A NARRATIVE STUDY ON TELEHEALTH ROLE IN COVID-19 PATIENT CARE

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Abstract

Background: In 2021, Indonesia reported 4,248,843 COVID-19 cases with 143,578 deaths, which had a significant impact on economic, social, and public health aspects. Telehealth is a strategic solution in mitigation efforts, especially in reducing exposure risks for health workers. This review aims to evaluate the role of telehealth in improving the quality of care for COVID-19 patients. Methods: A literature search was conducted through the electronic databases PubMed, ProQuest, and Google Scholar. Included studies had to clearly describe the use of telehealth in healthcare during the pandemic, be published until June 2025, be in English, and appear in a peer-reviewed journal. Study selection followed PRISMA guidelines, and quality evaluation was performed with the JBI checklist. Results: Of the 178 articles, 5 studies met the inclusion criteria. Forms of telehealth included telephone, video conference, email, patient portal, e-consultation, chatbot, GPS, and augmented and virtual reality technologies. These services enable remote diagnosis, evaluation, treatment, monitoring and provision of medical advice. Conclusion: Telehealth is proven to support the improvement of health services and maintain the safety of patients and medical personnel during the COVID-19 pandemic.

Keywords: COVID-19, pandemic, quality of care, telehealth

1. INTRODUCTION

COVID-19 (Corona Virus Disease 2019) is a type of virus that can cause various levels of disease severity, ranging from mild symptoms such as colds to severe respiratory disorders such as MERS (middle east respiratory syndrome) and SARS (severe acute respiratory syndrome) (1). According to data from the World Health Organization (WHO), the number of COVID-19 cases globally has reached 250,154,972, with a total of 5,054,267 deaths. In Indonesia alone, more than 4,248,843 cases were recorded with the number of deaths reaching 143,578 people (2).

The COVID-19 pandemic has had a significant impact on the global healthcare system, demanding rapid adaptation to maintain the well-being of both patients and healthcare workers (4). Limiting direct interactions is a crucial step in reducing the rate of virus transmission, prompting the need for innovative approaches to medical service delivery (5). One of the strategies adopted is the utilization of digital

technologies, including distance-based alternative medicine, which allows for reduced physical contact between patients and medical personnel (6).

The well-being of both patients and healthcare workers has become a crucial aspect and a major topic of conversation as the world tries to adjust to the COVID-19 pandemic situation. This has led to the need to implement innovative approaches in the provision of medical services (4). One of the measures taken is limiting direct interactions and utilizing alternative medicine to reduce the risk of virus transmission (5). Thus, physical contact between patients and health workers can be minimized. One solution that can be implemented is the provision of digital-based health consultation services (6).

Amidst these limitations, health consultation services such as telehealth are emerging as a promising solution (7). Although face-to-face interactions have important value in the diagnostic and treatment process, the pandemic situation places in-person interactions as a high risk factor. Therefore, medical personnel are faced with a major challenge, how to provide optimal care without the physical presence of the patient (5).

In the face of healthcare challenges during a pandemic, the utilization of telehealth becomes very important. This technology plays a role in facilitating communication between medical personnel and patients, enabling real-time monitoring of patient conditions, and assisting in a faster and more precise diagnosis and clinical decision-making process (8). In addition, with the easing of regulations related to telehealth in various countries, the utilization of telehealth in health services has accelerated significantly. This makes telehealth a key strategy in maintaining the effectiveness, efficiency and continuity of medical services amidst the limitations of in-person interactions (9).

In addition, telehealth plays an important role in maintaining the quality of care for COVID-19 patients, with a patient-centered approach that allows individual needs to be met even in conditions of limited access (11). Thus, this technology is not only a temporary alternative, but also opens up opportunities for the transformation of health services in a more adaptive and sustainable direction (10). A number of studies have shown that remote health services through telehealth can help reduce the risk of exposure to infection for medical personnel. Based on this, the authors are interested in analyzing the role of telehealth on improving the quality of care for COVID-19 patients.

