

# Telemedicine: The Experience of a Pediatric Department during the COVID-19 Pandemic

## Telemedicina: A Experiência de um Departamento de Pediatria durante a Pandemia COVID-19

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### Abstract

**Introduction:** During the coronavirus disease 2019 (COVID-19) pandemic in 2020, multiple measures were taken to decelerate the disease progression. This article describes the experience with telemedicine in a pediatric ambulatory clinic during the outbreak and reports the perception of the department's clinicians on telemedicine experience.

**Methodology:** This study was conducted in a pediatric ambulatory clinic in a level II hospital. A retrospective analysis was conducted, comparing the pediatric face-to-face and telemedicine appointments in two equivalent periods of 2019 and 2020: March to June and July to December. In order to evaluate the clinicians' perception on telemedicine, a questionnaire was applied.

**Results:** In the first period analysed (March to June), the number of pediatric appointments decreased in 2020. However, an eight-fold increase was observed in telemedicine appointments. In the second period (July to December), there was an increase in the total number of appointments in 2020, 60% of which were done by telemedicine. All the respondent practitioners considered telemedicine valuable during COVID-19 pandemic. The most important benefit found by the pediatricians was the minimization of infection risk (48.5%), and 63.6% of them considered the impossibility to do physical examination the most significant disadvantage. Overall, most clinicians (81.2%) want to keep using telemedicine in a future without pandemic.

**Discussion and Conclusion:** The number of pediatric telemedicine appointments increased significantly in 2020. This could be explained by the department's restructuring due to COVID-19 pandemic, the creation of the "post-emergency" appointments, and the reduced absenteeism. Although face-to-face appointments' irreplaceable value, the beneficial effect of telemedicine during pandemic period was evident and consensual in clinician's perception.

**Keywords:** COVID-19; Pediatrics; SARS-CoV-2; Telemedicine

### Resumo

**Introdução:** Durante a pandemia causada pelo novo coronavírus (COVID-19) em 2020, várias medidas foram tomadas para conter a progressão da doença. Este artigo visa descrever a experiência com teleconsulta de um serviço de pediatria durante a pandemia, assim como a percepção dos clínicos face a esta realidade.

**Métodos:** Este estudo foi realizado numa unidade de consulta externa de pediatria, de um hospital de nível II. Foi realizada uma análise retrospectiva das consultas de pediatria efetuadas por teleconsulta e presencialmente, comparando dois períodos equivalentes de 2019 e 2020: março a junho e julho a dezembro. Foi também aplicado um questionário para avaliar a percepção dos médicos relativamente à teleconsulta.

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**Resultados:** No primeiro período analisado (março a junho), o número de consultas foi menor em 2020. Contudo, observou-se um aumento do número de teleconsultas em 8 vezes. No segundo período (julho a dezembro), houve um aumento no número de consultas em 2020, das quais 60% foram teleconsultas. Todos os médicos inquiridos consideraram a teleconsulta uma mais-valia durante a pandemia. A principal vantagem apontada (em 48,5% dos casos) foi a diminuição do risco de infeção, enquanto a impossibilidade de realizar exame objetivo foi a principal desvantagem considerada (63,5%). A maior parte dos questionados (81,2%) prevê manter o recurso à teleconsulta num futuro sem a pandemia.

**Discussão e Conclusão:** O número de teleconsultas realizadas aumentou significativamente em 2020. Tal pode ser explicado pela reestruturação do departamento no período de pandemia de COVID-19, pela criação de consultas pós-urgência e pela redução do absentismo. Apesar do valor insubstituível das consultas presenciais, o efeito benéfico da teleconsulta durante este período foi evidente e consensual na perceção dos médicos do departamento.

**Palavras-chave:** COVID-19; Pediatria; SARS-CoV-2; Telemedicina

## Introduction

The coronavirus disease 2019 (COVID-19) pandemic, caused by a novel coronavirus (severe acute respiratory syndrome coronavirus 2 - SARS-CoV-2), has quickly spread worldwide during 2020.<sup>1</sup> In the pediatric population, this disease was found to have milder clinical symptoms, fewer laboratory and radiologic abnormalities and a much lower fatality rate, when compared to adults.<sup>2</sup>

In Portugal, the first cases of COVID-19 were confirmed on March 2<sup>nd</sup> and, considering the fast-increasing number of cases all over Europe, on March 19<sup>th</sup> a national lockdown was declared. At this point, telemedicine took a fundamental role to overcome restrictions and challenges on providing medical care to the population, protecting patients, families, and health care workers from exposure to coronavirus.

