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Effectiveness of telemedicine in health care in COVID-19 times: a systematic review

Efectividad de la telemedicina en la atención médica en tiempos de COVID-19: una revisión sistemática

Efetividade da telemedicina na assistência à saúde em tempos de COVID-19: uma revisão sistemática

ABSTRACT

Objective: To assess the impact of the use of telemedicine in health care during the COVID19 pandemic. **Method:** A systematic observational and qualitative review was carried out between June and July 2020, on SciELO, BVS and PubMed platforms. 834 studies were found and were analyzed 6. **Results:** All studies demonstrated an increase in the use of remote support as an element of health care during the outbreak. It was observed 83.33% of the writings showed interest in the use of telemedicine quantitatively, with user satisfaction at 66.66% and contentment and average utility rate above 90%. It was also identified a decrease in the rate of depression and anxiety after distance care. All variables indicated high significance. **Conclusions:** Telemedicine, during COVID19, proved to be an advantage as a health care mechanism. The high rates of acceptance and applicability corroborate the expectation of using this alternative tool, as medical support, in addition to the pandemic.

DESCRIPTORS: Pandemic; Public health; COVID-19; Telemedicine.

RESUMEN

Objetivo: Evaluar el impacto del uso de la telemedicina en la atención médica durante la pandemia de COVID19. **Método:** Se realizó una revisión observacional y cualitativa sistemática entre junio y julio de 2020, en plataformas SciELO, BVS y PubMed. Se encontraron 834 estudios y analizaron 6. **Resultados:** Todos los estudios demostraron un aumento en el uso de soporte remoto como elemento de atención de salud durante el brote. Se observó que el 83,33% de los escritos mostró interés en el uso de la telemedicina cuantitativamente, con satisfacción del usuario en 66,66% y satisfacción y tasa de utilidad promedio superior al 90%. También se identificó una disminución en la tasa de depresión y ansiedad después de la atención a larga distancia. Todas las variables indicaron alta significancia. **Conclusiones:** La telemedicina, durante el COVID19, resultó ser una ventaja como mecanismo de atención de la salud. Las altas tasas de aceptación y aplicabilidad corroboran la expectativa de utilizar esta herramienta alternativa, como apoyo médico, además de la pandemia.

DESCRIPTORES: Pandemia; Salud pública; COVID-19; Telemedicina

RESUMO

Objetivo: Avaliar o impacto do uso da telemedicina na assistência à saúde durante a pandemia de COVID19. **Método:** Realizou-se uma revisão sistemática observacional e qualitativa, entre junho e julho de 2020, nas plataformas da SciELO, BVS e PubMed. Foram encontrados 834 estudos e analisados 6. **Resultados:** Todos os estudos demonstraram aumento do uso de suporte remoto como elemento de assistência em saúde durante o surto. Observou-se que 83,33% dos escritos demonstraram interesse pelo uso da telemedicina quantitativamente, com satisfação dos usuários em 66,66% e contentamento e taxa média de utilidade acima de 90%. Foi identificado, também, diminuição no índice de depressão e ansiedade após atendimentos à distância. Todas variáveis indicaram alta significância. **Conclusões:** A telemedicina, durante a COVID19, se mostrou vantajosa como mecanismo de assistência em saúde. Os índices elevados de aceitação e aplicabilidade corroboram para a expectativa do uso dessa ferramenta alternativa, como suporte médico, para além da pandemia.

DESCRIPTORES: Pandemia; Saúde Pública; COVID-19; Telemedicina.

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ORCID: 0000-0002-3564-3597**INTRODUCTION**

Classified as a Public Health Emergency of International Importance (the highest alert level of the World Health Organization - WHO) since January 30th, 2020, the outbreak of COVID-19, the disease caused by the new coronavirus, is now considered a pandemic on March 11th of the same year. Infection with the SARS-CoV-2 virus can trigger acute cases of severe respiratory failure, and its most common symptoms are: fever, tiredness and dry cough. Some patients may experience nasal congestion, headache, conjunctivitis, diarrhea, and loss of taste or smell. On May 2nd, 2021, more than 150 million cases were confirmed in the world and already surpasses 3 million deaths.¹

The volatility of borders, together with the enormous influx of people worldwide, contributed to a rapid spread of the disease, which, to a certain extent, forced the regulation of new work alternatives, which were redesigned to meet the urgent needs of the new reality.²

In this troubled and hitherto unprecedented scenario, the expansion of telehealth-related services, including telemedicine, stands out. This education and medical care tool became part of the routine of service providers and patients, in the most diverse types of contact (routine appointments, specialist assistance, medical visits, among others). In this scenario, the pandemic caused by the new coronavirus has led to an acceleration movement of an incipient practice, but which shows an

ascendancy in participation in the healthcare market in the last decade. Access to this methodological tool was widely discussed and its implementation, on an emergency basis, was widely disseminated.²

