

Staff and patient satisfaction with telemedicine strategies adopted during the COVID-19 pandemic at a children's hospital

Gabriel Alcala Souza e Silva¹ , Fabio Carmona¹ 

ABSTRACT

Objective: This study aimed to assess the satisfaction of patients or their caregivers and medical staff with the telemedicine strategies adopted at HC Criança, a Brazilian tertiary-care hospital, during the COVID-19 pandemic. **Methods:** An electronic survey was sent to each group (patients/caregivers and staff) with questions on their experiences with telemedicine answered as Likert scales. **Results:** 81 answers were obtained from medical staff and 1,721 from patients/caregivers. Among patients/caregivers, 892 (52%) reported they did not have any appointment by telemedicine. Most patients/caregivers who experienced telemedicine at least once reported they were not trained to use telemedicine (77%), while overall satisfaction was 56%. Most (78%) believed telemedicine could be adopted after the pandemic. Among the medical staff, 77% reported they were not trained to use telemedicine, 56% rated their experience with telemedicine as satisfactory, and 78% believed telemedicine could be adopted in the future. **Conclusion:** Satisfaction with telemedicine of patients, their caregivers, and medical staff at HC Criança was good during the COVID-19 pandemic, even without proper training, and they think telemedicine could be adopted after the pandemic.

Keywords: Telemedicine, Pediatrics, COVID-19.

INTRODUCTION

One of the first mentions of telemedicine occurred in 1950, during the development of a transmission system for radiological images by telephone or radio between two hospitals in the United States. Later, in 1964, the first videoconference was made between Nebraska Psychiatric Institute and Norfolk State Hospital in Omaha.¹ Despite the evolution in telemedicine since then, its ethical principles were established in 1999 at the 51st annual General Assembly of the World Medical Association in Tel Aviv, Israel, with the Declaration of Tel Aviv.² In Brazil, telemedicine was regulated by the Brazilian Federal Council of Medicine (CFM) only in 2002, going through many modifications to date.^{3,4}

In 2020, during the 2019 new coronavirus disease (COVID-19) pandemic, measures adopted to mitigate the transmission of the disease restricted patient attendance to health services, especially outpatient clinics. In this context, telemedicine was the obvious choice to allow communication between

physicians and patients while adhering to the sanitary restrictions.⁵ COVID-19 triggered mass adoption and further development of telemedicine technology worldwide.⁶ This was essential to provide medical care while keeping social distancing and isolation. Previous reports on the experiences with telemedicine in many countries are available, including in the United States, at the Ann & Robert H. Lurie Children's Hospital in Chicago⁷ and the Lucile Packard Children's Hospital/Stanford Children's Health in California,⁸ as well in Germany,⁹ United Kingdom,¹⁰ Israel,¹¹ and others.

The CFM then released, in May 2020, emergency regulations supporting the use of telemedicine by medical services in three modalities: teleorientation, telemonitoring, and teleinterconsultation. Teleorientation was meant to provide patient education and counseling; telemonitoring, to allow physicians to keep track of objective health or disease parameters, such as vital signs and lab tests; and teleinterconsultation, to allow information exchange and case discussion between physicians of different areas.¹²

¹ University of São Paulo, Ribeirão Preto Medical School, Department of Pediatrics, Ribeirão Preto, (SP), Brazil.



In our hospital, Hospital das Clínicas de Ribeirão Preto, a Brazilian tertiary-care public university hospital, and its pediatric unit, HC Criança, the adoption of telemedicine was emergent in response to the restrictive measures to mitigate the transmission of COVID-19. This left little to no time to train staff and patients properly. Moreover, although there were previous studies reporting the relevance and safety of telemedicine in providing healthcare to adults and children in different countries,¹³ patients and health professionals in Brazil were not familiar with telemedicine. Besides, unlike in other countries, there was not enough equipment for web- or videoconferencing, so regular phone calls were used for teleorientation and telemonitoring. After an initial period of confusion, patients/caregivers and medical staff became more familiar with telemedicine, but it is important to assess their satisfaction to foster and further improve these practices.