Telemedicine is defined by World Health Organization (WHO) as “the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies (...).”<sup>3</sup>

In our department, telemedicine had a limited role in the past. During the COVID-19 crisis, following *Directorate-General of Health* (DGH) indications,<sup>4</sup> pediatric appointments should keep on going, by giving preference to telemedicine. In this period, the rapid and sharp increase of the use of telemedicine to deliver patient care unveiled many valuable benefits and created a unique opportunity for enhanced use of telemedicine in pediatrics.

The purpose of this article is two-fold: first, describe the experience with telemedicine with phone calls, in a pediatric ambulatory clinic in a level II hospital (Hospital de Cascais), during COVID-19 outbreak; second, to report the perception and opinion of the department’s clinicians on telemedicine experience.

## Material and Methods

This study was performed in a pediatric ambulatory clinic in *Hospital de Cascais - Dr. José de Almeida*. This is a level II hospital, located in the urban area of Cascais, 30 km west from Lisbon. *Hospital de Cascais* is part of the National Health Service in a

publicprivate partnership regimen. It serves the Cascais municipality, and for maternal and infant services it also serves 8 parishes of Sintra municipality. In total, it provides healthcare to over 330 thousand inhabitants, with a 277 bed-capacity.

A retrospective analysis of the pediatric appointments in 2019 and 2020, including telemedicine and face-to-face appointments, was conducted. The data for each appointment (type and corresponding area) were obtained. Two equivalent periods of each year were compared: March to June and July to December. The first period was chosen to reflect the immediate impact of the COVID-19 pandemic lockdown, and the second period to reflect the reorganization and responsiveness of the department.

In order to evaluate the clinicians’ perception on telemedicine appointments, a questionnaire via *GoogleForms* (Appendix 1) was sent to all the pediatric clinicians of the department (specialists and residents) who have clinical activity in outpatient clinic. The answers were anonymous, and the responders gave their consent for publishing the data. The questionnaire centres in the advantages and inconveniences of telemedicine when compared to face-to-face appointments, and in the clinician’s perspective on the future use of telemedicine and the parents’ satisfaction.

In our department, previously to the scheduled telemedicine appointments, the parents were informed of its occurrence, by text message or phone call or mail.

