



Comparing the effectiveness of Telehealth and in-person care during COVID-19 crises: A systematic literature review

Victor Savi & Amos Mulu

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Laurea University of Applied Sciences

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The onset of the COVID-19 pandemic had a significant impact on global healthcare delivery, leading to the need for alternative means of providing care while reducing the risk of infection. This systematic literature analysis focused on examining the effectiveness of Telehealth and in-person care during the COVID-19 crisis, specifically in terms of clinical outcomes, care quality, access to care, costs, chronic diseases, patient and healthcare provider satisfaction, utilization, and barriers.

The study aims to answer two research questions: 1) What is the overall effectiveness of Telehealth compared to in-person care during the COVID-19 crisis regarding health outcomes, patient satisfaction, and healthcare provider satisfaction? 2) How does patient and healthcare provider satisfaction with Telehealth compare to in-person care during the COVID-19 crisis regarding convenience, communication, trust, and perceived effectiveness?

The study utilized a systematic literature review methodology, searching databases such as MEDLINE, Science Direct PubMed, Cochrane Library, and CINAHL for relevant studies published between 2019 and 2023. Quality appraisal was performed using various tools, including the JBI Critical Appraisal Checklist for Systematic Review, CASP SCALE, PRISMA-ScR, MMAT, and NOS. Data collected from the studies was analysed, categorized into themes, and examined for key findings.

Nine studies met the inclusion criteria and were included in the analysis, leading to the identification of themes such as the convenience of Telehealth compared to in-person care, patient and healthcare provider satisfaction with both forms of care, and the utilization of Telehealth and in-person care during the COVID-19 crisis.

Findings suggest that Telehealth has proven to be a convenient and effective strategy for providing healthcare, with positive outcomes and cost-effectiveness. However, there are limitations, such as technical difficulties and lack of physical examination. The pandemic has affected in-person care due to increased infection risks and resource limitations. It is essential to weigh the benefits and drawbacks of both Telehealth and in-person care. More research is needed to determine the long-term effects of these modalities, which can better inform policymakers and healthcare administrators on how to deploy them.

Keywords: Telehealth, In person Care, Crises, Healthcare.

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1 Introduction

Public health emergencies are occurrences or events that pose a significant risk to the safety and health of the population. These occurrences usually require a fast response to prevent the spread of injuries or diseases. They range from wildfires, man-made disasters, natural calamities or diseases. Examples include the Ebola outbreak, hurricanes, tsunamis and the COVID-19 pandemic (World Health Organization 2018).

COVID-19 is a respiratory disease caused by coronavirus SARS-CoV-2. It was first reported in China in December 2019 and has since spread to other parts of the world where it wreaked havoc (Tang, Comish & Kang 2020). This disease is highly contagious, spreading mainly through channels such as physical contact, respiratory droplets such as sneezes and talking, or airborne transmission.

The symptoms of the viral disease range from one person to another, but the most common signs are high fever, fatigue, cough, difficulty in breathing, sore throat, congestion and taste loss. The severity of the diseases ranges from one person to another, making these symptoms appear to some people and not others (Tang et al. 2020). However, the diseases can cause severe illnesses or even deaths, especially in children, older citizens and people with chronic illnesses due to weak immunity.

There were diverse responses from the authorized institutions, which affected the traditional care settings to combat the illness. Such responses included lockdowns, restricted movement, quarantines, curfews, social distancing campaigns, vaccination campaigns and research and development of vaccines (WHO 2020). Due to its fast-spreading nature, COVID-19 put an enormous strain on the already struggling healthcare systems, especially in third-world countries. There were medical supplies shortages, equipment and personnel and increased workload. This affected how preventive care, surgeries, routine medical care, and check-ups were delivered, in many cases many treatments getting delayed or postponed. Also, the mode by which healthcare was traditionally delivered, i.e. in-person care, had to change to ensure that the patient and healthcare provision personnel's safety was ensured. This included social distancing, sanitization practices, wearing personal protective equipment (PPE) and adoption of Telehealth (WHO 2020).

Telehealth is the provision of health care services by using telecommunication technologies. These technologies include remote monitoring, messaging, web-based services, phone calls and video conferencing. This allows the providers to care for their patients remotely without needing them to visit the hospital physically (Bouabida, Lebouché, & Pomey 2022).

In-person care, on the other hand, is the opposite of telehealth. This is because in-person care refers to getting care in a physical setting, such as in a dispensary, hospital, clinic or doctor's office. This kind of care has been around for hundreds of years. Hatef et al. 2022, states that this case involves face-to-face interactions between the provider and patients.

As highlighted earlier, the COVID-19 pandemic had a profound effect on the provision of healthcare services. The implementation of measures such as lockdowns, restricted movement, and social distancing made it challenging to deliver in-person care, as there was an increased risk of transmission of the virus. Consequently, healthcare providers turned to Telehealth as an alternative means of providing care and treatment, particularly for COVID-19 patients. This transition resulted in a remarkable rise in the utilization of Telehealth services during the pandemic (Wosik et al. 2020).

It should be noted that Telehealth has proven to be effective for patient care while at the same time minimizing getting infected or infecting others with the virus. Also, this allowed healthcare personnel more time to treat more patients than in-person care. However, this does not make in-person care obsolete. This type of care is still necessary for some domains. Such domains would include emergency care, surgeries and diagnostic tests. When this had to be done during the COVID-19 pandemic, doctors ensured that they followed strict protocols such as social distancing and wearing PPE (Hollander & Carr 2020).

The comparison of in-person care and Telehealth's effectiveness during the COVID-19 crisis is crucial in developing optimal patient care strategies while mitigating the risk of virus transmission. The findings of this comparison can provide valuable insights for policymakers and healthcare providers in designing the most effective healthcare delivery methods for future health emergencies. Therefore, the primary objective of this research is to improve our comprehension of the role of Telehealth in delivering healthcare services during pandemics, with a particular focus on the COVID-19 pandemic, which is the most recent and pertinent global health crisis. This study aims to identify the benefits and constraints associated with both in-person and Telehealth methods of care delivery, while also evaluating the satisfaction levels of patients and healthcare providers with each approach. Additionally, the study will investigate the cost-effectiveness of these care delivery modes. The research questions outlined in systematic review will serve as the guiding framework for obtaining the necessary insights and addressing the objectives of this study.

To achieve this goal, a systematic literature review of recent research on the efficacy of in-person care and telehealth during the COVID-19 crisis will be conducted in this paper. This review can identify research gaps, provide critical insights, and guide healthcare providers' decisions on emergency healthcare delivery.

2 Literature review

The COVID-19 pandemic has presented healthcare providers and patients with unexpected challenges. To put this into perspective, as of May 2023, there had been 765,222,932 confirmed cases of COVID-19. Out of these cases, there had been a total of 6,921,614 deaths. By region, Europe led by the number of confirmed cases, with a total of 275,974,801 confirmed cases. Africa was last in the category with a total of around 9,525,097 confirmed cases (WHO 2022). As the virus spread, healthcare systems were forced to adapt quickly to keep up with increasing patient volumes while protecting patients and staff from the risk of infection. One solution that has been widely adopted is the use of telehealth technology to offer virtual care. Telehealth has become an important tool for providing access to care and has been used for various medical and mental health services. Telehealth provides healthcare services through telecommunication technologies, including the internet, video conferencing, and mobile applications (Watson, 2020).

Incorporating telehealth into healthcare services can enable a more comprehensive approach to healthcare by providing diagnosis, treatment, health information, and health education. During the pandemic, telehealth has proven to be an effective solution in reducing the burden on healthcare workers and addressing the limitations of in-person care for those who are unable to access it due to restrictions (Haleem et al. 2021).

2.1 Digitization of the healthcare

The digital revolution has taken the business sector by storm with new evolving technologies developed every day. Businesses are embracing this new revolution by digitizing their systems and operations. The healthcare sector has not been left behind either, embracing digital technology and navigating from mechanical and analogue settings to the digital technology available today. According to Paul et al. 2023, Some of the uses of this technology in the healthcare sector include monitoring the quality of patient care and searching medical knowledge resources, among other functionalities.

The onset of the pandemic sped up the adoption of this digitization journey for healthcare providers and institutions. However, threats exist to these whole settings due to sharing sensitive information over the Internet. As institutions embrace digitization, they must consider the cyber security part of this new paradigm. This is important as this mitigates threats to patient data.

2.1.1 Digital solutions in health care

The World Health Organization has classified digital health interventions and solutions into different categories that encompass the use of digital and mobile technologies within healthcare systems. These interventions primarily target the provision of care services to support primary health audiences, with the goal of promoting accessibility to healthcare and

making it readily available at any time (WHO 2019). Some examples of digital health solutions in healthcare include:

a) Electronic health records

Electronic Health Records (EHR) are the digital version of a patient's medical history. These records are patient-centred and maintained by a provider. Usually, in real-time, these records contain patient demographics that authorized users can access instantly. These demographics include but are not limited to health problems, age, medications, progress notes, vital signs, laboratory data, gender, past medical history, and immunizations (Ehrenstein et al. 2019).

EHR features help automate their work, thus streamlining their work. Also, this allows access to tools needed to help make decisions on patient care. Data can be shared across health organizations. These organizations could be medical labs, specialists, or pharmacies. EHR systems are assembled to reserve data accurately and to document a patient's shape extensively over time. It puts together necessity to find a patient's earlier paper medical track records, and it assists in ensuring that the data is latest, clear, precise and correct. There is less chance of data replication because there is only one modifiable file (Shah & Khan 2020).

b) Remote Patient Monitoring

Remote patient monitoring (RPM) allows for monitoring patients outside clinical settings, such as in homes, offices, or in remote places (Shaik et al. 2023). This involves constant remote care of patients by their physicians. This is ideal for patients with chronic diseases, in inaccessible locations, or post-hospitalization read since the continuation of care. RPM helps reduce healthcare costs while providing convenience anywhere in the world. This improves the quality of life.

RPM programs can gather common physiological data, such as vital signs, weight, oxygen saturation levels, blood pressure, heart rate, glucose levels, and heart rate. Once gathered, patient data is transmitted to a doctor's office using a specialized telehealth computer system or software application, which can be loaded on a computer or hand-held gadgets like phones or tablets (Shaik et al. 2023).

Examples of RPM include wearable sensors like smart watches, COPD management for chronic obstructive pulmonary disease patients, blood pressure monitors, diet logging programs, remote infertility treatment, and surveillance monitors for people with conditions like dementia or ambulating issues, among others (Atreja et al. 2019).

c) Artificial intelligence in healthcare

Artificial intelligence has gained enough traction in healthcare to have ground-breaking effects. This technology is enabling medical researchers and practitioners to diagnose, treat and monitor patients accurately. This is done by being able to provide accurate diagnoses and

personalized treatments accurately. Artificial Intelligence (AI) can filter through large amounts of data and identify patterns, disease markers, and trends otherwise invisible to the human eye (Chen & Decary, 2020).

By utilizing the full capabilities of AI-driven analytics, the healthcare sector can get more insight into how diseases manifest and the best treatment plans, identify at-risk patients before things get out of hand, and prevent frequent emergency room visits, which are costly. Patients should anticipate better health outcomes, lower costs, and easier access to care as more healthcare practitioners use these technologies. Artificial intelligence can be coupled with the Internet of Things (IoT) to provide RPM services, such as enabling wearable devices (Shaik et al. 2023).

d) Telemedicine

Telemedicine is the delivery of care remotely from a distance. This makes telemedicine a subset of Telehealth. Telemedicine offers a range of benefits, such as offering care to people in rural or remote locations and enabling patients to schedule appointments when they are not busy. The use of telemedicine to deliver healthcare services while lowering the risk of infection transmission has increased significantly during the COVID-19 pandemic. It is crucial to remember that telemedicine should be set up as a complement to current healthcare practices rather than as a substitute for face-to-face care (Mathew et al. 2023).

2.1.2 Benefits of digitization of healthcare

There are many associated benefits with digitizing healthcare in the long run. The benefits are two-way; they serve patients and the care providers also. The first benefit of digitization of healthcare is that there is improvement in diagnosis (McKee 2019). This is either through Artificial Intelligence (AI) or being diagnosed remotely without the need to appear physically at a hospital. Doctors and nurses can access patient medical data to diagnose a condition accurately. Healthcare providers can save, access, and exchange patient data in real-time, such as their medical history and medication directory. This contributes to the patient profile being presented clearer and more precisely, enhancing the precision of diagnosis and facilitating clinical judgments (McKee 2019).

Improved quality of healthcare is another benefit. Remote monitoring of patients helps continue care despite barriers such as distance and lockdowns which was witnessed during the COVID-19 pandemic. Through these technologies, continuing care is sure for patients with chronic conditions (Bokolo, 2021). Since patients do not have to travel for treatment, the costs associated with physically moving are reduced; hence patients who would have missed care due to economic constraints can now receive care with the lowest possible costs. Also, patients can be evaluated early to identify future risks that could be fatal to them.