Therefore, this study aimed to assess the training and satisfaction of patients and medical staff with telemedicine at HC Criança.

PARTICIPANTS AND METHODS

This was a cross-sectional electronic survey in which a questionnaire was sent to patients/caregivers and medical staff at HC Criança between February 19 and April 19, 2021. The study was approved by the local institutional review board (CAAE 41926821.1.0000.0068, opinion #4.536.007). All participants gave electronic consent. This study was designed according to The Checklist for Reporting Results of Internet E-Surveys (CHERRIES).¹⁴

The inclusion criteria for patients/caregivers were having had at least one medical appointment in the previous two years at HC Criança, agreeing to participate, and answering all survey questions. The inclusion criteria for medical staff were having provided medical care at least once in the previous two years, agreeing to participate, having used telemedicine at least once during the COVID-19 pandemic, and answering all survey questions.

The survey form was designed in Research Electronic Data Capture (REDCap, www.redcap.org).

Invitations to participate were sent as an SMS text message to all cell phone numbers available in the hospital database to two groups of participants: patients followed at HC Criança or their caregivers and medical staff. All patients and physicians were eligible. The research team had no access to the phone numbers. For medical staff, additional reminders were sent by e-mail and WhatsApp (Meta Platforms, Inc., Menlo Park, California, USA) messages. By clicking on the URL (link), participants were taken to an electronic informed consent form and asked for consent by choosing "I agree to participate in the study". Upon consenting, they were redirected to the questionnaire. The first questions addressed demographic information. For patients/caregivers, an additional question asked how often they have used telemedicine since the beginning of the COVID-19 pandemic. The following questions assessed perceptions and satisfaction with telemedicine during the COVID-19 pandemic. They were adapted from MinuteClinic® TeleHealth Survey.¹⁵ These questions were answered in Likert scales, with additional categories for "I rather not say", "I do not know", and "It does not apply to me", when appropriate. The questions were about demographics and presented a few statements to be rated as "Completely disagree", "Partly disagree", "Neutral", "Partly agree", or "Completely agree". The statements for patients/caregivers were: "I know what telemedicine is", "I was trained to use telemedicine", "I received high-quality care by the medical staff", "I trusted the recommendations given by medical staff", "I followed the recommendations given by medical staff", "I believe telemedicine can be adopted after the pandemics", and "My experience with telemedicine was satisfactory". The statements for medical staff were: "I know what telemedicine is", "I was trained to use telemedicine", "I provided high-quality care to the patients/caregivers", "Patients/caregivers trusted my recommendations", "Patients/caregivers followed my recommendations", "I believe telemedicine can be adopted after the pandemics", and "My experience with telemedicine was satisfactory". At the end of the survey, the participants were asked to write words they thought represented their experience with telemedicine.

STATISTICAL ANALYSIS

The answers were exported to a Microsoft Excel® spreadsheet (Microsoft Corporation, Redmond, USA) and summarized in means [standard deviations] or counts (percentages), as appropriate. For demographics, all respondents were considered. For patients/caregivers, the questions on perceptions and satisfaction with telemedicine were considered only if they had experienced telemedicine at least once after the beginning of the COVID-19 pandemic. For healthcare providers, all complete answers were analyzed. The word clouds demonstrated in this article were generated through the Wordclouds website (<https://www.wordclouds.com/>).

RESULTS

A total of 134,832 text messages were sent to potential participants (patients/caregivers), the questionnaire had 7,476 views, and 1,729 valid responses were recorded. Their demographic data are depicted in **Table 1**. Briefly, our sample of patients were mostly girls with a mean age of 8.8 [5.3] years and cared for mostly by their mothers with a mean age of 36.6 [8.8] years. These children were also frequently cared for by their fathers or grandparents.

The patients were followed by different medical specialties, as listed in **Table 2**, being the most frequent: neurology, endocrinology, general pediatrics, and cardiology (nearly 70% of patients).