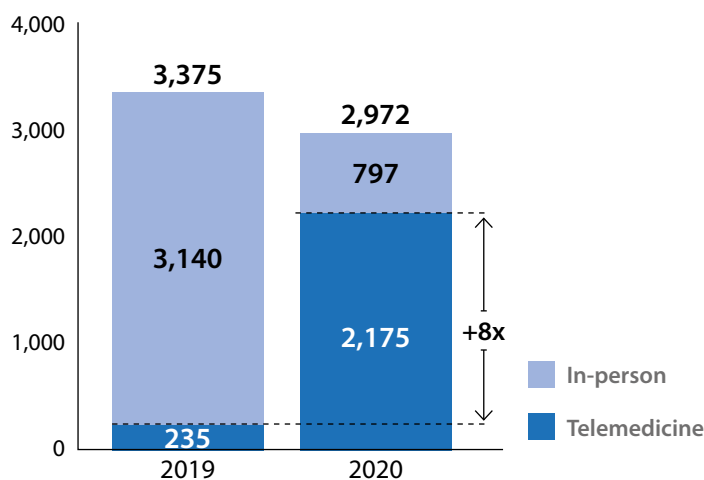
## Results

### Results on telemedicine growth in our department

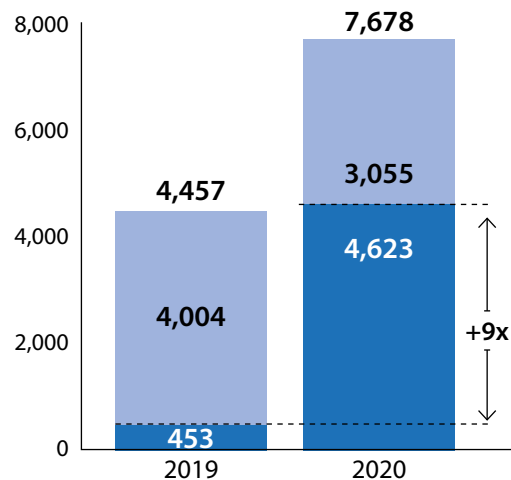
Throughout 2020 (from March to December) we have experienced a gradual increase in telemedicine appointments. The most common were of general pediatrics (2558), followed by allergology (1968), neurodevelopment (1024) and the new “post-emergency” telemedicine appointment (808). During this year, video-calls were also introduced, although sporadically.

Between March and June 2019 there were a total of 3375 pediatric appointments, contrasting with a decrease in 2020, with

A. Number of pediatric appointments Mar-June



B. Number of pediatric appointments July-Dec



**Figure 1.** Comparison of the number of pediatric appointments in the department between 2019 and 2020, for each period analysed (A: March to June and B: July to December). Colours differentiate the appointments performed face-to-face (light blue) and by telemedicine (dark blue).

only 2972 appointments. There was however an eight-fold increase in telemedicine appointments, with 235 in 2019 compared to 797 in the same period of 2020 (Fig. 1A).

In the second period analysed, from July to December 2020, our department showed a notable response during the COVID-19 pandemic, with an increase in telemedicine appointments, when compared to the homologous period in 2019.

During the second period, we had a total of 4457 pediatric appointments in 2019, either face-to-face or by telemedicine, compared with 7678 in 2020. Despite the reduction in the number of in-person appointments in this period of 2020 (4004 vs 3055), the increase in the number of telemedicine appointments (453 vs 4623) contributed to the higher total number of pediatric appointments. We have verified that between July and December 2020, 60% of our total number of appointments were done by telemedicine, in contrast to the same period in 2019, where only 10% of our pediatric appointments were done by telemedicine (Fig. 1B).

## Results in our department's perception

Out of 41 medical doctors of the pediatric department with outpatient clinic activity, 33 replied to the questionnaire (80.5%). The distribution of their areas of pediatric practice were: general pediatrics (51.5%), neonatology (15.2%), neurodevelopment (12.1%), allergology (9.1%), endocrinology/diabetes (9.1%), obesity (6.1%), nephrology (3%) and human immunodeficiency virus (HIV) vertical transmission risk (3%).

When asked if telemedicine was valuable during COVID-19 pandemic, all practitioners responded affirmatively. The possibility for evaluation of complementary exams was the reason most commonly found by these doctors to justify telemedicine's usefulness during this period (72.7%), followed by

chronic illness follow-up (70%) and prescription renovation (67%). The most important benefit considered by the majority of inquired pediatricians (48.5%) was the minimization of risk of infection by SARS-CoV-2. The most significant disadvantage according to 63.6% of practitioners was the impossibility to do physical examination, followed by the limitation on providing clinical information over distance (24.2%) and the barrier to doctor-patient relationship (21.2%). In addition, telemedicine was not considered pertinent as the first appointment for the majority of clinicians (75.8%).

In the opinion of 31 physicians, the majority of patients' parents were satisfied with telemedicine appointments. When asked about the perspective of using telemedicine in a future without pandemic, only 18.2% answered with a negative response.

## Discussion

In 2019 our department scarcely used telemedicine. It was used mainly to send medical reports to caregivers or for chronic medication renovation. The pandemic created a unique opportunity for enhanced use of telemedicine in all specialties, including pediatrics, offering solutions to protect patients, families, and healthcare workers from exposure to SARS-CoV-2.<sup>5</sup>

As an immediate response to the contingency plan imposed on a national level, we saw our face-to-face appointments to be reduced to a quarter between March and June, when compared to 2019. As such, according to DGH indications, and as seen in other hospitals,<sup>6</sup> in 2020 we have experienced a significant increase in telemedicine appointments, particularly in the last semester of 2020, that led to an increase in the total number of appointments when compared to 2019 (Fig. 1).

We identified several contributing factors for these results.

