration, and discussion phases, a total of 71 ideas were subjected to voting. Some ideas had the same score, which indicated that they were considered equally relevant by experts. The highest score obtained was 37 points, while the lowest score was 21 points. Tables 1, 2, and 3 present the generated ideas and their respective scores.

The analysis of the results revealed that the "low level of digital literacy" was voted as the main challenge relating to patients, which had an impact on the access to hospital-based medical specialty consultations through telemedicine, followed by the "lack of information about the process itself" and the "lack of familiarity with this type of technology". "Mistrust about the quality of services" was also identified as a significant challenge for patients in accessing hospital medical specialty consultations through telemedicine (Table 1).

Regarding the challenges relating to professionals, institutions, and healthcare systems, the "lack of integration of telemedicine in the patient's journey" was the most voted challenge. The "lack of motivation to adopt telehealth solutions" and the "lack of interoperability of telemedicine services with existing clinical records" were the second most voted challenges. The "lack of necessary technological equipment that could be used by professionals either in hospital services or telecommuting" was the third most voted challenge (Table 2).

As for the expert's recommendations, the most voted was "the need for greater investment by healthcare institutions (in professionals, technological equipment, developing interoperability, and dedicating working groups to telemedicine, and others)". The second most voted recommendation was "the need for clear guidelines to ensure the safety and quality of telemedicine practices, including those related to data, training of professionals and patients to acquire digital literacy skills, and inclusion of telemedicine in the curricula of health professions". "The development of local implementation models that consider the needs of stakeholders and the surrounding context, understanding the real needs of patients regarding telemedicine aspects and encouraging the integration of new technologies within the adopted ecosystem" were the third most voted recommendations (Table 3).

Table 1 – Expert voting results, in descending order of score and relevance, regarding challenges relating to patients, which impact access to hospital-based medical specialty consultations through telemedicine

| A) Challenges relating to patients, which impact access to hospital-based medical specialty consultations through telemedicine | Total score | Order of relevance |
|---|---|---|
| Low level of digital literacy of the patient and/or caregivers | 36 | 1 |
| Lack of information about the process itself | 34 | 2 |
| Lack of familiarization with telemedicine technologies | 33 | 3 |
| Mistrust about the quality of care provided through telemedicine services | 33 | |
| Disparities between socio-economic levels | 31 | 4 |
| Need for external support to perform consultations | 31 | |
| Non acceptance of the use of telemedicine services, for reasons related to the habit of performing consultations in a face-to-face format | 31 | |
| Low access to technological devices | 30 | 5 |
| Lack of home broadband Internet access | 30 | |
| Difficulty in access to intended care | 29 | 6 |
| Non-inclusion of telemedicine in financing and copayment models | 28 | 7 |
| Existence of educational disparities that may translate into difficulty in identifying the need and possibility of using telemedicine services | 28 | |
| Difficulties in rescheduling subsequent appointments | 28 | |
| Concerns about data privacy and confidentiality issues | 27 | 8 |
| The perception that the condition in question may not be susceptible to a virtual approach | 27 | |
| Racial/ethnic disparities, including cultural issues | 26 | 9 |
| Existence of conditions that cannot be assessed virtually | 26 | |
| Older age | 26 | |
| Lack of definition of criteria for tele-consultation | 26 | |
| Lack of clarity on the fact that tele-consultation does not replace face-to-face consultation, if this is necessary | 25 | 10 |
| Lack of data and communication security assurance | 24 | 11 |
| Language barriers | 23 | 12 |
| Disparities in housing context (privacy) | 22 | 13 |
| Pre-existing distancing of patients from health services | 21 | 14 |

## DISCUSSION

The present study explored the challenges that impacted the use of telemedicine in accessing hospital specialty medical consultations during the COVID-19 pandemic in Portugal, as well as possible recommendations to address them, from the perspective of a multidisciplinary panel of experts.