Most patients/caregivers reported not having been contacted by the hospital or healthcare providers (**Figure 1**). The perception and satisfaction of patients/caregivers who experienced telemedicine at least once (n=892, 52%) are summarized in **Table 3**. Overall, the perception was positive. They considered the experience with telemedicine satisfactory (72.4% partly or completely agree), except that most of them did not receive training to use telemedicine (54.9% partly or completely disagree). Interestingly, they were more satisfied with the healthcare they received (77.2% high-quality, 80.5% trustworthy) than with telemedicine (72.4% satisfaction).

Eighty-one valid responses were recorded for medical staff. They were residents (64.2%), staff (33.3%), or faculty (2.5%). Their perceptions about telemedicine are summarized in **Table 4**. Overall, they rated their experience as positive and were satisfied with telemedicine (55.5% partly or completely agree), except that they were not properly and timely trained (76.5% partly or completely disagree). Just like patients/caregivers, medical staff rated the quality of care (67.9% partly or completely agree) and patient trust (76.5% partly or completely agree) better than their satisfaction with telemedicine (55.5%).

The words mentioned by all participants at the end of the survey are shown as word clouds in **Figure 2**. The most frequent words cited by patients/caregivers were: "unfamiliarity", "doubts", and "future". The words most frequently cited by medical staff were: "challenge", "practicality", and "future".

DISCUSSION

In this study, we showed that patients/caregivers and medical staff at HC Criança had to quickly adopt telemedicine during the COVID-19 pandemic without proper training, but their experiences were satisfactory, and they believed telemedicine could be adopted after the pandemic. Besides reducing the transmission of COVID-19, telemedicine has the potential to reduce waiting times (and lines) before appointments and expenses with transportation of patients from other cities. The money saved with less transportation could be used to acquire new equipment and software for telemedicine by smaller cities, increasing the likelihood of interactions and discussions between local staff and reference centers, paving the way for the future of medicine.

In our study, overall patient satisfaction was 72.4%. Nguyen et al. reviewed patient and healthcare provider satisfaction with telemedicine and their determinants.¹⁶ They found numerous studies demonstrating a high level of satisfaction with telemedicine. Aashima et al. (2021) reviewed 25 articles on the experiences of 48,144 patients with telemedicine in 12 different countries. They found 82.0–94.9% satisfaction with telemedicine

(phone or video calls), with higher satisfaction rates in the United States, followed by India and Egypt.¹⁷ In the Egyptian study, 91.5% of patients rated telemedicine similarly to in-person appointments in terms of satisfaction.¹⁸ In another study in the United Kingdom, patients rated telemedicine superior to in-person appointments during the pandemic.¹⁹ We speculate that patient satisfaction was lower in our study because adoption was emergent and proper training was impossible.

One interesting finding was that patients/caregivers were more satisfied with the health-care they received (77.2% high-quality, 80.5% trustworthy) than telemedicine (72.4% satisfaction). This is important because well-trained and motivated practitioners can deliver excellent quality care despite suboptimal conditions. Zhu et al. (2020) interviewed 26 health professionals who used telemedicine during the pandemic in a hospital in New Jersey, USA, and reported that 88.5% of them effectively addressed their patients' concerns, 84.6% checked the results of their patients' laboratory tests, and 76.9% could see and hear their patients very well.²⁰ In our study, medical staff reported high-quality (67.9%) and trustworthy care (76.5%) in a lower proportion. Many of the professionals in the study by Zhu et al. (80.8%) expressed their desire to incorporate telemedicine in their practice in the future,²⁰ which is only partially consistent with our results (82.3% for patients/caregivers and only 55.5% for practitioners).