First, telemedicine minimizes risk of infection by SARS-CoV-2. Second, absenteeism is reduced. Since telemedicine did not lead to absence from work by parents or absence from school by children, it had a high acceptance by the former. Third, the lower frequency and lower severity of COVID-19 in pediatric age, together with the overall reduction of pediatric emergency department attendance, allowed some of the time of clinical activity in the pediatric department to be reallocated to the outpatient clinic activity, particularly in the last semester. Finally, another contributory factor for this increase was the creation of the “post-emergency” appointment, which was also part of the responsiveness of the department to the needs of the patients during this period. The latter was created in 2020 in order to inform our patient’s caregivers on the laboratory results, including also SARS-CoV-2, and re-evaluate their symptoms, according to DGH indications.<sup>7</sup>

Regarding our department’s perception on telemedicine, we had a response rate of 80.5% to the questionnaire. All the clinicians considered telemedicine beneficial during COVID-19 pandemic.

Minimizing risk of infection by SARS-CoV-2 was more frequently appointed as the greatest advantage of telemedicine during this period. This was followed by the usefulness of phone calls to inform the caregivers of their children’s complementary exams or to receive feedback on a patient follow-up, reducing the need for patients and parents to go to the hospital.

The lack of physical examination was the most significant hurdle highlighted by the questionnaire respondents. The following most referred issues were the limitation on communication and the barrier to doctor-patient relationship. In fact, in pediatric care the person of contact is usually not the patients themselves, but the caregivers. Additionally, the empathy and confidence are hindered during a telemedicine appointment, especially when the doctor-patient relationship history is short. Moreover, patient/caregivers literacy may be a challenge in communication during a telephone call. Video calls could potentially ameliorate these obstacles, despite the practitioners’ training needed, the difficulty of access or use for some families, and privacy concerns.<sup>6,8</sup>

The advantages and challenges pointed out by our practitioners were similar to the ones presented in other papers. Besides the ones that were discussed above, it has been reported telemedicine ensures equitable services to everyone and leads to fewer emergency department visits.<sup>6,8-10</sup>

In general, there was a positive response from most clinicians of our department, who expressed the will to keep using telemedicine in a future without pandemic. Moreover, in agreement with that, clinicians reported patients’ parents were satisfied with telemedicine appointments.

In the future, some issues that need to be addressed for a safe and wide adoption of telemedicine appointments include: evaluation of quality of care, as well as the adequacy of the number of visits needed, in order to maintain the existing

standards; confidentiality issues; and early detection of situations of child neglect, to name a few.<sup>10</sup>

## Conclusion

The COVID-19 outbreak brought to discussion the usefulness of a potentially underestimated resource. Telemedicine can never fully replace the face-to-face appointment, but it has many valuable benefits and, from our point of view, should be used as a complementary approach to provide the best possible care to our patients long after the COVID-19 crisis.

## Acknowledgments

We would like to gratefully thank all health care professionals who deal with this new disease on a daily basis, particularly those from our institution, who had a capacity to rearrange their daily appointments in order to provide our children the best medical attendance possible.

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## Responsabilidades Éticas

**Conflitos de Interesse:** Os autores declaram a inexistência de conflitos de interesse na realização do presente trabalho.

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**Confidencialidade dos Dados:** Os autores declaram ter seguido os protocolos da sua instituição acerca da publicação dos dados de doentes.

**Proteção de Pessoas e Animais:** Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

**Proveniência e Revisão por Pares:** Não comissionado; revisão externa por pares.

## Ethical Disclosures

**Conflicts of Interest:** The authors have no conflicts of interest to declare.

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**Confidentiality of Data:** The authors declare that they have followed the protocols of their work center on the publication of data from patients.

**Protection of Human and Animal Subjects:** The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

**Provenance and Peer Review:** Not commissioned; externally peer reviewed.

## Appendix 1. Questionnaire applied to evaluate the clinicians' perception on telemedicine appointments.

### Telemedicine appointments during the COVID-19 pandemic

During the COVID-19 pandemic, multiple measures were taken by our hospital in order to make it a more secure place for patients and health care workers. These included shutting down several routine outpatient departments and relying on telemedicine. This questionnaire aims to understand the opinion of pediatricians on telemedicine appointments.