In places where the majority of people live in rural areas, the majority of the time, there are very few healthcare institutions in such areas. This forces people to travel to urban centres for

medical attention, which can be challenging and costly. Digitization of healthcare brings care to their doorstep, making access to care easy. By making healthcare more convenient, effective, and inexpensive, digitization has increased access to care. Patients can receive medical care without taking time off work, traveling great distances, or spending much money on lodging and transportation (Waschkau, Götz & Steinhäuser 2020).

Traveling to hospital facilities attracts all costs; transport, parking, eating, and doctor consultation fees. The combination of these costs is a major deterrent to seeking care by the people down in the socio-economic paradigm. Technologies such as telehealth can help patients monitor their health remotely without moving. This, in turn, reduces unnecessary visits to emergency rooms, which are very costly (Giacalone, 2022). This helps patients to receive care despite their low purchasing power.

Last but not least is efficiency. Telehealth helped doctors treat many patients during the pandemic compared to in-person care. There are a few reasons for this; patients were given more control over their health, appointments could be done at any time, and there was no need for physical meetings, which cost time and money to actualize. Also, improvement in communication between patients and doctors played a role in improving efficiency (Gajarawala & Pelkowski 2021).

2.2 Digital services in healthcare

Digital services in healthcare are digital health innovations designed to provide medical care and services to patients by utilizing new technologies that save time, are effective and boost accuracy. These technologies aim to combine medicine and technologies such as augmented reality, blockchain and the Internet of Things (IoT) (Ratta et al. 2021). This enables the provision of care remotely. A digital healthcare service called Telehealth uses technology to deliver medical care remotely. The COVID-19 pandemic has seen an increase in telehealth usage to treat patients while lowering the danger of contracting the virus. As a result, comparing Telehealth and in-person care during the COVID-19 crisis is closely related to addressing digital healthcare services. Telehealth has become an important alternative to in-person care during the COVID-19 pandemic. Bokolo (2021), shows that Telehealth allows healthcare providers to ensure care and its continuation while minimizing the risk of transmission of the virus presented by physical care.

Digital edge services have taken over the traditional care setting in that these services provide a platform which streamlines access to care, more so for people who live in remote or rural areas. Telehealth allows patients to receive care from a distance without needing to leave the comfort of their homes. This is the best option for people in inaccessible areas and patients with chronic conditions who need regular check-ups, and they can be monitored regularly (Hyppönen, Hämäläinen & Reponen 2015).

Another benefit of digital healthcare services is that implementing them reduces healthcare services costs. Patients are exempted from travelling costs by providing care services remotely, while the care providers can save on expensive medical facilities and equipment. This makes healthcare affordable and accessible to patients. This, in turn, improves the quality of care since patients can be monitored closely and frequently (Bouabida et al. 2022).

2.3 Telehealth

As earlier stated, telehealth applies digital knowledge and transmission technologies to dispatch and enable health-related resources and education. It makes it possible for health personnel to deliver care remotely thus minimizing the need for in patient visits and physical interaction or contact. Telehealth encompasses technologies such as video conferencing, telephone consultations, remote patient monitoring services, and web-based services. With the emergence of the COVID-19 pandemic, the adoption of telehealth has significantly increased as it helps mitigate the spread of the virus while ensuring uninterrupted healthcare services. By embracing Telehealth, healthcare providers can continue delivering essential care while minimizing the risk of transmission (Hilty et al. 2013; Filip et al. 2022).

Several studies have assessed the effectiveness of telemedicine compared to in-person care during the COVID-19 pandemic. In a systematic review of ten studies by Hyppönen et al. (2015) published in the Check Point 2015 report, Telehealth was found to be effective in providing care for patients with chronic conditions such as diabetes, as well as reducing the burden on healthcare workers. Telehealth was also associated with lower levels of stress and increased job satisfaction among healthcare workers. The study concluded that Telehealth is an efficient and effective way to provide care to patients who cannot access traditional in-person care, as evidenced by the restrictions imposed due to the COVID-19 pandemic (Hyppönen et al. 2015).

The Finnish Society of telemedicine and eHealth conducted a study on the effectiveness of Telehealth compared to in-person care during the COVID-19 pandemic. The society focused on Telehealth even though there are other examples of digital services such as gamification solutions, robotics solutions, and intelligent solutions such as intelligent textiles since the study was limited to telehealth. The study found that Telehealth was effective in providing virtual care and was associated with better patient outcomes. Additionally, Telehealth was found to improve patient satisfaction and reduce healthcare costs. However, there are still obstacles to overcome in order to ensure successful implementation of telehealth, including access to digital infrastructure and proper training for healthcare professionals (Chen, Andoh & Nwanyanwu 2022). Patients also need to be adequately informed and educated about telehealth services to ensure their successful use. The study concluded that Telehealth was an efficient way to provide care to those unable to access traditional in-person care due to pandemic restrictions (Finnish Society of Telemedicine and eHealth 2020).

Telehealth has emerged as a valuable tool for providing healthcare to individuals who were unable to access in-person care during the pandemic. A study conducted by Bouabida et al. 2022, published in the European Parliamentary Research Service report, found that Telehealth has provided improved access to care for socially and economically disadvantaged individuals, particularly those residing in rural areas, those with limited access to technology, and those with difficulties in travelling to healthcare facilities. The study also found that Telehealth was associated with increased patient satisfaction and reduced healthcare costs, with higher patient satisfaction ratings and greater patient compliance with treatment plans being attributed to the use of telehealth.

In addition, the study findings indicated that Telehealth contributed to a significant reduction in healthcare costs by eliminating the need for in-person visits. Alongside its effectiveness, Telehealth has emerged as a practical solution for delivering care to individuals who face challenges in accessing traditional in-person care, particularly amidst the pandemic. The study further revealed that telehealth enhanced patient safety, access to care, and reduced healthcare costs. The report highlighted the reduced risk of infection associated with Telehealth's elimination of in-person visits. It concluded that telehealth is a feasible and efficient approach to providing care to individuals who cannot access traditional in-person care due to pandemic restrictions. While the study did not provide conclusive evidence on Telehealth's effectiveness as a substitute for in-person care, it demonstrated that telehealth is a valuable tool for providing care to those facing pandemic-related limitations (Bouabida et al. 2022).

According to Erbe's et al. 2017 research, both telehealth and in-person care interventions have several advantages. Telehealth is particularly beneficial in areas where care needs to be administered over long distances, allowing patients and physicians to work at their own pace, saving travel costs, and enabling clinicians to save time. However, despite these benefits, the approach may also have some disadvantages. For example, clinicians may miss nonverbal clues that could indicate for instance a future suicide attempt when using telehealth. Additionally, effective use of telehealth requires technical skills that some individuals may not possess, whereas in-person care typically relies on the physician to handle the technical aspects. This could present challenges for individuals who lack computer or internet skills.

Edgoose 2021 study, highlights the importance of the patient-doctor relationship in medicine. He notes that COVID-19 has made physical treatment challenging due to transmission risks, leading to an increase in Telehealth that is expected to continue post-pandemic. However, Edgoose argues that in-person care is crucial for fostering human connections and trust, which are essential for forming meaningful bonds between patients and doctors. Only after establishing this relationship can telehealth interventions be effective. This personal connection creates a shared context where patients feel a sense of ownership over their care, leading to better outcomes.

Khatri et al. 2011, provides a detailed analysis of the effectiveness of telemedicine services during the COVID-19 crisis in Finland. The article examines the benefits of telemedicine, including cost savings, convenience, and flexibility, as well as the potential challenges, such as privacy and security issues and the need for additional training. The authors suggest that telemedicine services can be effective in providing healthcare in Finland but must be customized to suit the country's specific needs and healthcare system. This article is a valuable resource for comparing the efficacy of telemedicine and in-person care. It emphasizes the importance of tailoring telemedicine services to the specific needs of the healthcare system and the country, while also considering the cost savings, convenience, flexibility, and privacy and security issues associated with telemedicine. The authors also stress the significance of providing adequate training to healthcare providers to ensure that telemedicine is used effectively and safely. Overall, the article suggests that telemedicine can be an effective tool for delivering healthcare in Finland if implemented correctly.

The research suggests that telehealth is an effective and efficient way to provide care to people who cannot access traditional in-person care due to pandemic restrictions (Barton et al. 2022). Telehealth has been associated with positive patient outcomes, greater job satisfaction among healthcare workers, reduced healthcare costs, and improved access to care for those who cannot receive in-person care. In order to comprehensively compare the effectiveness of both forms of care provision during crises, this study will conduct a thorough and systematic review of these two modes of care delivery.

2.4 Organizing health services

Good organization of care services ensures that patients receive high-quality care compared to unorganized settings, whether physical or telehealth. This was a crucial undertaking during the pandemic time as the risk of transmission was very high. Ensuring care is accessible is an important aspect of organizing health services regardless of their economic power or location. Telehealth promises patient access and continuation of care from anywhere or who faces travelling obstacles (Bokolo 2021). However, when patients have difficulty accessing the necessary technology or even handling telehealth devices, policymakers should consider how such services are implemented.

Collaboration and effective communication become a possibility when health services are organized. This ensures a streamlined line of communication between care providers and patients. This is important in establishing rapport, a crucial aspect of developing patient-doctor relationships. In the context of COVID-19, there was an increased need for collaboration between all healthcare provider personnel and patients to ensure care delivery while minimizing the risk of getting infected. An effective organization ensures that whatever approach is used, clear guidelines are laid down that promote the safe and effective use of the approach. This

was handy in the case of the pandemic, especially since doctors and nurses were required to wear PPEs in cases where they treated patients who visited them physically (Ali et al. 2020).

Additionally, ongoing training and support for healthcare providers in digital healthcare is important for ensuring that they are updated on the latest technological advancements and can effectively use them in delivering care to patients. This can improve the quality of care and increase patient satisfaction. Furthermore, healthcare providers should be trained to ensure patient privacy and confidentiality, especially when delivering care remotely. By ensuring that healthcare providers are adequately supported and trained, healthcare organizations can provide high-quality care services to patients both in-person and via digital healthcare services (Bassan 2020).

2.5 Comparison of telehealth and in-person care approaches

Some key differences are worth considering when comparing telehealth and in-person care (see figure 1). These differences help to explain the unique advantages and limitations of each approach. Furthermore, they can provide insights into which approach is best suited for certain medical conditions or patient populations (Ward et al. 2023).

Difference	Telehealth care	In-person care
Level of personal interaction	virtual communication between patients and healthcare providers	face-to-face interaction between patients and healthcare providers
level of convenience and accessibility	more convenient and accessible option for patients,	require travelling which can be costly and time-consuming and may be unfeasible for some
level of technological proficiency required	Requires being knowledgeable in using digital platforms and may include additional training	does not require any special technological proficiency
level of care that can be provided	better suited to certain types of medical conditions, such as mental health conditions	allows for a wide range of diagnostic tests and procedures

Table 1: Differences in these approaches

2.6 Impact of COVID-19 on healthcare delivery

The COVID-19 epidemic has significantly impacted global healthcare delivery. The virus outbreak disrupted healthcare delivery systems, leading to a move toward telemedicine services, reducing face-to-face contact and preventing the virus from spreading. The COVID-19 epidemic pushed medical professionals to adjust to new patient treatment difficulties. Because the virus had a high transmission rate, limiting face-to-face interactions between patients and medical professionals was critical. Due to this difficulty, telehealth services gained popularity (Ben-Pazi & Lamdan 2020.) Moreover, they are now popular among patients and healthcare professionals during the pandemic.

The pandemic put pressure on healthcare systems, leading to a shortage of medical professionals, supplies, equipment, and beds and added workload. Healthcare professionals have had to adjust to new treatment methods while reducing the danger of contracting the virus. The best option possible at the time was telehealth. Telehealth services played a crucial role in patient care during the pandemic. Patients received care remotely thanks to telehealth, which lowered their chance of contracting the infection. This method proved to be especially beneficial for patients who needed ongoing medical care due to chronic conditions. By freeing up hospital beds and medical staff for patients who need in-person care, telehealth services also lessened the strain on healthcare institutions. Telehealth services have been associated with reduced healthcare costs, improved patient outcomes, and increased patient satisfaction (Nagesh & Chakraborty 2020).

The epidemic also impacted in-person care. Medical treatments and elective surgeries have been delayed as noted by (Findling, Blendon & Benson 2020). Patients had difficulty accessing care due to a lack of hospital beds and medical staff. Additionally, the pandemic led to an increase in healthcare costs, which made it more challenging for patients to access medical care.