Although our study did not specifically address the benefits, barriers, and facilitators to adopting telemedicine in our hospital, we observed that telemedicine is promising, relatively inexpensive, and can be further improved by incorporating new technologies and training staff. Researchers from other countries share our perceptions. For example, Xie et al. (2021) described the major barriers to the use of telemedicine by patients/caregivers and medical staff from Lucile Packard Children's Hospital/Stanford Children's Health, California, USA: socioeconomic disparities, different languages, different health insurance plans, geographical distance to medical centers, low-quality Internet connections, lack of patients' ability to use the telemedicine platforms, and lack of general guidelines on the use of telemedicine by

physicians.⁸ Julien et al. highlight that successful use of telemedicine relies on three factors: access to broadband internet, an internet-capable device, and sufficient technology literacy to take advantage of the first two factors.²¹ A recent systematic review and meta-analysis conducted by Eze et al. reported patient acceptability, satisfaction, and barriers to the use of telemedicine.²² Overall, patient acceptability and satisfaction with telemedicine were good, while lack of training, poor patient tolerance with faulty systems, and technical problems were the main barriers. Bokolo et al. report that the factors that may negatively impact the adoption of telemedicine can be organizational (insufficient funding, inadequate training, and poor workflow integration), technological (data privacy, data security, broadband access, and poor infrastructure), and social (licensure requirements, health insurance and reimbursement, lack of regulation, and patients' and healthcare providers' willingness).⁶ In our hospital, we believe that the major barriers to the use of telemedicine were the lack of training (for patients/caregivers and medical staff) but mostly the lack of institutional guidelines at first. After the initial period, our hospital released instructions and guidelines and acquired software and equipment to support the extensive use of telemedicine.

Regarding national policies, on the other hand, it was only in 2022 that CFM released new guidelines on the use of telemedicine in Brazil, revoking the previous regulation and creating seven modalities: teleconsultation, teleinterconsultation, telediagnostic, telesurgery, tele-surveillance, telescreening, and teleconsulting. Teleconsultation is a non-presential medical appointment; teleinterconsultation allows information exchange and case discussion between physicians of different areas. Telediagnostic is the issue of reports on the results of exams sent online. Telesurgery is a robotic surgery remotely driven by a physician. Telesurveillance or tele-monitoring consists of the remote supervision of health indicators such as vital signs or lab tests. Telescreening is the remote assessment of a patient's condition to guide referral to specialized care. Finally, teleconsulting is an administrative procedure, a remote consulting.²³ Although these regulations are very welcome, they are late.

The main strength of our study is the high number of responses timely obtained during a period of intense social restrictions imposed by COVID-19. This sample is representative of a population of pediatric patients with chronic and complex conditions. Among the limitations of our study, we mention: (1) the lack of an instrument validated to capture the specific perceptions of patients and health professionals regarding telemedicine; (2) our sample extracted from a highly selected population of pediatric patients with chronic and complex health conditions, which limits the generalizability of our findings to other populations assisted in centers of lower complexity; and (3) the opinions and perceptions about telemedicine reflect the emergent use and could be different if patients/caregivers and physicians were more familiar with it.

CONCLUSION

In conclusion, the satisfaction with telemedicine of patients, their caregivers, and medical staff at HC Criança, a tertiary-care pediatric hospital, was reasonable during the COVID-19 pandemic, even without proper training, and they think telemedicine could be adopted after the pandemic.