Low digital literacy, lack of information about the process of telemedicine deployment, poor familiarity with technologies, and distrust about the quality of services were identified as the most prevalent challenges faced by patients, which is consistent with the results of other studies.[13,14,32,33]

Patients with lower levels of digital literacy are likely to experience other challenges in adopting telemedicine, as they may lack confidence and familiarity with these processes.[22,24,34-36] This is underscored by the results of the Digital Health Barometer developed in 2022, which identified low digital literacy as the main barrier to the development of telehealth in Portugal.[37] Furthermore, the World Health Organization (WHO) recognizes information and communication technology literacy, and access to equipment, broadband, and the internet, as key determinants of digital health, emphasizing their importance in the global strategy for digital health between 2020 and 2025.[38] These findings highlight the critical role of digital literacy in promoting the adoption and implementation of telemedicine and support the need for targeted interventions to improve digital skills among patients and health care professionals.

Portugal has been recognized for its governance and active role in promoting, guiding, and clarifying telemedicine programs, compared to other European Union and Organization for Economic Cooperation and Development (OECD) countries in 2020.[1,16] The Portuguese National Center for Telehealth has played a fundamental role in this regard,

Table 2 – Expert voting results, in descending order of score and relevance, regarding the challenges relating to professionals, institutions and health systems, which impact access to hospital medical specialty consultations through telemedicine.

| B) Challenges relating to professionals, institutions and health systems, which impact access to hospital medical specialty consultations through telemedicine | Total score | Order of relevance |
|---|---|---|
| Lack of integration of telemedicine into the patient journey | 35 | 1 |
| Lack of motivation in adopting telehealth solutions | 34 | 2 |
| Lack of interoperability of telemedicine services with existing clinical processes | 34 | |
| Lack of necessary technological equipment that can be used by professionals either in the hospital services or in a telecommuting regime | 33 | 3 |
| Low access to technology equipment | 32 | 4 |
| Lack of familiarization with telemedicine technologies | 32 | |
| Inadequate telehealth system design | 32 | |
| Lack of simple and transparent digital solutions | 31 | 5 |
| Lack of process integration between the different 'points of contact' of the services (between doctor, secretariat, nursing, etc.) | 31 | |
| Lack of adequate financial incentives | 30 | 6 |
| Lack of time dedicated to teleconsultation | 30 | |
| Existence of a top-down implementation, not including the perspectives of stakeholders and the local context | 30 | |
| Lack of investment in telemedicine platforms | 29 | 7 |
| Lack of information about the process itself | 29 | |
| Lack of multidisciplinarity among professionals in diagnostic consultations | 29 | |
| Low level of digital literacy | 28 | 9 |
| Lack of assurance of data and communication security, by health professionals, institutions and services | 27 | 10 |
| Lack of jurisprudence on the application of telemedicine | 27 | |
| Lack of resources by prioritizing the Corona Virus Disease of 2019 (COVID-19) approach | 26 | 11 |
| Need to establish obligations related to privacy protection, with a clear definition of subcontractors responsibilities | 26 | |
| Lack of specific regulation by professional associations | 26 | |
| Lack of alignment between digital health strategies and the National Health Plan | 26 | |
| Difficulties in rescheduling subsequent appointments | 26 | |
| Lack of demonstrated quality metrics for telemedicine services | 26 | |
| Information and data quality | 24 | 12 |

providing numerous digital resources, including best practice guides for teleconsultations for both healthcare professionals and patients.[39,40] However, despite these efforts, the communication and dissemination strategies adopted may not have been comprehensive or effective enough, potentially excluding individuals with lower levels of digital health literacy.[40,41] Therefore, it is essential to address this issue and ensure that telemedicine programs are accessible and inclusive in order to maximize the potential benefits of this technology.

For professionals, institutions and healthcare systems, lack of integration of telemedicine in the patient journey and lack of motivation to adopt telehealth solutions, poor interoperability between systems and lack of technological equip-

ment were identified as the most challenging factors, which is consistent with other studies.[32,37,42,43] The implementation of telemedicine has been shown to be influenced by several critical factors, including organizational, technological and social factors.[32] As health care professionals play a crucial role in delivering care and digital tools are fundamental to achieve the objectives of telemedicine, it is essential to provide training and support to professionals and institutions. This will foster the integration of these tools into routine practice and ensure workflows, including the seamless integration of these processes into the patient journey, and interoperability conditions. Previous studies have highlighted the importance of these factors in promoting the adoption and implementation of telemedicine.[44,45]

Table 3 – Results of the expert voting, in descending order of score and relevance, regarding the generated recommendations.