3 Objectives, and research questions

This study aims to investigate the effectiveness of telehealth and in-person care in addressing healthcare needs during the COVID-19 pandemic. The study's main objectives are to identify the advantages and limitations of these two modes of care delivery, and to evaluate the satisfaction of patients and healthcare providers with each approach. Additionally, the cost-effectiveness of telehealth and in-person care will be examined. In that this research will answer:

1. To what extent is telehealth as effective as in-person care during the COVID-19 crisis, in terms of health outcomes, patient satisfaction, and healthcare provider satisfaction?
2. How does patient and healthcare provider satisfaction with telehealth compare to in-person care during the COVID-19 crisis, with regards to factors such as convenience, communication, trust, and perceived effectiveness?

4 Methodology

In this chapter, the study methodology, literature search, and data analysis are comprehensively explained. The literature search process is described, including details on how studies were selected and their demographics. Additionally, various methodology-related issues are discussed in this section. It is important to note that this study is a systematic literature review, which involves synthesizing and summarizing existing research in a particular area systematically. This approach enables researchers to gain insights into the current state of knowledge on a topic and identify areas where further research is needed. Overall, the methodology of this study is robust and ensures that the findings are based on a thorough systematic analysis of the available literature.

4.1 Study design

The research study utilized a systematic literature review as its method, which allowed for a thorough, impartial analysis and synthesis of the literature within the area being investigated (Maringe 2021). A systematic literature review is a comprehensive approach that integrates scientific evidence to address a specific research question, while being transparent and reproducible, and striving to incorporate all available published evidence on the topic while evaluating its quality (Pati & Lorusso 2018).

Systematic literature reviews should not be conflated with integrative literature reviews. Integrative reviews are research methods that comprehensively synthesize previous empirical or theoretical studies to provide a more comprehensive comprehension of a particular phenomenon or healthcare matter. The primary distinction between these two types of reviews lies in the inclusion of studies. Integrative literature reviews encompass both experimental and non-experimental studies, whereas systematic literature reviews exclusively incorporate experimental studies (Bowden & Purper, 2022).

The integrative review can have a broad or narrow scope, while systematic literature reviews have a narrow scope. This could be because systematic reviews use quantitative research as their main sampling frame, while integrative reviews may employ qualitative, quantitative, methodological, or theoretical literature. Integrative reviews use narrative analysis, while systematic reviews can use narrative or statistical analysis (Bowden & Purper 2022).

As a valuable research technique, systematic review empowers us to assess and synthesize the current knowledge surrounding our research questions, especially those that are of practical significance to the research subject. However, systematic literature reviews are not without their limitations. One major limitation is that they are time-consuming and resource-intensive since they involve screening a large volume of literature, which can be a significant challenge. Additionally, the quality of the review is heavily dependent on the quality of the studies that are included in the review. If the studies included in the review have poor quality, then the findings of the review may not be reliable (Moher et al. 2009; Owens 2021).

Moreover, the process of selecting studies for inclusion may not be entirely objective since there may be differences in judgment among the reviewers. This subjectivity can lead to a bias in the study selection process, which can affect the overall findings of the review. Lastly, a systematic literature review is limited to the studies that have been published and may not include relevant unpublished studies or studies published in languages other than the language used in the review (Moher et al. 2009).

In summary, systematic literature reviews are a robust research method that offers numerous benefits, including transparency, reproducibility, minimizing bias, and guiding decision-making based on the best available data. However, they are also time-consuming and resource-intensive and may be limited by the quality and availability of the studies included in the review. Nonetheless, despite these limitations, systematic literature reviews remain an essential tool for synthesizing and evaluating the existing evidence in various fields of research (Moher et al. 2009).

To minimize bias, one strategy is to implement a quality assessment process involving independent reviewers. However, despite these measures, the process of screening, selecting, and synthesizing studies can introduce potential bias, as decisions about which studies to include or exclude may be influenced by subjective reviewer perspectives. This can be particularly problematic when reviewers arrive at different conclusions. Another constraint that may limit the effectiveness of systematic literature reviews is the possibility of language and accessibility bias. These reviews often rely on studies published in a specific language or database, potentially excluding important studies that were published in other languages or sources that were not recorded (Moher et al. 2009; Owens 2021)

This study adheres to the guidelines recommended for systematic reviews and meta-analyses, known as PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). PRISMA provides a detailed framework for conducting and reporting on such studies, specifying the number and sources of studies assessed, the reasons for any exclusions, and the final number of studies included in the analysis (Lame 2019; Pati & Lorusso 2018). The PRISMA statement is an evidence-based guide consisting of a checklist and flowchart intended to aid authors in improving the reporting of systematic reviews and meta-analyses. It includes four distinct phases that are meant to provide a structured approach to reviewing and synthesizing available evidence (Pati & Lorusso 2018).

A systematic review approach has been utilized for this study, which follows a rigorous and transparent method to identify, evaluate, appraise, and synthesize all relevant research on the topic. A comprehensive and reliable assessment of the current evidence on telehealth and in-person care as patient services were aimed to be provided. The PRISMA guidelines ensured that the study was robust and reproducible, providing a clear and transparent account of the methods and findings as outlined by Owens (2021).

4.2 Inclusion and exclusion criteria

Clear inclusion criteria were established for this study, which dictated that any selected research must have been published in English between the years 2019 and 2023. Any studies that failed to meet these criteria were excluded from our analysis.

Booth et al. (2012) emphasized the importance of inclusion and exclusion criteria in conducting systematic literature review analysis. These criteria ensures that studies selected for the review meets specific criteria and are relevant to the research question, as well as of sufficient quality and rigor with appropriate study design and methodology that provide valid and reliable results. By doing so, it minimizes the risk of bias and guarantees that the findings are based on high-quality evidence. Additionally, well-defined inclusion and exclusion criteria streamline the literature review process by providing clear guidelines for selecting relevant studies, especially when dealing with large volumes of literature. Overall, using such criteria increases the accuracy, transparency, and validity of systematic literature reviews, leading to high-quality evidence-based findings (Booth et al. 2012).

Additionally, we utilized specific criteria for conducting a meta-analysis, including the requirement for at least three available results and the ability to pool outcome measures. To be included in our study, the selected research had to present reviews and qualitative data on the use of telehealth and in-person interventions during the COVID-19 pandemic.

To ensure transparency and reproducibility, the study has summarized inclusion and exclusion criteria in the table below.

Inclusion	Exclusion
studies/literatures published in English language	studies/literatures published in other languages
Studies /literatures published between 2019-2023	Studies /literatures published before 2019
Contents reviews and qualitative data focusing on the use of Telehealth and in-person interventions during COVID-19 pandemic	Contents reviews and qualitative data not focusing the use of Telehealth and in-person interventions during COVID-19 pandemic
Peer reviewed journal and articles, original publications, peer reviewed conference publications, guidelines, and recommendations on of Telehealth and in-person interventions during COVID-19 pandemic	Textbooks, thesis publications, newspapers, and narrative literature reviews

Table 2: Inclusion and exclusion criteria

4.3 Search strategy

To ensure that this study is based on the most recent and relevant information available, prioritized studies were the ones published between 2019 and 2023. Electronic search of several reputable medical and social sciences databases, including MEDLINE, Science Direct PubMed, Cochrane Library, and CINAHL was conducted. In the search, a range of keywords was used, such as telehealth, telemedicine, in-person care, crisis, COVID-19, and effectiveness, to identify studies that met the inclusion criteria. To supplement database search, google scholar was utilized to identify any additional articles that may have been missed in the initial search. By utilizing a comprehensive search strategy, this aimed to ensure that this study is based on the most complete and relevant information available.

Database	Search string/phrase	Total number of results
MEDLINE	"Telehealth", "telemedicine", "virtual visits", "remote care", "in-person care" OR "face-to-face care" OR "traditional care", "COVID-19" OR "pandemic" OR "coronavirus"	400
PubMed	'Telehealth' AND 'in-person care' AND 'COVID-19' OR 'coronavirus' AND "effectiveness"	300
Cochrane Library	"Compare" AND "contrast" AND "video consultations" OR "virtual consultations" AND "utilization"	150
CINAHL	"pandemic" "popular" "clinical outcomes" "Satisfaction" "Telehealth"	200
Google Scholar	"Chronic diseases" "vulnerable population" "Physical visits" "Physical care OR "In-person care"	230
Science Direct	'Telehealth' AND 'in-person care' AND 'COVID-19' OR 'coronavirus' AND "effectiveness"	20

Table 3: Literature search strings used in the databases

Figure 1. PRISMA flow diagram of selected studies

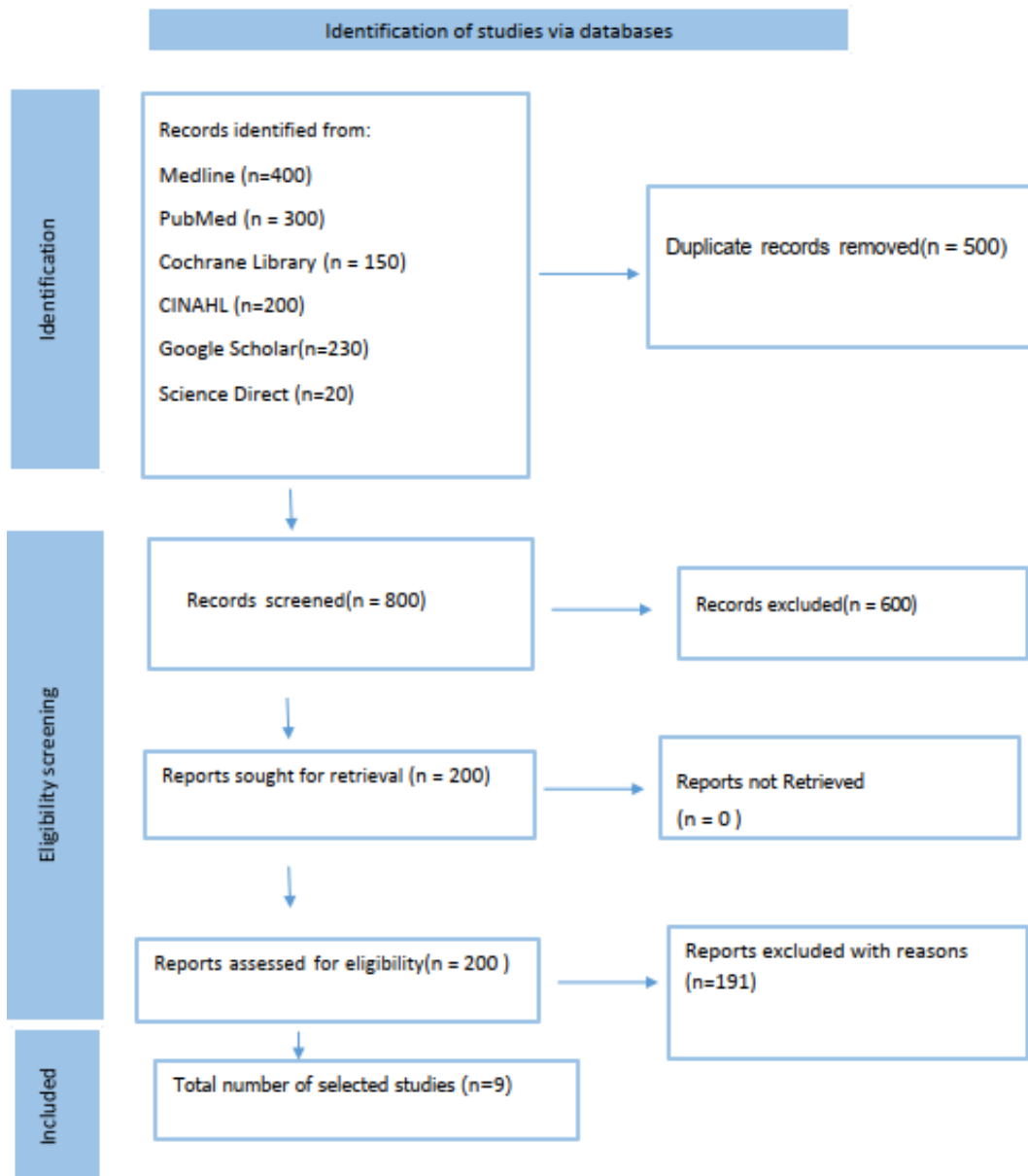


Figure 1: shows the detailed research identification and selection process

4.4 Search results

Initially, a preliminary search of the database was conducted by the authors, which yielded a total of 1300 studies. After removing 500 duplicate records, the remaining titles and abstracts were screened and identified 200 potentially relevant studies. Upon further analysis, 191 studies were excluded with reasons, with 80 containing unclear or ambiguous data, 41 being editorial letters, and 70 consisting of full-text articles. Eventually, after applying rigorous inclusion and exclusion criteria, only nine studies met this paper's eligibility criteria and were

included in the systematic review. The figure below demonstrates the process taken by the authors.