REFERENCES

1. Zundel KM. Telemedicine: history, applications, and impact on librarianship [Internet]. 1996 [cited 2022 May 7]. Available from: <https://pubmed.ncbi.nlm.nih.gov/8938332/>
2. World Medical Association [homepage on the Internet]. Statement on Accountability, Responsibilities and Ethical Guidelines in the Practice of Telemedicine [Internet]. 2017 [cited 2021 Nov 27]. Available from: <https://www.wma.net/policies-post/wma-statement-on-accountability-responsibilities-and-ethical-guidelines-in-the-practice-of-telemedicine/>
3. Conselho Federal de Medicina. Resolução CFM no. 1.643/2002. Brasil: Diário Oficial da União.; 2002 p. 205.
4. Conselho Federal de Medicina. Resolução CFM no. 2.227/2018. Brasil: Diário Oficial da União; 2018.
5. Fernandes Garcia MV, Fernandes Garcia MA. Telemedicine, segurança jurídica e COVID-19: onde estamos? *Jornal Brasileiro de Pneumologia* [Internet]. 2020;46(4):e20200363–e20200363. Available from: http://www.jornaldepneumologia.com.br/detalhe_artigo.asp?id=3402
6. Bokolo AJ. Exploring the adoption of telemedicine and virtual software for care of outpatients during and after COVID-19 pandemic. *Ir J Med Sci* [Internet]. 2021;190:1–10. Available from: <https://doi.org/10.1007/s11845-020-02299-z>
7. Schinasi DA, Foster CC, Bohling MK, Barrera L, Macy ML. Attitudes and Perceptions of Telemedicine in Response to the COVID-19 Pandemic: A Survey of Naïve Healthcare Providers. *Front Pediatr*. 2021 Apr 7;9.
8. Xie J, Prahalad P, Lee TC, Stevens LA, Meister KD. Pediatric Subspecialty Adoption of Telemedicine Amidst the COVID-19 Pandemic: An Early Descriptive Analysis. *Front Pediatr*. 2021 Apr 13;9.
9. Peine A, Paffenholz P, Martin L, Dohmen S, Marx G, Loosen SH. Telemedicine in Germany during the COVID-19 pandemic: Multi-professional national survey. *J Med Internet Res*. 2020 Aug 1;22(8).
10. Iqbal MR, Chaudhuri A. COVID-19: Results of a national survey of United Kingdom healthcare professionals' perceptions of current management strategy – A cross-sectional questionnaire study. *International Journal of Surgery*. 2020 Jul 1;79:156–61.
11. Grossman Z, Chodick G, Reingold SM, Chapnick G, Ashkenazi S. The future of telemedicine visits after COVID-19: perceptions of primary care pediatricians. *Isr J Health Policy Res*. 2020 Dec 1;9(1).
12. Conselho Federal de Medicina. Ofício CFM Nº 1.756/2020. Brasília; 2020.
13. Orlando JF, Beard M, Kumar S. Systematic review of patient and caregivers' satisfaction with telehealth video-conferencing as a mode of service delivery in managing patients' health. Borsci S, editor. *PLoS One* [Internet]. 2019 Aug 30;14(8):e0221848. Available from: <https://dx.plos.org/10.1371/journal.pone.0221848>
14. Eysenbach G. Improving the quality of web surveys: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES). Vol. 6, *Journal of Medical Internet Research*. JMIR Publications Inc.; 2004.
15. Polinski JM, Barker T, Gagliano N, Sussman A, Brennan TA, Shrank WH. Patients' Satisfaction with and Preference for Telehealth Visits. *J Gen Intern Med*. 2016 Mar 1;31(3):269–75.
16. Nguyen M, Waller M, Pandya A, Portnoy J. A Review of Patient and Provider Satisfaction with Telemedicine. Vol. 20, *Current Allergy and Asthma Reports*. Springer; 2020.
17. Aashima MN, Sharma R. A Review of Patient Satisfaction and Experience with Telemedicine: A Virtual Solution During and Beyond COVID-19 Pandemic. *Telemedicine and e-Health*. 2021 Mar 12;
18. Mostafa PIN, Hegazy AA. Dermatological consultations in the COVID-19 era: is teledermatology the key to social distancing? An Egyptian experience. *Journal of Dermatological Treatment*. 2020;1–6.

19. Smrke A, Younger E, Wilson ; Roger, Husson O, Farag S, Merry E, et al. Telemedicine During the COVID-19 Pandemic: Impact on Care for Rare Cancers [Internet]. Available from: <https://doi.org/10.>
20. Zhu C, Williamson J, Lin A, Bush K, Hakim A, Upadhyaya K, et al. Implications for Telemedicine for Surgery Patients After COVID-19: Survey of Patient and Provider Experiences. Vol. 2020, The American Surgeon. 2020.
21. Julien HM, Eberly LA, Adusumalli S. Telemedicine and the Forgotten America. Vol. 142, Circulation. Lippincott Williams and Wilkins; 2020. p. 312–4.
22. Eze ND, Mateus C, Hashiguchi TCO. Telemedicine in the OECD: An umbrella review of clinical and cost-effectiveness, patient experience and implementation. Vol. 15, PLoS ONE. Public Library of Science; 2020.
23. Conselho Federal de Medicina. Resolução CFM N° 2.314, de 20 de abril de 2022. Define e regulamenta a telemedicina, como forma de serviços médicos mediados por tecnologias de comunicação [Internet]. 2022 p. 227–31. Available from: <https://www.in.gov.br/en/web/dou/-/resolucao-cfm-n-2.314-de-20-de-abril-de-2022-397602852>