| C) Recommendations to overcome challenges encountered in the adoption of telemedicine solutions | Total score | Order of relevance |
|---|---|---|
| Higher investment from healthcare institutions (training of professionals, technological equipment, interoperability, dedicated work teams, etc.) | 37 | 1 |
| Need for clear guidelines to ensure the safety and quality of telemedicine practices, including those related to data | 34 | 2 |
| Train professionals and patients to acquire digital literacy skills | 34 | |
| Include telemedicine in the curricula of health professions | 34 | |
| Development of local implementation models that consider the needs of stakeholders and the surrounding context | 33 | 3 |
| Understand the users› real needs regarding telemedicine aspects | 33 | |
| Encourage the integration of new technologies within the adopted ecosystem | 33 | |
| Provision of a 'one-click' solution for participation in a telemedicine service | 32 | 4 |
| Expansion and specialization of the national telehealth center/SNS24 (contact center of the National Health Service) branches | 31 | 5 |
| Involvement of the most vulnerable groups in the design and development of the solutions | 31 | |
| Align the digital strategy with the National Health Plan | 31 | |
| Strengthening of specific regulations for the use of telemedicine | 31 | |
| Encourage research in this area (technological, process, etc.) | 31 | |
| Establish a funding system and incentives for telehealth | 30 | 6 |
| Promote digital literacy, respecting the idiosyncrasies of the target audience (patients and professionals) | 30 | |
| Create a referral solution that allows the identification of the type of consultation needed (telemedicine or face-to-face) | 29 | 7 |
| Creation of professional association opinions on the appropriate use of telehealth | 28 | 8 |
| Systematized collection of the perspectives of the patient, healthcare professionals and health managers | 28 | |
| Reduce the complexity of the value proposition, facilitating the involvement of everyone | 28 | |
| Creating more investment in telehealth solutions, rather than specifically in telemedicine | 27 | 10 |
| Identify, via financial incentives, which telemedicine services should be prioritized | 25 | 11 |
| Create a clarification desk for users about telemedicine solutions, within health institutions | 24 | 12 |

The Portuguese National Center for Telehealth and the Shared Services of the Ministry of Health proposed the Portuguese National Strategic Plan for Telehealth for the period of 2019 - 2022.[46] The plan recognizes the importance of defining processes, standards and guidelines, integrating SNS healthcare, establishing necessary technological infrastructures (technical and operational), and managing human resources continuously and efficiently as the most significant challenges for the development of telehealth in Portugal.[46]

The recommendations proposed by the experts in the field of telemedicine highlighted the need for significant investment in health institutions, including investing in the training of professionals, technological equipment, teams, and interoperability of systems, as well as in the development of clear guidelines for the safety and quality of telemedicine practices. This investment should also include the acquisition of digital literacy skills, the inclusion of telemedicine in the curricula of health professions, and the development of local implementation models that consider the needs of stakeholders and the surrounding context. Furthermore, it is essential to understand the patient's real needs concerning telemedicine aspects and encourage the integration of modern technologies within the adopted ecosystem to ensure a successful and operationalization of telemedicine in Portugal. For the successful use of telemedicine, a collective and integrated approach involving all stakeholders is required.[47]

Other studies have identified lack of access to internet services, lack of appropriate technological devices for virtual consultations, low levels of digital literacy, language barriers, concerns about data privacy and confidentiality, and geographic disparities as some of the main barriers to the use of telemedicine during a pandemic.[6,19-23,48,49] Although

these barriers are related to other contexts or healthcare systems, they are in line with the challenges identified by the experts in this NGT. Therefore, the strategies recommended in this study could also serve as a basis for addressing the challenges identified in other international contexts, which reinforces their relevance and appropriateness for promoting the adoption of telemedicine.[6,50]

According to the WHO, digital health will only be successful and widely adopted if: it is universally accessible; it increases the efficiency and sustainability of healthcare systems; reinforces health promotion and disease prevention, as well as diagnosis, management and rehabilitation; strengthens health systems, during and after an epidemic or pandemic situation; and respects the patients' privacy and the security of their health information.[38] To achieve these goals, several national and international strategic action plans have been created, which align with the recommendations generated in this study.[38,46,47,51] In order to fulfill the potential benefits of telemedicine, it is crucial to deepen our understanding of its real impact on patients, healthcare professionals, institutions, and systems. Furthermore, health policy should take into account national contexts and focus on identifying the facilitators of telemedicine that should be promoted, as well as the barriers to telemedicine adoption and implementation that need to be overcome in the future.