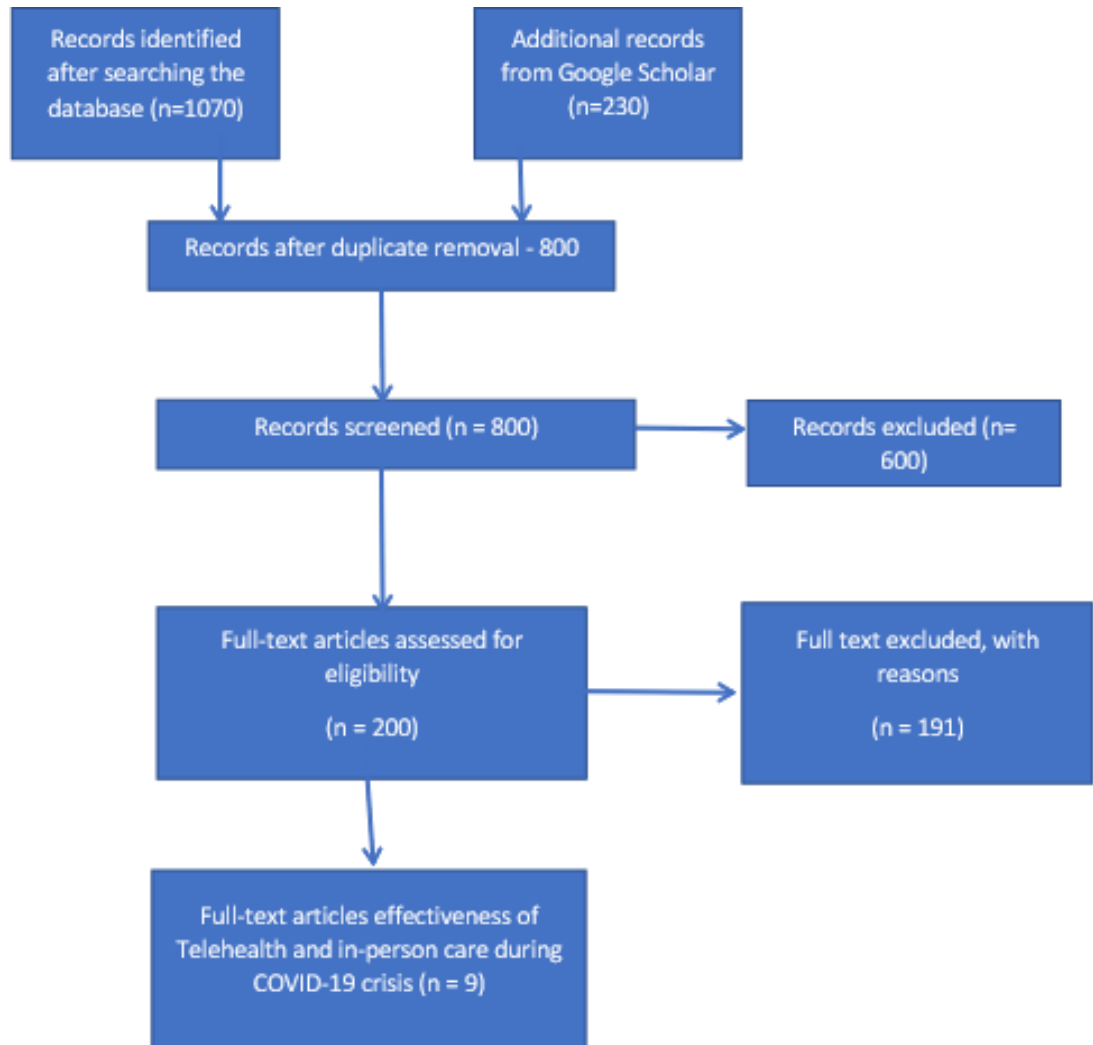


Figure 2: Inclusion/Exclusion process

The reasons behind the exclusion of the 191 studies were: study design, small sample sizes that may affect the generalization of results, poor quality of research, not being relevant to the research question, and duplications.

4.5 Article screening

The authors (VS and AM) first screened the titles and abstracts of the potential articles. Important aspects of the articles that were chosen include author, year of article publication, sample size, country, Study design, study aims and outcome. Attached appendix 1, shows the characteristics of studies included after screening.

4.6 Quality assessment

Conducting a thorough quality assessment is critical to ensure that the study's methodological and risk of bias are carefully evaluated. This helps to ensure that the study's findings are based on high-quality evidence that is both reliable and valid. To assess the quality of this study, several tools were used, including the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Systematic Review, CASP SCALE, PRISMA-ScR, Mixed Methods Appraisal Tool (MMAT) and Newcastle-Ottawa Scale (NOS) checklists. These tools provide a structured framework for evaluating essential aspects of the study, such as sample size, participant selection, outcome assessment, study design, and statistical analysis (Aromataries et al. 2020; Higgins et al. 2019; Higgins et al. 2011). By utilizing these quality assessment tools, it ensured that this study's findings are based on robust and reliable evidence, increasing the overall confidence in the study's conclusions.

To assess the selected studies' quality, the authors used Critical Appraisal Skills Program tool. This tool considered several essential aspects, including the discussion of objectives, rationale for qualitative methodology, research design, participant recruitment, ethical guidelines, and the value of the research (Higgins et al. 2019). The study's quality assessment was thorough and reliability was double checked by independently reviewing and assessing the quality of the included studies. In cases of conflicts, disagreements, or discrepancies, the authors resolved the issues through discussion and consensus, ensuring that the final quality assessment was based on a well-informed and collaborative process.

The risk of bias was evaluated and was assigned as low based on the quality assessment tools as shown in appendix 2. Studies are usually assigned either low, moderate, or high risk of bias based on the findings of the quality assessment tools used. Studies with a high or moderate risk of bias are usually interpreted cautiously, and their limitations are usually noted. On the other hand, studies with low risk carry more weight since they have high methodological quality (Higgins et al. 2011).

4.7 Data analysis

This systematic review utilized thematic analysis technique to examine the data collected from the selected studies. This method enabled the identification of themes and patterns within the selected studies which assisted the authors in understanding and finding answers to the research question. Nowell et al. (2017), emphasized the important value thematic analysis provides for integrating data from various sources and discerning similarities and differences between studies. Through identifying key themes, the authors were able to draw meaningful conclusions and provide recommendations for future research in this field.

Thematic analysis, as described by Braun and Clarke (2006), "involves scrutinizing qualitative data to detect and examine patterns that can enhance the understanding of a research question". This approach comprises several steps, including familiarizing oneself with the data,

creating preliminary codes, exploring for themes, reviewing, and defining themes, and generating the final report. Thematic analysis is a commonly used method in healthcare research for synthesizing qualitative data from multiple sources, which can lead to a more comprehensive and nuanced understanding of intricate phenomena (Braun & Clarke, 2006; Nowell et al. 2017).

The themes that came up after a thorough analysis of the selected studies were the effectiveness of telehealth and in-person care during the COVID-19 crisis, patient and healthcare provider satisfaction, and the advantages and limitations of each approach. Findings will be presented in tabular and narrative formats, with supporting evidence from the included studies.

4.8 Subgroup Analysis

Subgroup analysis is a statistical technique used to investigate data by dividing a sample into smaller groups to determine if there are any variations in the impact of a treatment or intervention across the subgroups. This method is used to recognize the heterogeneity of the study population and to identify any differences in treatment response among particular subgroups. Subgroup analysis can be carried out based on a range of characteristics, including age, sex, ethnicity, comorbidity, and disease severity (Fletcher 2007; Burke et al. 2015).

It is crucial to note that subgroup analyses are investigative and should be interpreted with caution. Inappropriate execution of subgroup analyses can lead to biased or misleading outcomes. Several studies have highlighted the importance of performing subgroup analyses correctly. For instance, Sun et al. (2012) recommended that subgroup analyses should be pre-specified in the study protocol, and appropriate statistical techniques should be utilized to adjust for multiple comparisons. Similarly, Hlatky et al. (2019) recommended that subgroup analyses should be based on robust biological or clinical rationale, and subgroup findings should be reported transparently with confidence intervals. Therefore, subgroup analysis is a crucial technique that can provide meaningful insights into the treatment effects of different subgroups, but it needs to be executed and reported appropriately to prevent bias and errors (Burke et al. 2015).

In this study, the subgroup analysis will examine potential reasons for heterogeneity, including different types of Telehealth interventions (such as telemedicine, teleconsultation, and tele-monitoring), diverse populations (including different age groups and health conditions), and various study designs (such as randomized controlled trials, cohort studies, and cross-sectional studies).

4.9 Characteristics of the included studies

The studies that were included in the systematic review were conducted in diverse locations, representing a diverse range of nations, regions, and environments. These locations included both urban and rural areas, as well as countries with varying levels of wealth and healthcare

systems. To assist readers in determining the applicability of the results to different demographics and contexts, the geographic location of each study in the results section will need to be listed. Out of the nine studies that met eligibility criteria, four different countries were represented. One study was conducted in South Africa (n=1), five studies were carried out in the USA (n=5), one study in Canada (n=1), and two studies in Iran (n=2).

The visual representation (see figure 3) illustrates the themes and areas that were covered in the selected studies.

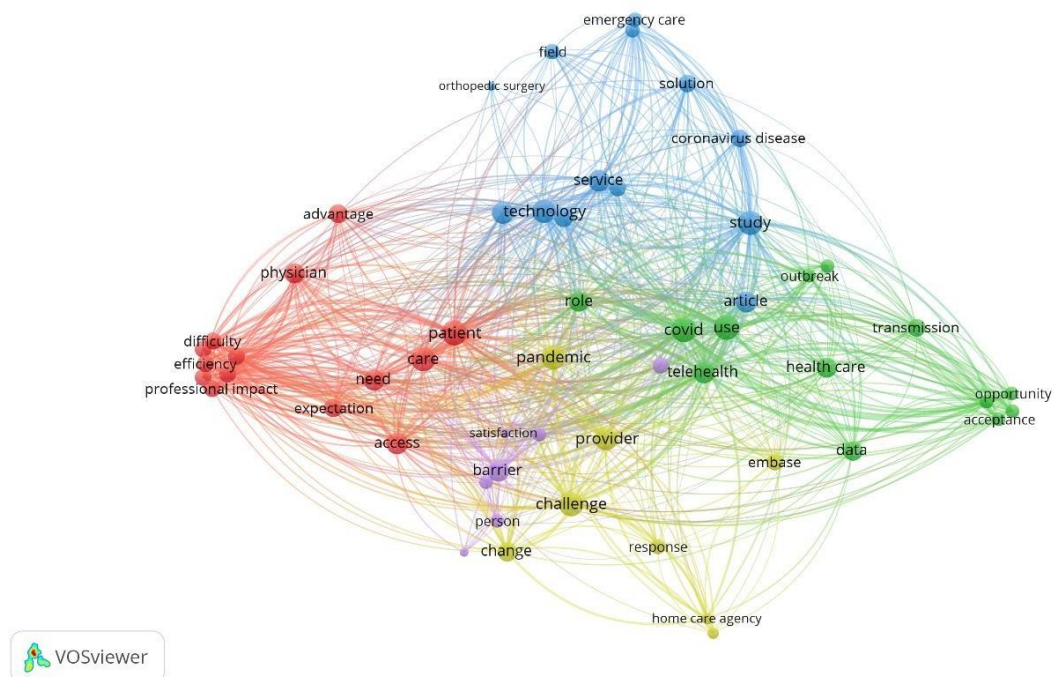


Figure 3: Visual presentation of themes and areas selected studies covered

In terms of study designs, the analysis comprised of two case studies, three case-control studies, and four systematic reviews. The included studies had diverse sample sizes, ranging from small-scale to large-scale studies with significant sample sizes. These sample sizes were reported in the original publications and will be presented in the results section of our systematic literature review. Furthermore, it was found that 40% of the studies in the analysis focused on telehealth implementation both before and during the COVID-19 pandemic. A total of 10% of the studies discussed in-person care, while 20% compared and contrasted telehealth and in-person care across major identified themes.

4.10 Quality evaluation

The selected nine studies for the systematic review were evaluated with CASP methods. The assessed studies had typically excellent quality. Two studies (22%) were medium quality, while

seven (78%) had good quality. Additionally, research was not disqualified based on the evaluation of their quality level. Thematic analysis was used to identify themes related to this study. The process involved the following steps:

1. Getting familiar with the available data involved reading through the data, understanding the content, and then trying to draw emerging patterns.
2. Coding - labelling the data using appropriate, interactive, or descriptive labels. This helps to come up with different categories.
3. Generating themes - this involved generating initial themes which are general.
4. Refining themes - involves reviewing the identified themes to remove repeated or overlapping themes. Involved in combining, splitting, and reorganizing themes
5. Naming and defining themes - this was the last step, and it involves developing clear definitions for each theme and selecting a name that accurately captures the essence of the content.