Declaration of conflict of interest:

Nothing to declare.

Financial Support:

None.

AUTHORS' CONTRIBUTIONS

GASS and FC: Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; Drafting the work or revising it critically for important intellectual content; Final approval of the version to be published; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Corresponding Author:
Gabriel Alcala Souza e Silva
gabriel-alcala@hotmail.com

Editor:
Prof. Dr Felipe Villela Gomes

Received: jun 06, 2022
Approved: mar 23, 2023

Table 1

Demographic characteristics of patients and caregivers.

Characteristic	Result
Patients' age (years)	8.8 [5.3]
Male gender	834 (48.1%)
Caregiver	
Mother	1460 (84.1%)
Father	145 (8.4%)
Grandparent	47 (2.7%)
Uncle or aunt	23 (1.3%)
Sibling	15 (0.9%)
Legal guardian	24 (1.4%)
Other	22 (1.3%)
Caregivers' age (years)	36.6 [8.8]

Caption: Data are mean [standard deviation] or number (percentage).

Table 2

Pediatric specialties the patients were followed by at HC Criança, 2021 (in decreasing order of frequency).

Specialty	N (%)
Neurology	450 (26.3)
Endocrinology	315 (18.4)
General Pediatrics	242 (14.2)
Cardiology	182 (10.6)
Ophthalmology	163 (9.6)
Gastroenterology	137 (8.1)
Immunology	127 (7.4)
Pediatric Surgery	109 (6.4)
Neurosurgery	108 (6.3)
Pneumology	108 (6.3)
Nephrology	102 (5.9)
Otorhinolaryngology	98 (5.7)
Allergology	65 (3.8)
Oncology	65 (3.8)
Rheumatology	55 (3.2)
Hematology	46 (2.7)
Infectious Diseases	36 (2.1)
Gynecology	35 (2.1)
Neonatology	32 (1.9)
Urology	34 (1.9)
Hepatology	22 (1.3)
Other	376 (22.0)

Table 3

Relative distributions the perceptions of patients or their caregivers about telemedicine at HC Criança, 2021 (n=892).

Statement	Completely disagree	Partly disagree	Neutral	Partly agree	Completely agree
I know what telemedicine is	10.7%	7.0%	10.9%	26.5%	45.0%
I was trained to use telemedicine	45.4%	9.5%	17.2%	12.8%	15.2%
I received high-quality care from the medical staff	10.2%	5.3%	7.4%	17.7%	59.5%
I trusted the recommendations given by the medical staff	10.1%	2.9%	6.5%	15.2%	65.3%
I followed the recommendations given by the medical staff	8.5%	2.1%	3.7%	12.7%	73.0%
I believe telemedicine can be adopted after the pandemic	12.0%	6.2%	9.6%	22.9%	49.4%
My experience with telemedicine was satisfactory	10.7%	5.2%	11.7%	19.7%	52.7%

Caption: Cells with the higher frequency for each statement are shaded in gray.

Table 4

Relative distributions the perceptions of medical staff about telemedicine at HC Criança, 2021 (n=81).