The reorganization of health services with greater inclusion of this tool proved to be, in a way, revolutionary, with the new coronavirus pandemic being a milestone in the history of its contributions. Rethinking the flow of care in the context of social isolation proved to be of great value for the containment of incident cases and a possible collapse of health systems.^{2,4}

The considerable insertion and adequacy of telemedicine in the public and supplementary system democratized the reach of knowledge, generating benefits in health care and becoming an important additional instrument in the doctor-patient relationship. In this context, many patients began to understand it as essential in their health care, not being intimidated by technology and making efforts to adopt it.^{5,6}

Within this perspective, in this systematic review, we sought to assess the impact of telemedicine on health care in times of COVID-19 pandemic, in order to discuss the care, ethical, social and cultural impact of this tool for the community in general.

METHOD

This is a systematic review of online search, carried out independently by two researchers and reviewed by a third party, using the recommendations of the

Preferred Reporting Items for Systematic Reviews and MetaAnalyses (PRISMA).⁶ The research is observational, exploratory, cross-sectional with qualitative analysis and systematic random sampling.

First, we searched the databases of the Virtual Health Library (VHL), PubMed and SciELO, between the period of June and July 2020, regarding the theme of Telemedicine and its impact on the health context. The following terms were used as Boolean descriptors and operators: “Telemedicine” or “tele-saude services” or “esaude” or “tele-care” and “COVID-19” or “coronavirus” or “SARS-CoV-2” and “pandemic”.

After this moment, among the articles found, the texts published in the last year, in the human species, written in English, Spanish or Portuguese and with full reading availability were included. In addition, only clinical trials, observational articles or controlled studies in LILACS or MEDLINE databases were used as inclusion factors. Short papers and publications that were theses, dissertations, research protocols, review articles, conference proceedings or guidelines were excluded.

Thus, 834 articles were found for exploration in three phases. The first stage consists of the manual exclusion of repeated publications, the second, the initial screening based on titles, and the third, the analysis of abstracts. In this context, articles that met the chronic components of the PICO question, “What is the effectiveness of telemedicine in health care in times of pandemic?” were included.

Thus, after consensus among researchers, 44 articles were eligible for the third phase of analysis. During this stage, 32 articles that did not fit the proposed theme were excluded, that is, they did not reveal the impact of telemedicine, did not focus on the pandemic or did not address telemedicine in the care process. Thus, 12 potentially relevant articles were selected for full reading.

For each study included, the following data were extracted: authors, journal titles, country, year of publication, institution where the study was conducted, type of publication, methodological characteristics of the study, data treatment, main results, implications, level of evidence, methodological rigor and identification of limitations and biases.

After proceeding with a complete reading of the 12 selected articles and extracting the data in a form developed

by the authors, eligibility was independently verified by the researchers and disagreements were resolved by consensus among the group. Thus, 6 articles were excluded, as 4 lacked methodological quality and quantity of biases and 2 did not focus on the pandemic, which invalidates the aforementioned articles for this review.

Therefore, this review relies on the extraction of data from 6 articles, highlighting the use of telemedicine in a chaotic moment experienced worldwide, its benefits and harms, user satisfaction and its actual reported applicability, by both the physician and the patient's vision.

For the quality analysis of the studies, the ACROBAT-NRSI tool (The Cochrane Risk Of Bias Assessment Tool: for Non-Randomized Studies of Interventions) developed by the Cochrane Collaboration was used. In the meantime, the biases were divided into

seven categories, namely: confounding bias, selection, measurement, follow-up, missing data, outcome measure and selective reporting of outcomes. In each category, the risk of bias was classified as low, moderate, serious or critical, and the risk of total bias was subsequently classified.⁷

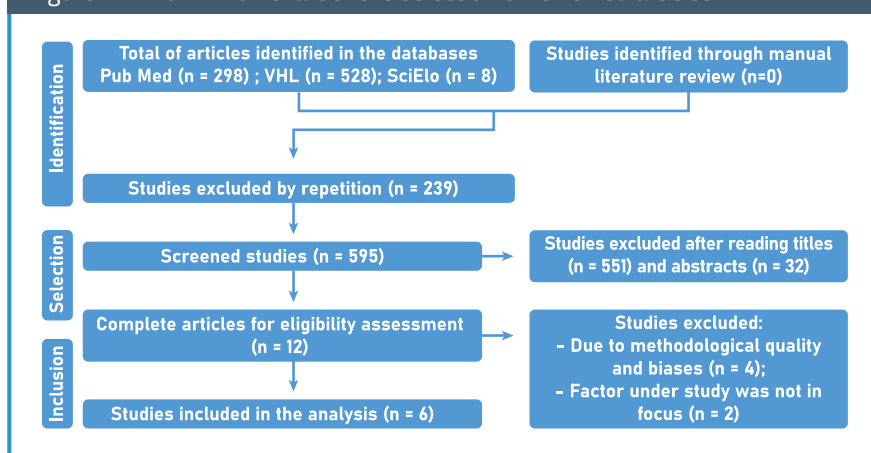
RESULTS

A total of 834 research-related studies were identified in the database. Of these, 6 texts met the inclusion criteria and were evaluated using the content analysis method. Figure 1 presents the flowchart with the steps of identification, selection and inclusion of articles. Table 1 summarizes the main characteristics of the selected studies.