Theme	Subthemes
Convenience	Accessibility of care for patients who cannot travel, reduced wait times for appointments, flexibility, appointments scheduling, reduced exposure to infection, ease of use of Telehealth technology
Patient and healthcare provider satisfaction	Quality of communication, trust, Satisfaction with the quality of care received, Patient and provider comfort with the technology used for Telehealth
Utilization of Telehealth and in-person care during the COVID-19 crisis.	Changes in the volume of in-person visits due to the pandemic, provider attitudes towards Telehealth versus in-person care, impact of Telehealth on healthcare costs and resource utilization compared to in-person care

Table 4: Study themes and subthemes

4.11 Ethical considerations and limitations

Since this study is a systematic literature review, an ethical review was deemed unnecessary. However, the authors took ethical considerations seriously and ensured protection of the privacy and confidentiality of the data obtained from the included research. Additionally, authors acknowledged the work of the original authors, upheld copyright, and other intellectual property rights, and adhered to Laurea university of applied sciences thesis ethical standards.

It is important to note that certain limitations may affect the accuracy and generalizability of this studies analysis. For instance, the availability and quality of the included research, publication bias, and the heterogeneity of the included studies may pose limitations to the

conclusions drawn from authors review. Furthermore, systematic reviews are inherently susceptible to certain biases, such as confounding, selection bias, and information bias, which may also affect the reliability of the findings. Despite these limitations, the authors have taken great care to ensure that the analysis is as rigorous and comprehensive as possible.

5 Results

As outlined in the study's introduction, a set of themes has been identified to address the objectives and goals of this research. The list comprises of three themes: Convenience of Telehealth compared to in-person care during the COVID-19 crisis, Patient, and healthcare provider satisfaction with telehealth and in-person care and Utilization of telehealth and in-person care during the COVID-19 crisis. These themes provide a comprehensive look into how Telehealth and in-person care could affect care delivery in a pandemic scenario.

Based on the dynamics of these two approaches (Telehealth and in-person care), each has its strengths and areas of weakness. Such nature provides an excellent ground to carry out a comparison of how effective these methods were during the pandemic time. For instance, the highly contagious nature of the COVID-19 virus made policymakers look for an alternative to in-person care since physical visits to the hospital facilitated the spreading of the pandemic. The method of choice of care was telehealth which meant it could be used in such emergencies. This worked well, especially in places where care had to be postponed, ensuring a guaranteed continuation of care for all. Telehealth, in all its glory, could not be reliable in cases where a patient needed to be performed on surgically. This required physical care of the patient and the presence of doctors to perform the surgery. Cases like this limited the effectiveness of these approaches in one area while maximizing them in other areas.

Themes ensure a deeper look into the main facets of care and how effective these methods were. The convenience of telehealth compared to in-person care during the COVID-19 crisis focuses on the comfort of telehealth. This convenience is derived from various factors, including the elimination of the need for travel, cost reduction, the flexibility to schedule meetings at any time and location, and enhanced accessibility. These aspects collectively contribute to making healthcare services easier to access. The second theme is patient and healthcare provider satisfaction with telehealth and in-person care. This theme expounds on the reaction of patients, their doctors and nurses. This theme borrows from the first and last themes in that the success of those themes leads to higher approval rates from patients and physicians, regardless of which approach. Hypothesis would be, where Telehealth reduces workload, promotes convenience, development of trust, makes good use of the available resources, and promotes increased access to care, patients and care providers are bound to be satisfied in different ways. This theme explores the satisfaction levels of the parties mentioned above, considering additional parameters such as quality of care and overall individual

experience in the whole spectrum. Lastly, the last theme, the utilization of telehealth and in-person care during the COVID-19 crisis explores patterns that try to map the utilization of in-person care and telehealth during the pandemic era. Factors such as patient outreach weighted heavily on the effectiveness of these methods.

5.1 Convenience of Telehealth compared to in-person care during the COVID-19 crisis

In the United States, telehealth was already being used prior to the COVID-19 pandemic. However, patients generally preferred in-person care over telehealth. With the advent of COVID-19 and its contagious nature, the dynamics of healthcare provision changed significantly. Studies have shown that telehealth is comparable to in-person care in terms of clinical outcomes, patient satisfaction, and quality of care. In fact, several studies have reported similar or improved healthcare outcomes with telehealth over in-person care (Monaghesh & Hajizadeh 2020). The results suggest that telemedicine was an efficient substitute for providing medical treatment during the COVID-19 crisis, with clinical outcomes that were just as good as conventional in-person care (Bashshur et al. 2020).

According to Maleka & Matli (2022), accessing in-person care could be a challenge for patients living far away or in remote areas from the nearest hospital facility, especially those with mobility issues. This limits their access to care, which is a significant problem. However, telehealth has been found to be a solution for patients facing such barriers. Telehealth utilizes technology to provide services such as video consultations, remote monitoring, and mental health services (Monaghesh & Hajizadeh 2020), which reduce the need for patients to travel and cut down on medical costs. Moreover, telehealth provides continuous access to care regardless of a patient's location in the world.

Compared to in-person care, telehealth was found to offer greater flexibility to patients. This was made possible by enabling patients to schedule virtual appointments and access care from the comfort of their homes or offices. This proved to be highly convenient, especially for patients with chronic illnesses like diabetes, HIV, cancer, and high blood pressure. Physical care, on the other hand, was often associated with limitations such as long wait times, travel requirements, and strict appointment schedules that undermined patient flexibility (Ganjali et al. 2022).

The COVID-19 pandemic required patients to undergo various medical procedures, including examinations and tests, to ensure they received the best possible care. In some instances, surgeries were necessary for patients with underlying medical conditions or in the Emergency Department (ED). This level of care and treatment could only be provided in person. Studies have shown that in-person care during the pandemic allowed for a wider range of services compared to telehealth. This is because in-person care facilitated surgeries and hands-on treatment, which was not feasible with telehealth. However, it is worth noting that telehealth

remains a useful option for certain types of medical care where physical presence is not essential (Moisan, Barimani & Antoniou 2021).

COVID-19 is a highly contagious disease, and it was necessary to implement measures to minimize its spread. In-person care relied on social distancing and the use of personal protective equipment (PPE) by doctors when treating their patients, which left room for error and potential viral transmission. According to Monaghesh & Hajizadeh (2020), telehealth has enabled remote triage, screening, and monitoring of COVID-19 cases, reducing the risk of infection for both patients and healthcare providers. Conversely, in-person care may increase the risk of COVID-19 transmission due to the close physical contact between patients and medical professionals.

The results also indicate that both modalities encountered healthcare disparities on various levels. In-person care was constrained by its availability only in remote areas (Maleka & Matli 2022), high expenses related to medical visits, linguistic obstacles, and cultural awareness. On the other hand, telehealth confronted challenges, such as internet connectivity, inadequate technological knowledge, and medical circumstances requiring the physical presence of healthcare professionals. Nevertheless, telehealth has proven to be a more effective method of care delivery during the COVID-19 pandemic, as compared to in-person care.

5.2 Patient and healthcare provider satisfaction with telehealth and in-person care

Before going through the second theme, it's important to clarify a key concept to prevent any confusion among readers. The discussion in the second theme revolves around a simple idea: understanding the factors and considerations that contribute to the satisfaction of both patients and healthcare providers. While numerous factors will be evaluated, it is essential to highlight that the primary focus is on how these parties respond to these factors. The reason for addressing this clarification is that convenience, which is one of the themes, plays a role as a contributing factor. This may require further clarification for readers. In this context, the level of comfort provided by both telehealth and in-person care determines the satisfaction of patients and providers. Thus, an entire theme is condensed into a factor or consideration within this study. By understanding this distinction, readers can grasp the significance of convenience as a factor and its impact on the satisfaction levels of patients and healthcare providers.

According to Ganjali et al. (2022), patients who received care through telehealth reported lower travel burden, greater convenience, and increased access to care compared to those who received in-person care. Patients expressed high levels of satisfaction with telehealth for conditions requiring physical visits, such as examinations and therapy. Healthcare providers also reported higher levels of satisfaction with telehealth compared to in-person care, although there was still a degree of satisfaction with the latter. The popularity of telehealth among physicians and patients was driven by reduced workload, improved efficiency, access to care in remote areas, and lower costs (Monaghesh & Hajizadeh 2020). Notably, some studies

highlighted positive comments from patients and healthcare professionals regarding the simplicity and convenience of telehealth systems. Taken together, these findings suggest that telemedicine was well-received by both patients and healthcare professionals during the COVID-19 pandemic.

Research has revealed that patient and healthcare provider satisfaction with telehealth or in-person care varies according to factors such as trust, convenience, perceived effectiveness, and communication. Telehealth offers the convenience of scheduling virtual appointments at any time and from any location, eliminating the need for patients to travel and wait, which can cause inconvenience and additional costs. This flexibility allows healthcare providers to remotely consult with patients, which may be advantageous (Ganjali et al. 2022). Similarly, patients may experience inconvenience when required to attend in-person visits due to the associated costs, travel time, and waiting periods, compounded by traffic or inclement weather conditions. The convenience afforded by telehealth may contribute to higher satisfaction levels among both patients and healthcare providers.

According to Annaswamy et al. (2020), the utilization of audio and video technologies in healthcare communication has been found to have a significant impact on its quality and effectiveness. The study suggests that poor internet connectivity can adversely affect communication, while most areas experience real-time and apparent communications. The authors further assert that non-verbal clues play a vital role in treatment, and physicians may be unable to note them in cases of poor communication. Moreover, in-person care allows for direct face-to-face communication, which is perceived as more personal and practical. Additionally, physical examinations and hands-on evaluations are facilitated in such cases, improving communication between medical professionals and patients.

The establishment of trust is of paramount importance in the interactions between patients and healthcare providers. Trust can be built through effective communication, empathy, and the medical professionals' expertise. In the context of telehealth, trust can also be established by demonstrating professionalism, expertise, and compassion during virtual consultations. Studies have found that patients are satisfied with this approach and trust the recommendations and advice given by healthcare professionals during telemedicine sessions. In contrast, in-person care environments allow for direct physical presence, which can foster trust through physical inspections, hands-on treatments, and face-to-face discussions. These settings also provide an opportunity for patients to become familiar with healthcare professionals, further strengthening trust. Ultimately, the development of trust between doctors and patients facilitates the establishment of solid relationships, which are crucial for achieving positive healthcare outcomes (Breton et al. 2021).

5.3 Utilization of telehealth and in-person care during the COVID-19 crisis.

Research has revealed a significant increase in the adoption of telehealth during the COVID-19 pandemic compared to pre-pandemic times. Telehealth has been widely utilized to deliver healthcare services, particularly for non-emergency and routine care, in order to reduce the risk of COVID-19 transmission and ensure continuity of treatment. Studies have shown an increase in Telehealth usage across different patient populations and healthcare settings, including pregnant women. Notably, Telehealth has been particularly beneficial for elderly patients and those with chronic diseases or other underlying conditions. Additionally, telehealth has been successfully implemented in various healthcare settings, such as primary care, mental health services, and specialty care (Ganjali et al. 2022).

The findings of the study indicate that telehealth represents an effective means of providing continuity of care, even in the absence of physical proximity between healthcare providers and patients. In-person care is limited in its ability to ensure continuity of care, as it is contingent upon patients returning for follow-up care. In contrast, telehealth has been found to promote and support the continuation of care, thus addressing this issue. Furthermore, the utilization of telehealth can reduce the risk of viral transmission of COVID-19 by eliminating the need for physical touch. Healthcare providers have adopted Telehealth for various purposes, including virtual consultations, mental health services, patient health education, and the management of chronic conditions. In areas with severe or total lockdowns and high infection rates, the study found that telehealth was heavily utilized as in-person care was limited (Nguyen et al. 2020).

Despite the growing popularity of telehealth, in-person treatment remains essential for managing urgent and acute disorders that require immediate attention. Moreover, physical examinations, diagnostic tests, surgeries, and other procedures cannot be effectively conducted remotely, further emphasizing the need for in-person care (Moisan et al. 2021). Research suggests that in-person care is valuable in providing comprehensive healthcare services that may not be feasible through telehealth alone. Nonetheless, in-person care has encountered various challenges related to infection control measures, shortages of personal protective equipment (Barr et al. 2022), and the need to minimize exposure and reduce the risk of transmission among both patients and healthcare providers.

Research has shown that telehealth was the preferred mode of care during the COVID-19 period, with prevalence observed in three primary areas: virtual consultations, COVID-19 screening and triage, and remote monitoring. Notably, virtual consultations enabled healthcare providers to conduct assessments, patient education, and diagnosis remotely, which was particularly crucial during the COVID-19 crisis. Healthcare professionals could continue providing healthcare services while following social distancing rules, thanks to telehealth for virtual consultations. Virtual consultations were conducted using telehealth using zoom, skype, and webex, allowing for real-time communication between patients and medical professionals. Video meetings were

particularly useful in guiding COVID-19 testing and assessing symptoms, determining the need for further medical care (Monaghesh & Hajizadeh 2020).