#### 1. Do you consider telemedicine appointments were a surplus during the COVID-19 pandemic?

Yes  No

#### If your answer was "Yes", which of the following do you think was the most advantageous?

- a. Chronic illness follow-up
- b. Complementary diagnostic tests evaluation
- c. Medication adjustment
- d. Other: \_\_\_\_\_

#### 2. With regard to the inconveniences, please order the following situations from 1 to 6 (being 1 the most relevant and 6 de less relevant)

- a. Insecurity about doctor-patient confidentiality
- b. Barrier to the patient-doctor relation
- c. Limitation in communicating clinical information
- d. Inability to perform physical examination
- e. Difficulty in the phone call (missed call, wrong phone number, bad reception)
- f. Less confidence in the diagnosis/increase in medical error

#### 3. What is the most important advantage in telemedicine appointments? Please order the following situations from 1 to 6 (being 1 the most relevant and 6 the less relevant)

- a. Larger number of medical appointments
- b. Shorter duration of the appointment
- c. Reduced absenteeism
- d. Decrease in the risk of infection by SARS-CoV-2
- e. Earlier diagnosis
- f. More regular follow-up

#### 4. Do you believe most parents are satisfied with this modality (telemedicine appointments)?

Yes  No

#### 5. Do you consider pertinent the implementation of a first medical appointment by telemedicine?

Yes  No

#### 6. In a future without the pandemic, do you predict keeping telemedicine appointments?

Yes  No

#### 7. Which of these types of medical appointments do you perform?

- a. General pediatrics
- b. Obesity
- c. Neuropediatrics
- d. Endocrinology
- e. Allergology
- f. Development
- g. Nephrology
- h. Neonatology
- i. Vertical transmission

We thank you for your answers

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## References

1. Hu B, Guo H, Zhou P, Shi ZL. Characteristics of SARS-CoV-2 and COVID-19. *Nat Rev Microbiol.* 2021;19:141-54. doi: 10.1038/s41579-020-00459-7.
2. Zimmermann P, Curtis N. COVID-19 in Children, Pregnancy and Neonates : A Review of Epidemiologic and Clinical Features. *Pediatr Infect Dis J.* 2020;39:469-77. doi:10.1097/INF.0000000000002700.
3. WHO Guideline: recommendations on digital interventions for health system strengthening. Geneva: World Health Organization; 2019. [cited 2021 Feb 15]. Available from: <https://www.who.int/reproductivehealth/publications/digital-interventions-health-system-strengthening/en/>.
4. Norma da Direção Geral da Saúde 010/2015 de 15/06/2015. Modelo de Funcionamento das Teleconsultas [cited 2021 Feb 15]. Available from: <https://www.dgs.pt/directrizes-da-dgs/normas-e-circulares-normativas/norma-n-0102015-de-15062015-pdf.aspx>.
5. Chandler AL, Beavers JC, Hall RW. Telemedicine in pediatrics: Possibilities and pitfalls. *Pediatr Rev.* 2020;41:376-8. doi:10.1542/pir.2019-0171.
6. Nogueira M, Vale-Lima R, Silva C, Gonçalves D, Guardiano M. Telemedicina en pediatría del neurodesarrollo durante la pandemia de COVID-19: experiencia en un hospital terciario. *Rev Neurol.* 2020;71:467-8. doi:10.33588/rn.7112.2020554.
7. Norma da Direção Geral da Saúde 004/2020 de 23/03/2020, atualização 14/10/2020. COVID-19: Abordagem do Doente com Suspeita ou Confirmação de COVID-19 [cited 2021 Feb 15]. Available from: <https://www.dgs.pt/normas-orientacoes-e-informacoes/normas-e-circulares-normativas/norma-n-0042020-de-23032020-atualizada-a-141020201.aspx>.
8. Mahajan V, Singh T, Azad C. Using Telemedicine During the COVID-19 Pandemic. *Indian Pediatr.* 2020;57:658-61. doi:10.1007/s13312-020-1895-6.
9. Utidjian L, Abramson E. Pediatric Telehealth. Opportunities and Challenges. *Pediatr Clin North Am.* 2016;63:367-78. doi:10.1016/j.pcl.2015.11.006.
10. Badawy SM, Radovic A. Digital approaches to remote pediatric health care delivery during the COVID-19 pandemic: Existing evidence and a call for further research. *JMIR Pediatr Parent.* 2020;3:e20049. doi:10.2196/20049.