2. METHODOLOGY

From the results of the literature selection according to PRISMA guidelines (12), only five articles met the inclusion criteria. This limitation is due to the small number of studies with appropriate designs and a focus on the quality of care for COVID-19 patients. Other factors such as language limitations, full-text access, and publication period also limited the number of studies analyzed in this review. Therefore, despite the small number of articles reviewed, the five articles were rigorously selected and judged to be of high quality and relevance to support the objectives of this review.

1.1 Eligibility Criteria

The article selection stage will determine the validity and relevance of the literature review, so researchers need to apply some inclusion and exclusion criteria. Articles are said to be eligible for inclusion if they focus on the theme of implementing telehealth, and digital care solutions during the COVID-19 pandemic. The expected outcome was quality of care services. Articles were selected mainly from 2019 - 2025.

Inclusion criteria taken in this review include; 1) patients with COVID-19, 2) methods with systematic review, scooping, review, and meta-analysis, 3) publications that come from trusted academic sources, such as journals, conference proceedings, and document reports, (excluding dissertations, books, or unverified online sources), 3) only full-text articles in English, 4) only articles published in the last six years. Exclusion criteria included: 1) articles of certain types RCT, quasi-experimental, pre-experimental, 2) articles available only in abstract form or no full text available, 3) articles written in other than English, 4) studies that were not directly relevant to the main topic of the review (e.g., did not focus on COVID-19 patients or did not discuss appropriate interventions/outcomes).

1.2 Information Sources

To identify relevant studies for this review, a systematic search was conducted in various electronic databases, websites of leading health organizations, and other additional sources. The searches were conducted in March 2025 using keyword combinations tailored to the targeted topic, population, intervention and study type. All final searches were conducted between March 27 and 29, 2025. As a complement, an additional search was conducted via google scholar on March 31, 2025 to capture studies that may not have been indexed in the main database.

1.3 Search Strategy

The search strategy was designed to thoroughly and systematically capture relevant literature from multiple sources. A combination of keywords and Medical Subject Headings (MeSH) were used to increase the sensitivity of the search (can be seen in table 1). Certain filters and restrictions were applied to filter the results according to inclusion and exclusion criteria.

Table 1. Keyword Search PICOT

Code	Keyword
P	*"Covid-19" OR "Patient Covid-19"*
I	*"Telehealth" OR "e-Health" OR "telehealth" OR "telemedicine" OR "telenursing" OR "electronic family meeting" OR "virtual" OR "online conference" OR "online"*
C	-
O	*Quality of Care*
T	2019 - 2025

1.4 Screening of Articles

The study selection process was conducted systematically following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines to ensure transparency and reproducibility in study screening and selection (12). The process began with duplication removal using EndNote (https://endnote.com/), then screening was conducted through Rayyan (https://www.rayyan.ai/).

Two independent AKA & MNS reviewers screened titles and abstracts based on inclusion and exclusion criteria. Successful articles proceeded to the full-text screening stage, also by two independent reviewers. Differences of opinion were resolved through discussion, and when necessary, with the help of a third reviewer.

Automation tools such as Rayyan are used to facilitate the screening process, but final decisions are still made manually by the review team. The selection process is presented in the PRISMA 2020 flowchart.