Healthcare providers swiftly identified possibly infected patients, prioritised care, and prevented the virus from spreading by using Telehealth platforms to screen and triage patients with suspected COVID-19 symptoms. Patients were screened using telehealth tools like video consultations and smartphone apps, and those who needed additional evaluation were booked for in-person visits (Ganjali et al. 2022).

Additionally, remote monitoring has been essential for monitoring patients with chronic conditions, as healthcare providers can monitor vital signs, assess symptoms, and adjust treatment plans as necessary. These remote monitoring tools have been particularly critical for vulnerable populations at higher risk for severe COVID-19 outcome. In order to monitor patients' health without forcing them to visit medical institutions physically, linked gadgets and sensors were used. Equally, remote monitoring assisted medical professionals in proactive patient condition management by enabling early detection of COVID-19 symptoms (Monaghesh & Hajizadeh 2020).

6 Discussion

6.1 Scrutiny of the used studies

Based on the provided literature, the available studies have had similarities and differences, which have been noted down in the course of putting this study together. The comparison is between studies used in the introduction part and literature review sources versus the studies selected in the findings section. Studies used in the introduction and literature review for this discussion will be referred to as 'lit sources'. This applies in this discussion part only. Lit sources introduce their arguments by defining what public health emergencies are, which according to WHO (2018), may be adverse to populace health and safety. On the other side, findings start by identifying themes pointed out during the scrutiny of the selected studies.

Lit sources explore how the world responded to the COVID-19 pandemic, with measures such as lockdowns, social distancing, quarantine and vaccination campaigns being the methods employed. These sources show how this affected the implementation of physical care, thus inconveniencing in-person care. This is because surgeries, check-ups and preventive care were delayed or postponed. Also, physical touch was discouraged as this could escalate the contagion of the COVID-19 virus. This called for developing measures that could prevent new viral cases where physical care was needed. Such efforts include social distancing, sanitization practices, wearing personal protective equipment (PPE) and adoption of telehealth (WHO 2020). Findings also discussed this but are more focused on lockdowns and social distancing and how this would influence the effectiveness of telehealth, or in-person care based on the identified themes. For

instance, lockdowns did not affect the provision of care for patients under the telehealth programs. This is because by employing remote monitoring, telehealth makes it easier for patients to get their care from home, so restricted movement will not affect them; this applies to patients living in remote areas (Maleka & Matli 2022).

Patient - doctor relationship seems to reflect the same thing on both sides of the sources. There is universal agreement that a strong relationship between a doctor and their patients lead to better treatment outcome (Breton et al. 2021). In physical care, the doctor and the patient interact personally and given enough time, a rapport is established and growth of trust. Also, doctors can point out nonverbal clues that could signify signs of illness or enable the doctor to know if the patient is lying. This is not the case in telehealth, as patients casually interact with their patients. The doctor may not be able to know if the patient is lying to them through a screen. Also, due to the absence of physical touch, some things may be missed, such as course skin and swollen body organs, thus not being able to get all the symptoms of a disease. Telehealth interventions need to ensure that patients and their care providers can establish good relationships for the interventions to be effective (Edgoose 2021).

One notable difference is that findings point out the existence of telehealth before the onset of the COVID-19 pandemic. This should be mentioned in the lit section/sources. Findings state that the United States had already been using telehealth services before COVID struck, although it was not that popular. The onset of the COVID-19 pandemic changed the dynamics of care delivery as it was deemed safer. Thus, people had to use it. In the middle of such a medical crisis, telehealth met the patient's expectations (Monaghesh & Hajzadeh 2020). lit sources majorly talk about telehealth after the onset of COVID-19 and how it influenced care from that timeline but only touch on it after COVID-19.

A similarity noted in the discussion of both sides on how COVID-19 put immense pressure on already struggling healthcare systems worldwide. Both note that COVID-19 puts a strain on the healthcare system. High infections reported due to its highly contagious nature meant that sick people outnumbered the available medical personnel. This forced these personnel to work long hours, many of them ending up with burn out. Also, there needed to be more beds and even rooms. Also, both agree that telehealth eradicated these issues more significantly, with the flexibility brought about by accessing care from the comfort of one's home. This reduced workload for healthcare providers, ensuring no burnout affects them. This would be very hard to achieve using in-person care due to the large number of patients, leading to burnout, anxiety or even depression among care providers (Ganjali et al. 2022).

The main surge of telehealth agreed on both sides was based on the fact that in-person care could not be trusted with the safety of patients and nonpatients due to the contagious nature of COVID-19. This viral disease could be spread through physical touch and respiratory droplets (Tang et al. 2020). since infection cases were so high despite even the adoption of measures

such as the use PPEs, there needed to be a long-term solution to that problem. Health institutions advocated for the use of PPEs and social distancing. This did not guarantee complete protection from getting infected by the COVID-19 virus. This points to the fact that the risk of transmission is inherently high since there is room for error to occur while handling any of that, as opposed to the telehealth approach, as emphasised by Monaghesh & Hajizadeh (2020). Telehealth promised remote care where there would be zero physical interaction between the care provider and their patients. Also, other benefits came along with telehealth, such as remote care, a continuation of care, cost savings, convenience, and flexibility (Gajarawala & Pelkowski 2021).

Remote monitoring has been discussed majorly by both sources since it is a very crucial part of Telehealth. This is because providing remote care forms the basis of Telehealth. Especially when dealing with vulnerable populations, remote patient monitoring ensures continuous care everywhere, even in remote areas. These vulnerable populations comprise people suffering from chronic diseases such as diabetes, children and the elderly (Monaghesh & Hajizadeh 2020). Still, on remote monitoring, both findings and lit sources found out that combining AI and IoT can be used to implement wearables like smartwatches to monitor patient vital signs (Shaik et al. 2023).

Additionally, remote monitoring has been essential for monitoring patients with chronic conditions, as healthcare providers can monitor vital signs, assess symptoms, and adjust treatment plans as necessary. These remote monitoring tools have been particularly critical for vulnerable populations at higher risk for severe COVID-19 outcomes. In order to monitor patients' health without forcing them to visit medical institutions physically, linked gadgets and sensors were used. Remote monitoring assisted medical professionals in proactive patient condition management by enabling early detection of COVID-19 symptoms (Monaghesh & Hajizadeh 2020).

Digitization of healthcare is a topic given much weight in the lit sources section, exploring how the healthcare landscape has been able to change ever since the technology was introduced. There is a discussion of different technologies, such as the Internet of Things (IoT), Blockchain and Artificial Intelligence (AI). AI has been hailed as good at identifying disease markers for potential ailments (Chen & Decary 2020).

Despite the rise of telehealth, both sides agree that there are challenges that face this approach. Some of these challenges include the ethical issues of implementing the Telehealth. This is because patient data shared or stored in electronic health records is susceptible and contains markers that could identify an individual in case of a hacking attempt. Other challenges include technical issues related to handling devices, connectivity issues and inadequate technological knowledge needed to surf the internet. Serious challenges could be

that sometimes the Telehealth approach could mask patients' nonverbal cues, which could be essential in treating this patient (Erbe et al. 2017). Also, medical emergencies such as surgeries or accidents cannot be addressed through Telehealth. This would need physical handling of the situation. Such events limit the application and usage of Telehealth. On the other hand, in-person care was limited much by the economic power of patients, the remoteness of the location and the nature of coronavirus, which was very contagious (Tang et al. 2020).

Findings were able to map areas of popularity when comparing the effectiveness of telehealth and in-person care during the pandemic time. This is something not touched on in the lit section. According to the findings, telehealth excels and receives more approval in the following areas: virtual consultations, screening and remote testing (Monaghesh & Hajizadeh 2020). In-person care excelled in diagnostic testing, surgeries and emergency room treatments.

6.2 Comparing results with the selected studies

Comparing Monaghesh & Hajizadeh (2020) and the results, there is an aspect of familiarity. Finding out how telehealth services helped with the COVID-19 outbreak's, illness prevention, diagnosis, treatment, and control is the primary goal of this study. Throughout the study's results, there is evidence that through remote monitoring and caring of patients, there was a reduction in transmission of COVID-19.

Maleka and Matli (2022) provide valuable insights into the recent impact of COVID-19 on people's behaviors and their adoption of telehealth. Their findings reveal that the highly contagious nature of the virus compelled individuals to search for alternatives to in-person care, leading to an increased utilization and acceptance of telehealth services.

By concentrating on demarcation functions, Ganjali et al. (2022) presents, a map of the already available evidence on the usage of telemedicine during the COVID-19 pandemic. This study explores the same parameters explored by the results, such as Telehealth flexibility, cost effects and even areas of application.

Moisan et al. (2021), reviews the evidence of telemedicine's usage in orthopaedic surgery, stressing its benefits and drawbacks during the COVID-19 pandemic and afterward. Orthopaedic surgery patients fall under vulnerable populations dependent on Telehealth, mainly because Telehealth enables the continuation of care. This follows the study's results.

Moving on, Annaswamy et al. (2020), explores obstacles and difficulties telehealth users with impairments encountered during the COVID-19 pandemic. According to the current results, these people could experience problems if the connection is poor since this means poor audio and video output, affecting them further, considering they have pre-existing impairments.

Breton et al. (2021) explore the advantages and disadvantages of telehealth in Canada and the USA. The results touch on this, comparing the advantages of telehealth against in-person care and listing the existing limitations of telehealth. However, these results do not draw from USA OR Canadian sources alone but globally. This is where there is a little difference.

Nguyen et al. (2020) discusses the factors influencing telemedicine (TM) patient and provider satisfaction and how they differ from face-to-face care. Comparison is made based on convenience, cheapness, readiness and efficiency. There is a similarity in what is discussed and agreed upon.

Barr et al. (2022) examine the difficulties home care organizations and providers faced during the COVID-19 pandemic and the adjustments made to address these difficulties. This study reflects the whole paper since the discussion is around how COVID-19 impacted healthcare, the failure of in-person care and the adoption of telehealth to address the problem of treatments while minimizing the spreading of the viral disease. All these studies are in synch with studies since their purposes are connected to the aim of this study. There were notable similarities.

6.3 Reflection on results

This research aimed to assess the efficacy of Telehealth compared to in-person care during the COVID-19 pandemic. It's important to note that the pandemic presented numerous challenges, and new solutions were necessary to address an already difficult situation. To prevent the virus from spreading, physical distancing measures were put in place, and telehealth emerged as a robust alternative to ensure uninterrupted healthcare services. Telehealth involves using technology to provide healthcare remotely, and during the pandemic, it has been employed in various ways, such as telemedicine, teletherapy, and telemonitoring (Mathew et al. 2023). Due to the digitization of the healthcare sector, providing such digital services has become possible. A combination of technologies such as IoT and blockchain helps make remote monitoring a reality for patients (Ratta et al. 2021).

Telehealth and in-person care exhibit significant differences in clinical outcomes, with telehealth offering superior access to care. This can be attributed to the effects of COVID-19 on how healthcare was delivered during the pandemic. The COVID-19 epidemic has significantly impacted global healthcare delivery. The virus outbreak disrupted healthcare delivery systems, leading to a move toward telemedicine services, reducing face-to-face contact and preventing the virus from spreading. The COVID-19 epidemic pushed medical professionals to adjust to new patient treatment difficulties. Because the virus had a high transmission rate, limiting face-to-face interactions between patients and medical professionals was critical. Due to this difficulty, telehealth services gained popularity (Ben-Pazi & Lamdan 2020).) Moreover, they are now popular among patients and healthcare professionals during the pandemic.

The pandemic put enormous pressure on healthcare systems, leading to the shortage of medical professionals, supplies, equipment, and beds. Healthcare professionals have had to adjust to new treatment methods while reducing the danger of contracting the virus. The best option possible at the time was telehealth. Telehealth services played a crucial role in patient care during the pandemic. Patients received care remotely thanks to telehealth, which lowered their chance of contracting the infection. This method proved to be especially beneficial for patients who needed ongoing medical care due to chronic conditions. By freeing up hospital beds and medical staff for patients who need in-person care, Telehealth services also lessened the strain on healthcare institutions. Telehealth services have been associated with reduced healthcare costs, improved patient outcomes, and increased patient satisfaction (Nagesh & Chakraborty 2020).

The epidemic also impacted in-person care. Medical treatments and elective surgeries have been delayed (Findling et al. 2020) due to the virus disrupting conventional healthcare delivery mechanisms. Patients had difficulty accessing care due to a lack of hospital beds and medical staff. Additionally, the pandemic led to an increase in healthcare costs, which made it more challenging for patients to access medical care.