**Strengths and Limitations**

Regarding possible limitations of this study, it is important to acknowledge that some invited experts were unable to participate, which may have limited the heterogeneity of the group. Nevertheless, the number and diversity of the experts who did participate in this panel were deemed appropriate for conducting this NGT and ensuring the scientific rigor and robustness of our findings.

An additional potential limitation of our study is that the participating experts had a strong interest in and enthusiasm toward the analyzed topic. As a result, alternative or contrasting ideas, particularly those coming from less enthusiastic individuals, may not have been adequately represented. Similarly, the possibility of reporting bias should be acknowledged as a possible limitation. It is possible that some participants may have been inclined to provide answers that aligned with their perception of the researchers' expectations. Nonetheless, this bias was mitigated by the moderator's role in guiding the focus of the panel towards the topic under review and encouraging the generation of diverse ideas throughout the session. The fact that the session was recorded for content analysis purposes may also have constrained participants from sharing additional ideas or potentially controversial themes, which represents another possible limitation of our study.

The inclusion of only three medical specialists, with only

one being a hospital specialist, may have limited the accuracy of capturing the opinions of medical professionals working in hospital settings. Moreover, the perspective of patients was not included in this NGT. For this reason, patients' perceptions regarding the practice of telemedicine were inferred solely from the professionals' opinions, which is one of the limitations of this study. This limitation should be explored in future research to achieve a more comprehensive understanding of telemedicine experiences.

Nonetheless, the NGT is a methodology that promotes shared decision-making by jointly analyzing available scientific evidence and exploring the questions at hand in greater depth. This technique facilitated the generation of ideas and encouraged the expert panel to tackle the challenges of telemedicine in Portugal from a problem-solving perspective, resulting in effective solutions for future implementation. This approach represents one of the primary strengths of this study. Furthermore, the active participation and strong involvement of the expert panel led to the generation of a considerable number of ideas, as evidenced by the high scores awarded during the idea voting stage (with the highest score being 37 out of a maximum of 40 and the lowest being 21 points). These results suggest that even the ideas with lower scores were considered relevant, underscoring the robustness of our results. Voting on ideas was conducted independently and confidentially, thereby safeguarding the privacy and freedom of speech of the participating experts.

This study also benefited from the participation of highly qualified professionals with credible reputations in the health and digital health fields. These experts have been actively involved in the process of incorporating telemedicine into health services throughout the pandemic period and have the necessary competence and practical experience to engage in informed discussions on this topic.

The results of this study provide valuable insights for developing recommendations and action plans at both the local and national levels to integrate and operationalize telemedicine in the Portuguese healthcare system. They also provide a basis for addressing inequities in access to digital health services in Portugal. While the national evidence on the use of telemedicine is still limited, further research is necessary to monitor its evolution, identify its main trends and barriers, and explore the applicability of the results of this study in non-pandemic settings. Addressing these challenges will be crucial for ensuring the successful implementation and uptake of telemedicine in Portugal in the future.

**CONCLUSION**

Throughout the pandemic, the use of telemedicine for accessing hospital medical specialty consultations was impacted by a variety of factors that challenged professionals,

institutions, systems and patients alike. Despite these challenges, common themes emerged, including issues related to digital health literacy, technological and operational requirements for conducting telemedicine consultations, and reluctance to adopt new technologies.

It is clear that addressing the challenges related to telemedicine will require investments in several key areas. These include the training of both professionals and patients, the development of robust technological infrastructures, the establishment of appropriate workflow and interoperability conditions, the implementation of effective communication strategies that encourage and demystify the use of telemedicine, the inclusion of telemedicine in the curricula of health professionals, the integration of telemedicine into the patient journey, and the strengthening of specific regulations governing this area.

Further research on this subject, using similar and complementary methodologies, should be conducted in the future, ideally including a larger number of experts from different medical specialties, taking into account the geographical dispersion of their professional activity and, importantly, considering the perspective of patients.

## AUTHOR CONTRIBUTIONS

ASC, ARP: Study design, collection and interpretation of research results, drafting of the manuscript.

JVC: Study design, interpretation of research results, drafting of the manuscript.

## PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

## DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

## COMPETING INTERESTS

The authors have declared that no competing interests exist.

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