Among the results found, the territorial distribution of the articles is noteworthy, since the number of cases occurs mostly in the continent of the Americas, 1 which reflects the largest number of articles also identified in this region, 50% in the American continent, 33% in Asia and 17% in Europe.

All studies were published in 2020, due to the pandemic and the average duration of the research was approximately 32 days. Of the 6 articles analyzed, 5 were typified as observational (84%), with only 1 of them being experimental (16%). Regarding the quality of the texts, it was observed that all articles had a moderate overall risk of bias, that is, they were suitable for investigation, especially in a relatively short period of time from the onset of the pande-

Figure 1: PRISMA flowchart of the selection of reviewed articles



Source: Rezende, GR et al., 2021

Table 1: Main characteristics of selected studies

AUTHOR (S)	YEAR	COUNTRY	DURATION OF STUDY	SAMPLES	TYPE OF STUDY	TOTAL BIAS RISK
Capozzo et al. ⁸	2020	Italy	15 days	31	Observational	Moderate
Hong et al. ⁹	2020	USA	57 days	6146	Observational	Moderate
Layfield et al. ¹⁰	2020	Pennsylvania	30 days	100	Observational	Moderate
Olayiwola et al. ²	2020	USA	56 days	6740	Observational	Moderate
Shenoy et al. ¹¹	2020	India	8 days	100	Observational	Moderate
Wei et al. ¹²	2020	China	26 days	22	Experimental	Moderate

Source: Rezende, GR et al., 2021

mic. Table 2 shows the full quality assessment of the studies according to the ACROBAT-NRSI.⁷

The articles in their entirety pointed to the increased use of telemedicine during the pandemic. Among the studies, 83,33% of the articles quantitatively measured interest in remote support and 66,66% assessed patient satisfaction in this context. Given this situation, the degree of usefulness and contentment of patients and health professionals was observed, with the average degree of applicability being 91,80% and the degree of satisfaction being 92,46% in studies that evaluated these markers. All study variables showed high significance.

In addition, the quality of telemedicine was also identified through the reduction of depression and anxiety after remote consultations, calculated by scores of 17HAMD ($t = -3,089$, $p = 0,005$) and HAMA ($t = -3,746$, $p = 0,001$). Qualitative records on service delivery, feasibility and satisfaction were also analyzed in this systematic review.

DISCUSSION

The selected articles explained about care in Telemedicine and its implications in a pandemic context, a matter of extreme relevance in medical practice. In this context, the articles covered web-mediated communication, user satisfaction, conduct feasibility, population

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interest and benefits of this tool in a complex period.

Faced with a turbulent and uncertain scenario, the transformation of models to provide safe care to patients was inevitable. Telemedicine, which until then was not very significant in the world context, appears as a reality on the rise during the pandemic. The demand for remote care grew significantly during this period and became essential to guarantee the social distance promoted by quarantine, the main strategy to avoid contagion with the new virus, that is, to reduce viral circulation and, consequently, infection.

Despite being a new model, most of the population was willing to include virtual care in their routine, as a way to ensure their safety and that of their families during isolation. In addition to the imminent interest, studies have shown that user satisfaction was undeniable. The triggering factors for this contentment are not only security, but also the reduction of long waiting lines, flexible schedules and quick access. Thus, it is clear the acceptance and success of this tool, until then little used.

In the meantime, the effect of telemedicine on patients with symptoms of depression and anxiety during COVID-19 was also discussed. Fear of the virus, uncertainty about the future, loneliness in isolation and socioeconomic impacts were undoubtedly triggering factors that impacted mental health.