Telehealth was not impacted by lockdowns or movement restrictions, ensuring the uninterrupted delivery of care. Furthermore, telehealth reduced the costs associated with seeking care, including expenses related to transportation. Geographical location was also no longer a factor in care delivery, as telehealth provided the convenience of receiving care in the patient's own home. By eliminating the need for travel to hospitals, telehealth also eliminated additional expenses incurred during travel. Moreover, telehealth eliminated waiting times in reception areas, reducing the risk of COVID-19 transmission (Monaghesh & Hajizadeh 2020).

Individuals with underlying conditions such as diabetes, HIV, hypertension, and mental health issues were part of the vulnerable population that was significantly impacted by COVID-19, more than the general population. Children and the elderly were also considered vulnerable populations. According to Hyppönen et al. (2015), patients with chronic conditions, avoiding exposure to COVID-19 was critical. Telehealth provided a way to receive care without having to visit hospitals, significantly reducing the risk of COVID-19 infection. By remotely monitoring patients, healthcare providers were able to track vital signs, adjust treatment plans, and evaluate symptoms, effectively managing chronic diseases. Telehealth interventions such as remote monitoring of vital signs and tele-education offered a convenient and effective approach to disease management, medication adherence, and lifestyle modifications for patients with chronic conditions (Hyppönen et al. 2015).

Telehealth provided high-quality care that could be delivered at any time and place, doctors and patients could engage in patient education. This resulted in high patient satisfaction levels, and the continuity of care ensured that the care provided was of a consistently high standard

(Nguyen et al., 2020). This is not to suggest that in-person care is of poor quality. In-person care can only be provided when the patient is physically present, and doctors may experience high levels of stress and work overload during the Covid crisis, which can affect their care delivery. In contrast, Telehealth allowed doctors to treat more patients while reducing work-related stress and fatigue. Research has shown that high levels of stress can impact work performance. This was facilitated by efficiency provided by telehealth (Gajarawala & Pelkowski 2021).

Access to care refers to patients' ability to receive healthcare services without encountering any barriers or obstacles. In-person care typically requires patients to travel to hospitals or healthcare facilities, which can be challenging for individuals living in remote or inaccessible locations, or those affected by natural disasters or other emergency situations. Moreover, travel costs and time can be a significant barrier to receiving timely and effective care. Telehealth has emerged as an effective solution to address these challenges and improve access to care (Monaghesh & Hajizadeh 2020).

By leveraging phone calls, video consultations, and web-based services, telehealth has the potential to provide care to patients from remote areas, and those with mobility or transportation limitations. This has been especially beneficial during the COVID-19 pandemic, where social distancing measures have made it difficult for patients to receive in-person care. Overall, telehealth has the potential to significantly improve access to care for all patients, regardless of their location, mobility, or financial constraints (Monaghesh & Hajizadeh 2020).

Access to healthcare has always been influenced by costs, with in-person care requiring expenses such as travel, consultations, parking, and food. For those with limited economic power, these costs act as a barrier to seeking care services. In contrast, telehealth has shown the potential to reduce costs during the pandemic by minimizing the need for frequent hospital visits, follow-up tests, and complications from unmanaged chronic conditions. Virtual visits have led to a reduction in overall care delivery costs, particularly routine and follow-up care (Bouabida et al. 2022).

Telehealth services have proven to be more convenient and satisfactory for both patients and healthcare providers compared to in-person care. Studies have shown that patients prefer telehealth services as it eliminates the need for travel and transportation challenges. With telehealth, patients can receive care services from the comfort of their homes, saving time and effort. In contrast, in-person care can be inconvenient, time-consuming, and expensive, especially for patients with chronic conditions that require frequent visits to healthcare facilities. Furthermore, telehealth has been found to reduce costs for both patients and healthcare providers. Patients can avoid missing work, parking, and transportation expenses by receiving care services remotely. Continuation of care and routine check-ups through telehealth also reduces the need for frequent visits to the emergency department, lowering hospital expenditures, equipment costs, and physical facility expenses. In addition, telehealth

can optimize scheduling and workload management, resulting in increased efficiency and cost savings for healthcare providers (Nguyen et al. 2020)

Telehealth proved to be an effective tool for healthcare providers to manage their workload. By using virtual visits or remote monitoring, healthcare providers could attend to more patients in less time, reducing scheduling and administrative duties. Follow-ups with patients or conducting check-ins remotely eliminated the need for unnecessary in-person visits, making it easier to manage their workload. Additionally, telehealth provided scheduling flexibility, allowing healthcare professionals to deliver care outside of regular business hours or accommodate patients with varying availability or time zones. This flexibility potentially reduced their workload and improved their work-life balance, which was difficult to achieve with in-person care due to the overwhelming number of patients, leading to burnout, depression, and anxiety among healthcare providers (Ganjali et al. 2022).

Patients were highly satisfied with the convenience of receiving healthcare without having to visit a physical doctor's office. With telehealth, patients no longer needed to deal with the hassle of commuting, waiting in crowded waiting rooms, or adjusting their busy schedules. Thanks to the real-time nature of telehealth services, patients could receive timely care without having to wait for an available appointment slot. Furthermore, telehealth allowed healthcare providers to deliver care from their own offices or homes, without the need to travel to different locations or be physically present, thus improving accessibility (Maleka & Matli, 2022). This feature is particularly useful during emergencies, natural disasters, or other events that disrupt normal healthcare facility operations.

While face-to-face encounters have traditionally been viewed as essential for building rapport, communication, and trust in the context of in-person care, telehealth can also facilitate trust and productive communication between patients and medical professionals. Through virtual visits or remote monitoring, patients and healthcare professionals can engage in meaningful conversations about health issues, treatment options, and build rapport. However, some patients have reported a preference for in-person care in terms of doctor-patient relationships, citing that virtual consultations can feel impersonal and like they are talking to a machine. They noted a mutual understanding with their doctors during in-person visits (Breton et al. 2021).

During the COVID-19 pandemic, telehealth has emerged as a critical tool for delivering healthcare services while minimizing the risk of infection. Healthcare facilities and providers have quickly adopted telehealth to continue providing essential care to patients without requiring them to physically visit healthcare facilities. Telehealth has been extensively utilized for various healthcare services, including primary care, specialty care, mental health services, and follow-up care. By leveraging Telehealth, patients can receive timely care for non-urgent or routine health needs without being exposed to the risk of COVID-19 in healthcare settings. Vulnerable populations, such as the elderly or those with chronic health conditions, who may

be at higher risk for severe COVID-19 complications, have particularly benefited from the utilization of telehealth (Monaghesh & Hajizadeh 2020).

Due to concerns regarding the potential transmission of COVID-19, there has been a significant reduction in in-person care during the pandemic. Whenever possible, non-urgent or routine care has been postponed or transitioned to telehealth visits, while urgent or emergency cases have been prioritized for in-person care. To allocate resources towards COVID-19 patients and reduce the risk of infection in healthcare facilities, many elective procedures, preventative screenings, and non-essential healthcare services have been postponed or discontinued. The utilization of in-person care has been impacted by several factors, including lockdowns, social distancing policies, and healthcare facility capacity issues, leading to a significant decrease in its usage during the COVID-19 crisis (Findling et al. 2020).

6.4 Barriers and limitations of Telehealth and in-person care

Despite their importance in providing healthcare services during the COVID-19 pandemic, both in-person care and telehealth have encountered barriers and limitations. To ensure equitable access to healthcare services and enhance patient outcomes in the present and future, it is crucial to identify and address these obstacles and constraints.

6.4.1 Barriers and limitations of telehealth during COVID-19.

1. Access to technology was a limiting factor for some patients, who were unable to utilize telehealth due to the absence of necessary devices such as personal computers, smartphones, and internet connections. This limitation may disproportionately impact vulnerable populations, the impoverished, and individuals residing in remote areas, exacerbating healthcare disparities during the current pandemic (Chen et al. 2022).
2. Digital literacy and skills can be a significant challenge for some patients, particularly older adults, who may be less familiar with technology. Without adequate support or training, it may be challenging for patients to navigate telehealth platforms, potentially leading to a lack of access to essential healthcare services (Chen et al. 2022).
3. Telehealth visits may have limitations when it comes to diagnosing and treating some medical conditions that require physical examinations or diagnostic testing. For example, evaluating skin lesions, listening to heart or lung sounds, or performing physical manoeuvres may be challenging to do virtually. Some medical procedures, such as surgeries, cannot be conducted through telehealth visits, requiring patients to present themselves in person (Haleem et al. 2021).
4. Security and privacy concerns regarding the confidentiality of patient information and compliance with regulations such as Health Insurance Portability and Accountability Act (HIPAA) must be addressed in Telehealth encounters. Guidelines should be in place to ensure that patient data is protected from unauthorized access or breaches, and healthcare providers must take steps to safeguard sensitive information (Haleem et al. 2021).

6.4.2 Barriers and limitations of in-person care during COVID-19

1. In-person care during the COVID-19 pandemic carries a higher risk of COVID-19 transmission due to the need for physical contact and exposure to healthcare facilities. This risk can be concerning for both patients and healthcare providers, especially in areas with high COVID-19 prevalence or inadequate infection control measures. Proper use of personal protective equipment (PPE) can help reduce this risk (Ali et al. 2020).
2. Limited capacity and resource constraints in healthcare facilities can lead to prioritization of urgent or emergency cases, potentially limiting in-person care. Non-essential healthcare services, such as elective surgeries or preventive screenings, may also be postponed or cancelled (Findling et al. 2020).
3. Travel restrictions and logistical difficulties caused by lockdowns, social distancing measures, and transit restrictions can make it challenging for patients to access in-person care, particularly for those living in remote or underdeveloped areas (Bouabida et al. 2022).
4. Increased workload and exhaustion among healthcare personnel due to managing COVID-19 patients and establishing infection control measures may have impacted the quality and availability of in-person care. This workload and burnout can lead to decreased morale, depression, and staff turnover, further straining healthcare systems already under pressure (Monaghesh & Hajizadeh 2020).

7 Conclusions

The COVID-19 pandemic had a significant impact on healthcare delivery, and telehealth emerged as a vital alternative to in-person care. To investigate the effectiveness of these two approaches during the crisis, this systematic literature review needed to be conducted. The study suggests that telehealth holds great promise, as it offers a convenient and accessible way for patients to receive care, and has been associated with high patient satisfaction, favourable clinical outcomes, reduced costs, and better communication between patients and healthcare providers. However, the study also identified several barriers and limitations to the widespread adoption of telehealth, such as technological challenges, restrictions in physical examinations, and potential disparities in access.

In-person care remains a critical component of healthcare delivery, especially for acute emergencies and conditions requiring physical examinations. Moreover, it is crucial in building a rapport and fostering trust between healthcare providers and patients (Breton et al. 2021). Nonetheless, the COVID-19 pandemic has posed significant challenges to in-person care delivery, such as increased infection risks, limited resources, and travel restrictions, affecting its accessibility and utilization.

This research indicates that both in-person care and telehealth have advantages and disadvantages during the COVID-19 pandemic. Therefore, it is crucial to assess the individual situation, patient requirements, and resource availability before selecting a suitable approach. Furthermore, further research is required to evaluate the long-term impact of these methods on clinical outcomes, patient satisfaction, and healthcare provider experiences.

To achieve optimal healthcare outcomes, healthcare systems need to strike a balance between Telehealth and in-person care, leveraging the strengths of each to deliver safe, effective, and patient-centric care amidst the ongoing pandemic. Collaborative efforts among policymakers, healthcare administrators, and clinicians are needed to develop guidelines, protocols, and strategies that account for evolving patient and provider needs. By leveraging the potential of both in-person and virtual care, we can ensure that patients receive the highest quality care possible, both during and beyond the current crisis.

7.1 Recommendations

Based on the findings, here are recommendations for this study:

1. Health institutions should prioritize making telehealth an integral part of their structure. This could save the sector during a crisis like COVID-19 pandemic. Access to care, a lower risk of contracting infectious diseases, and convenience are just a few advantages of telehealth over traditional in-person care. Telehealth can assist healthcare professionals in maintaining continuity of care during public health emergencies while lowering the risk of infection spread (Bokolo 2021).

2. To ensure patients receive high-quality treatment, it is crucial for healthcare providers to receive proper training on how to effectively use telehealth platforms and deliver care remotely. Telehealth systems require particular knowledge and skills for it to be used effectively. To guarantee that patients receive a high-quality treatment, healthcare providers should be trained to use Telehealth platforms and give care remotely (Cottrell et al. 2021).
3. Telehealth providers should prioritize patient confidentiality and privacy by ensuring that the Telehealth platforms they utilize are safe and adhere to laws like HIPAA - Important factors in telemedicine delivery include patient confidentiality and privacy. By ensuring that the Telehealth platforms are safe and in compliance with laws like HIPAA, telehealth providers should prioritise patient privacy and confidentiality. This makes the approach more popular (Liddick 2021).
4. Further research is needed to assess the long-term effectiveness of telehealth services. While telehealth is effective in numerous studies, more research is required to determine its long-term effectiveness and pinpoint patient groups that might gain the most from its offerings.