Statement	Completely disagree	Partly disagree	Neutral	Partly agree	Completely agree
I know what telemedicine is	0%	1.2%	3.7%	32.1%	63.0%
I was trained to use telemedicine	43.2%	33.3%	11.1%	8.6%	3.7%
I provided high-quality care to the patients/caregivers	1.2%	8.6%	22.2%	40.7%	27.2%
Patients/caregivers trusted my recommendations	1.2%	3.7%	18.5%	40.7%	35.8%
Patients/caregivers followed my recommendations	1.2%	11.1%	30.9%	43.2%	13.6%
I believe telemedicine can be adopted after the pandemic	2.5%	14.8%	4.9%	46.9%	30.9%
My experience with telemedicine was satisfactory	2.5%	16.0%	25.9%	37.0%	18.5%

Caption: Cells with the higher frequency for each statement are shaded in gray.

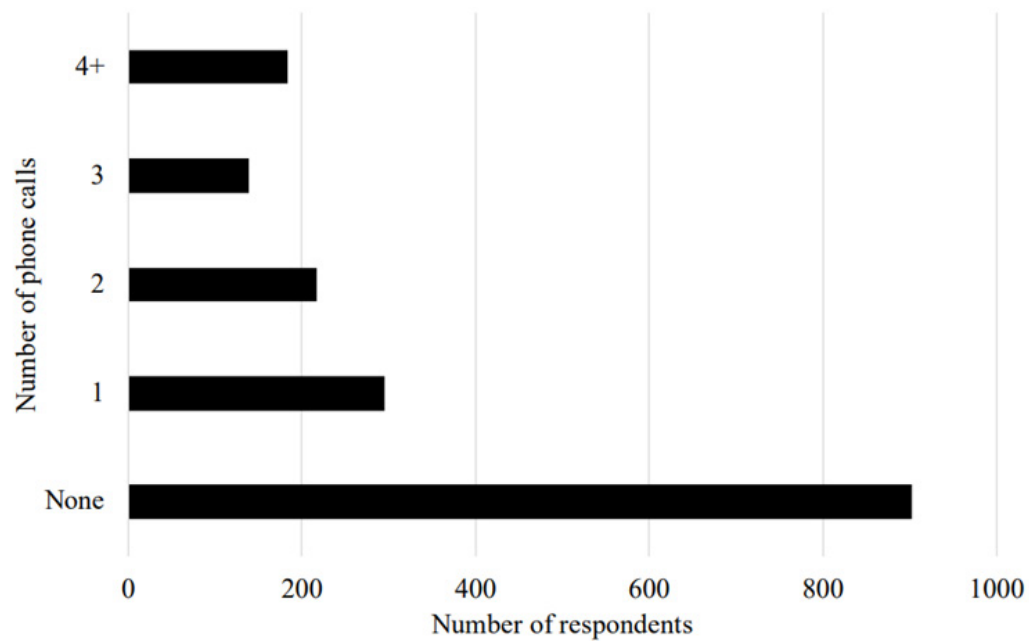
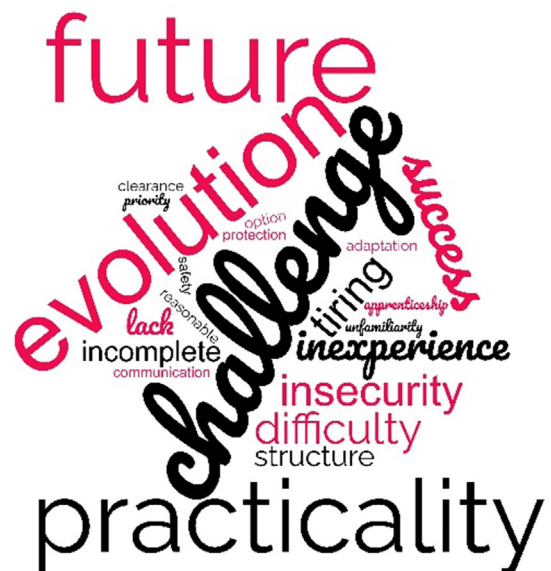


Figure 1: Number of phone calls received by patients/caregiver at HC Criança, 2021 (n=1,721).



(A) Patients/caregivers



(B) Medical staff

Figure 2: Word clouds with words mentioned by (A) patients or their caregivers and (B) medical staff about telemedicine at HC Criança, 2021.