Table 2: Assessment of the quality of studies before the ACROBAT-NRSI

FIRST AUTHOR	CONFUSION BIAS	SELECTION BIAS	MEASUREMENT BIAS	FOLLOW-UP BIAS	MISSING DATA BIAS	OUTCOME MEASUREMENT BIAS	SELECTIVE REPORTING BIAS OF OUTCOMES
Capozzo ¹⁰	Moderated	Moderated	Low	Moderated	Low	Moderated	Moderated
Hong ¹¹	Moderated	Low	Low	Moderated	Low	Moderated	Moderated
Layfield ¹²	Moderated	Moderated	Moderated	Moderated	Low	Moderated	Moderated
Olayiwola ³	Moderated	Low	Low	Low	Low	Low	Low
Shenoy ¹³	Moderated	Moderated	Low	Moderated	Low	Low	Moderated
Wei ¹⁴	Moderated	Moderated	Low	Low	Low	Low	Low

Source: Rezende, GR et al., 2021

What drew attention in the study was the rapid improvement in symptoms when patients were followed by remote applications.¹³ This is because, with the flexibility of this tool, it is possible to maintain continuous treatment within the home, providing better guidance for conduct and reflection.

In addition to providing a reduction in psychological distress, telemedicine allowed an increase in access to health services, a fact that boosted the promotion and prevention of risks, which are central characteristics of care. With this tool, it was possible to democratize access to excellent professionals for anyone in any part of the world, combined with better decision-making.

Thus, it is a fact that telemedicine cannot cover all health care, especially those that require physical and complementary examinations, but it is an element that, if used within ethical norms, can add to care and access to health beyond the pandemic period.

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CONCLUSION

This review addressed the effectiveness of telemedicine in health care during the COVID-19 pandemic and demonstrated that the remote medical care model is not only important in pandemic moments, but also beyond the disease outbreak.

This conclusion highlights evidence of usefulness for clinical practice, in the sense that it exposes telemedicine as a mechanism increasingly thought out and used as an instrument of assistance and access to health, which proved capable of guiding and monitoring patients from a distance, in an assertive, fast and continuous way, thus allowing access to hospitals and clinics for those who really need face-to-face care.

In this reasoning, this remote support apparatus is admitted as an appropriate, adequate and effective alternative as a reinforcement for the structure of access to health. Changing the expectation of care tends to be beneficial both in the emergency period and beyond. ■

REFERENCES

1. Organização Pan-Americana da Saúde. Folha informativa – COVID-19 (doença causada pelo novo coronavírus). Brasília, 2021.
2. Olayiwola, Nwando et al. Telehealth as a Bright Spot of the COVID-19 Pandemic: Recommendations From the Virtual Frontlines (« Frontweb »). *JMIR Public Health and Surveillance*, 6(2), e19045, 2020.
3. Lurie, Nicole et al. The Role of Telehealth in the Medical Response to Disasters. *JAMA Intern Med*, 178(6), 745-746, 2018.
4. Rabuñal, Ramón et al. Usefulness of a Telemedicine Tool TELEA in the Management of COVID-19 Pandemic. *Telemedicine and e-Health*, 2020.
5. Castro, T.M.S.; Guimaraes Silva, B.A.; Venturi, K.; Análise quantitativa do atendimento remoto durante a pandemia do COVID-19 relacionado aos marcos históricos da doença no Brasil. *Saúde Coletiva (Barueri)*, (10) N. 53, 2020.
6. Mishra, Vinaytosh et al. Factors affecting the adoption of telemedicine during COVID-19. *Indian Journal of Public Health*, 64 (6), 234, 2020.
7. Urrútia G, Bonfill X. PRISMA declaration: a proposal to improve the publication of systematic reviews and meta-analyses. *Med Clin* 2010; 9;135(11):507-511.
8. Sterne JAC, Higgins JPT, Reeves BC on behalf of the development group for ACROBAT- NRSI. A Cochrane Risk Of Bias Assessment Tool: for NonRandomized Studies of Interventions (ACROBAT- NRSI), Version 1.0.0, 24 September 2014.
9. Capozzo, Rosa et al. Telemedicine is a useful tool to deliver care to patients with Amyotrophic Lateral Sclerosis during COVID-19 pandemic: results from Southern Italy. *Journal Amyotrophic Lateral Sclerosis and Frontotemporal Degeneration*. 2020
10. Hong, Young-Rock et al. Population-Level Interest and Telehealth Capacity of US Hospitals in Response to COVID-19 : Cross-Sectional Analysis of Google Search and National Hospital Survey Data. *JMIR Public Health and Surveillance*. Vol 6. 2020
11. Layfield, Eleanor et al. Telemedicine for head and neck ambulatory visits during COVID-19: Evaluating usability and patient satisfaction. *Head & Neck*. Vol 42. 2020
12. Shenoy, Padmanabha et al. Switching to teleconsultation for rheumatology in the wake of the COVID-19 pandemic: feasibility and patient response in India. *Clin Rheumatol*. 1-6. 2020.
13. Wei, Ning et al. Efficacy of Internet-Based Integrated Intervention on Depression and Anxiety Symptoms in Patients with COVID-19. *J Zhejiang Univ Sci B*. Vol 5. 400-404. 2020