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List of abbreviations

WHO- World Health Organization

PPE- Personal protective Equipment

COVID-19- Corona Virus Disease 2019

TM -Telemedicine

ED- Emergency Department

HER- Electronic Health Records

RPM- Remote Patient Monitoring

IoT- Internet of Things

AI- Artificial Intelligence

FSTeH- Finnish Society of Telemedicine and eHealth

JBI- Joanna Briggs Institute

CASP- Critical Appraisal Checklist for Systematic Review

MMAT- Mixed Methods Appraisal Tool

NOS- Newcastle-Ottawa Scale

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Appendices

Appendix 1: Characteristics of included studies

N	First author	Year	Study Tittle	country	study design	sample size	Aim of the study	outcome	Quality Appraisal
1	Monaghesh, E & Hajizadeh, A.	2020	The role of Telehealth during COVID-19 outbreak: a systematic review based on current evidence.	Iran	Systematic Literature Review	8	Identify the role of Telehealth services in preventing, diagnosing, treating, and controlling diseases during the COVID-19 outbreak	The use of Telehealth improves the provision of health services.	(7/9) =78%
2	Bashshur, R.L et al.	2020	Beyond the COVID Pandemic, Telemedicine and Health Care. Telemedicine and E-Health	USA	Systematic Literature Review	N/A	To review the current experience and the flaws encountered in a rush to deploy telemedicine as a substitute for in-person care in response to the raging coronavirus (COVID-19) pandemic	provides a sober reflection on the recent experience with telemedicine, the systemic fault lines that preceded the pandemic, and a better path forward.	(5/9)= 56%
3	Maleka N.H & Matli W.	2022	A review of Telehealth during the COVID-19 emergency	South Africa	Systematic Literature review	19	provide the current state of knowledge on how the COVID-	COVID-19 emergency forced healthcare workers and their patients to rapidly use and rely	(7/9)=78%

			in the public health sector: challenges and opportunities.				19 emergency necessitated the behaviour influencing the use and acceptance of Telehealth	on Telehealth to reduce the rate of COVID-19 transmission	
4	Ganjali R. et al.	2022	Telemedicine solutions for clinical care delivery during COVID-19 Pandemic: A scoping review.	Iran	Systematic Reviews and Meta-Analyses	66	provide a map of the existing evidence on the use of telemedicine during the COVID-19 pandemic by focusing on delineation functions and technologies, analyzing settings, and identifying related outcomes.	The benefits of telemedicine in medical care delivery systems during pandemic conditions have been well-documented, especially for outpatient care.	= 100%
5	Moisan P. et al.	2021	Orthopedic Surgery and Telemedicine in Times of COVID-19 and Beyond: A Review. Current Reviews in Musculoskeletal Medicine.	Canada	Literature review	N/A	current knowledge on the use of telemedicine and summarizes the literature highlighting the advantages and limitations of this technology in orthopedic surgery during the COVID-19 pandemic and beyond.	Widespread teleorthopedics is a new reality with which we are confronted, given the current COVID-19 pandemic.	(9/12)=75%
6	Annaswamy T.M et al.	2020	Telemedicine barriers and challenges for	USA	Meta-analysis	N/A	What barriers and challenges people suffering from	Outlines the challenges and barriers that face	(8/11)=73%

			persons with disabilities: COVID-19 and beyond.				disabilities underwent using Telehealth during the COVID-19 pandemic times.		
7	Breton M. et al.	2021	Telehealth challenges during COVID-19 as reported by primary healthcare physicians in Quebec and Massachusetts.	USA	Mixed methods	42	To describe the positive and negative implications of using Telehealth in Canada/USA	Identified key themes affecting Telehealth delivery	(3/6)= 50%
8	Nguyen M. et al.	2020	A Review of Patient and Provider Satisfaction with Telemedicine	USA	Mixed methods	N/A	describe the determinants of satisfaction with telemedicine (TM) and how they compare with in-person visits from the perspective of patients and providers.	Demonstrated a high level of satisfaction with telemedicine visits from patients and providers	(6/6)= 100%
9	Barr L.L.B et al.	2022	COVID-19 challenges and changes for home care agencies and providers.	USA	Scoping reviews	N/A	explore the challenges experienced by home care agencies and home care providers during the COVID-19 pandemic and the changes made to overcome these challenges.	List and discuss challenges experienced by home care agencies.	(9/11)=82%

Appendix 2: Quality assessment

1. Newcastle-Ottawa Scale (NOS) for Systematic Reviews.

Author, Year	Selection (****)	Compatibility (**)	Outcome (***)	Total
Monaghesh, 2020	****	*	**	7/9,
Bashshur, 2020	**	*	**	5/9,
Maleka, 2022	****	*	**	7/9,

2. CASP SCALE for literature reviews.

CASP SCALE	Moisan, 2021
Focused question/objective	+
Appropriate design	+
Appropriate recruitment	-
Matched control	+
The test procedure cleared the state.	—
Appropriate outcomes used	+
The outcome is accurately scaled to reduce bias.	+
Cofounding cofactor accounted	—
Appropriate analysis	+
Precise statistical results presented	+
Ability to generalize results	+
Interpretation related to existing evidence	+
Total score	9/12, 75%

3. Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Meta-analysis

JBI checklist	Annaswamy, 2020
review question clearly and explicitly stated?	Yes
Are inclusion criteria appropriate for the review question?	Not sure
Was the search strategy appropriate?	Yes
Were the sources and resources used to search for studies adequate?	Yes
Were the criteria for appraising studies appropriate?	Yes
Did two or more reviewers conduct critical appraisal independently?	No
Were there methods to minimize errors in data extraction?	No
Were the methods used to combine studies appropriate?	Yes
Was the likelihood of publication bias assessed?	Yes
Were recommendations for policy and/or practice supported by the reported data?	Yes
Were the specific directives for new research appropriate?	Yes
Total score	8/11, 72%

4. Quality Appraisal using MMAT Checklist (ii) for mixed studies.

Authors	SCREENING QUESTIONS		Is further appraisal appropriate?	Qualitative	Qualitative randomized controlled trials	Quantitative non-randomized	Quantitative descriptive	Mixed methods	Scores
	Are there research questions?	Does data address research questions?							
Bretton, 2021	No	No	Yes	Yes	N/a	Yes	N/a	No	3/6, 50%
Nguyen, 2020	Yes	Yes	Yes	Yes	N/a	Yes	N/a	Yes	6/6, 100%

5. JBI Checklist for a scoping review

1) Barr, (2022).

Is the review question clearly and explicitly stated?	Yes
Were the inclusion criteria appropriate for the review question?	Yes
Was the search strategy appropriate?	Yes
Were the sources and resources used to search for studies adequate?	Yes
Were the criteria for appraising studies appropriate?	Yes
Did two or more reviewers conduct critical appraisal independently?	Yes
Were there methods to minimize errors in data extraction?	Yes
Were the methods used to combine studies appropriate?	Yes
Was the likelihood of publication bias assessed?	No
Were recommendations for policy and/or practice supported by the reported data?	No
Were the specific directives for new research appropriate?	Yes
Score	9/11, 82%

6. Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

1) Ganjali, 2022 (Score = 100%)

SECTION TITLE	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Telemedicine solutions for clinical care delivery during	1	Evidence of being a scoping review: This is more of a topic-based and mapping article than a question-based one.	1

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
COVID-19 pandemic: A scoping review			
ABSTRACT			
Structured summary	2	Background, objectives, methods, results, discussion, and conclusion	1
INTRODUCTION			
Rationale	3	Objectives seek to map the existing evidence on the use of telemedicine during the COVID-19 pandemic by focusing on delineation functions and technologies, analysing settings, and identifying related outcomes.	2
Objectives	4	Objectives are addressed to key elements such as the functionality of telemedicine services in clinical care delivery, technologies used in current clinical practices, and results of telemedicine studies and their effects on clinical care.	2
METHODS			
Protocol registration	5	Np registration protocol	n/a
Eligibility criteria	6	Criteria used during screening: (1) studies that explored the possibility of improving management outcomes or treatment during COVID-19; (2) articles about applying telemedicine; (3) studies falling under the following categories - randomized studies and non-randomized studies; (4) studies published in scientific journals; (5) studies published in the English language; and (6) studies published between 2019 and 2020. Databases used in the search: PubMed and Scopus.	3
Information sources*	7	Additional sources: n/a Search terms selected: telemedicine, information technology, setting, outcomes, function, context, COVID-19	3
Search	8	The search was conducted in the third week of September, and the collected data were exported to Microsoft Excel for screening and charting. Search terms selected for the literature search included telemedicine domains, the target pandemic context of its implementation, and Boolean operators (OR/AND). Authors RG and MJ screened the search results.	3
Selection of sources of evidence†	9	A review of titles and abstracts was used to remove articles unrelated to the domain of this research. Disagreements between the two reviews were resolved by subjecting the articles to an in-depth analysis.	3
Data charting process	10	Data was collected into extraction sheets. Further, this data was categorized into four domains: setting, outcomes, technology, and functionalities. The setting domain stood for the location of	4

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		care, and the technology domain stood for network design and synchronicity. The functionality domain is all about aspects of the medical care process, such as diagnosis and rehabilitation. Lastly outcomes domain included parameters such as healthcare resource utilization, patient, and healthcare provider outcomes	
Data items	11	Variables: resource utilization, patient, and healthcare provider outcomes	5
Critical appraisal of individual sources of evidences	12	Not done	n/a
Synthesis of results	13	Data handling, extraction, grouping, and then charting	4
RESULTS			
Selection of sources of evidence	14	1602 articles were retrieved and excluded 163, which were duplicates. This led to the screening of the remainder articles, with 100 qualifying for full-text analysis. Out of these, only 66 were included in the final analysis. The 66 papers examined in this study were released in 2020. 66 papers were included, and 21 (32%) of them dealt with the use of telemedicine systems in the US; the remaining articles dealt with the use of telemedicine systems in China (17%), Italy (12%), India (6%), and the UK (6%) (Figure 2). It was discovered that 49 (74%) articles used a cross-sectional design, 11 (17%) articles utilized a cohort design, and 6 (9%) studies employed a pre-post comparative design in their research.	4
Characteristics of sources of evidence	15		4
Critical appraisal within sources of evidence	16	Not done	n/a
Results of individual sources of evidence	17	According to two studies, social media and video therapy have been used to track the expense of quarantine and the frequency of visits to long-term facilities. Four studies described the use of the telemedicine system to address certain incidents involving the provision of emergency care during the COVID-19 pandemic. In two investigations, both inpatient and outpatient care was delivered via telemedicine. In 51 (85%) trials, telemedicine was used to deliver outpatient or follow-up services.	5-8
Synthesis of results	18	The data visualization outcomes for the four research fields assessed in the papers under consideration are as follows. 90% of the telemedicine studies (n = 59) included counseling as a functional component. Phones, social media platforms, specialized platforms, videoconferencing, smartphones, and video conversations were among the technologies utilized for counseling. Furthermore, seven	4

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		studies used telemedicine to diagnose illnesses using technology, including phones, particular platforms, video conferencing, and social media. Primary care doctors (n = 7, 11%) had complete patient responsibility in these investigations. In 12 investigations, patients were telemonitored by phone, custom platforms, social media, Bluetooth devices, and video chats.	
DISCUSSION			
Summary of evidence	19	Healthcare systems had to suspend or drastically cut back on in-person care for non-urgent patients due to the COVID-19 pandemic to limit the various transmissions through this route. This increased the use of alternatives, with telemedicine being the best for preserving social distance and limiting contagion. This scoping review's main goal was to summarize the research on the use of telemedicine in clinical treatment during the COVID-19 epidemic.	8
Limitations	20	Methodological quality remains an issue. Because many of the included studies are observational, these concerns are particularly connected to the use of various outcome measures, inadequate reporting, and retrospective data-gathering techniques. Due to the exclusion of other pertinent papers published in languages other than English, this review's selection of research may have been biased by those studies' publications (language). In times of medical emergency, telemedicine may be used to deliver clinical treatment since it is practical, secure, scalable, efficient, and environmentally friendly. The delivery of medical treatment is enhanced by telemedicine in pandemics, particularly for outpatient and emergency care. It can enhance results for patients, healthcare providers, and patients.	10
Conclusions	21	Future studies must examine the specifications for a pandemic-ready telemedicine system, the traits of effective telemedicine systems, and the performance metrics that should be employed to assess the quality of the clinical care services provided.	10
FUNDING			
Funding	22	No funding information available for this study	n/a