1.5 Data Extraction

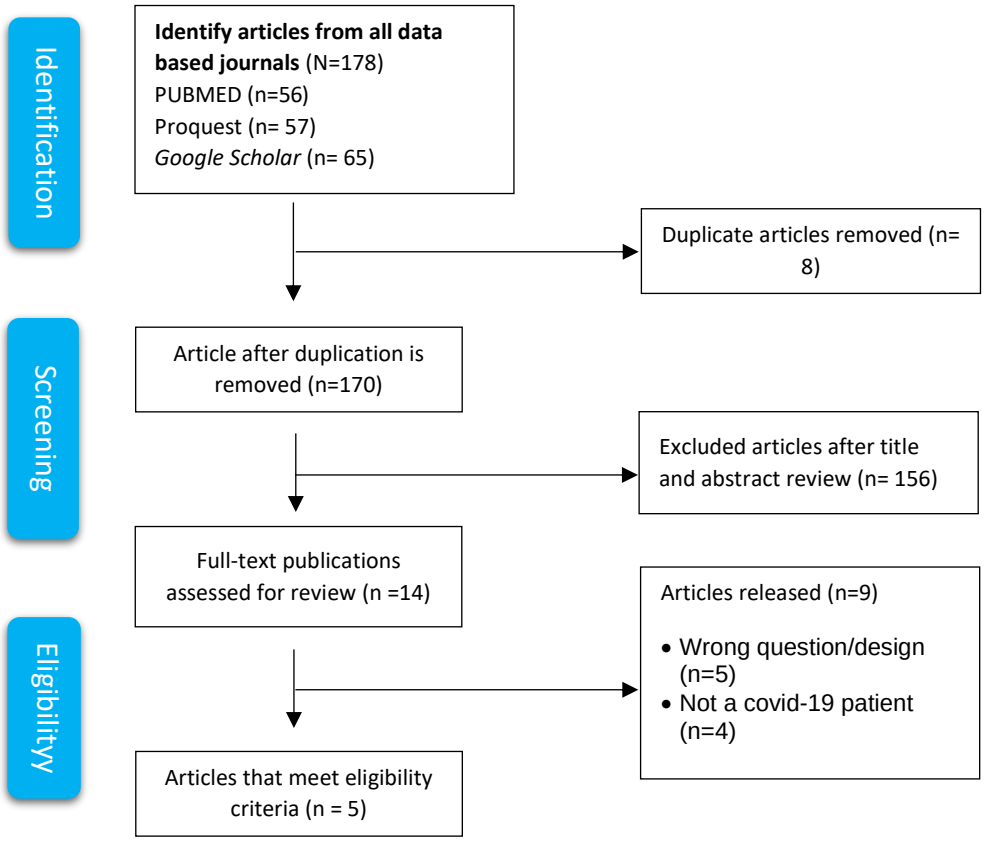
A critical assessment of methodological quality and risk of bias was conducted to evaluate the validity and reliability of each study included in this review. This process is important to ensure that the synthesized findings come from credible sources and are relevant in the context of the study.

The risk of bias assessment method was conducted using the critical appraisal tools from the Joanna Briggs Institute (JBI), which were adapted to the types of studies included, namely systematic reviews and meta-analyses. The tool covers several domains such as clarity of research questions, appropriateness of search methods, openness to publication bias, and transparency in reporting results.

Each included study was independently assessed by two AKA & MNS reviewers. Based on the review of titles and abstracts, 178 articles were obtained. Then, 8 articles were removed because they were considered duplicates and 156 articles were excluded, leaving 14 articles. Furthermore, a validity review using JBI obtained 5 articles which were selected because they were considered valid and credible. The data extracted from each article included the author's name, year of publication, purpose, type of methodology, type of telehealt and research results.

3. RESULTS

From the search results in the three databases using PICOT-based keywords, 178 articles were found. After removing 8 duplicates, 170 articles remained for screening. 156 articles were excluded because they were not full access, not in English, or did not fit the study type (such as not a systematic review, scoping review, or meta-analysis). A total of 14 articles remained, and after final selection based on the relevance of the question/design and population (not relevant to the specified topic), 5 articles were obtained for analysis in this scoping review. The selection results are depicted in the PRISMA Flowchart.



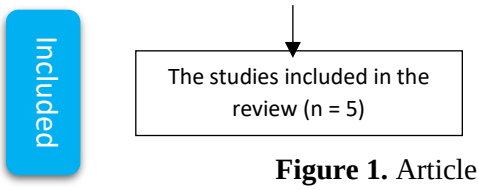


Figure 1. Article Selection and Exclusion Flowchart

1.1 Critical Appraisal

Our systematic review included five studies assessed using the JBI tool. The quality of the assessed studies was generally at a high level. Two articles (90.0%) of the studies enjoyed good quality and three articles (72.7%) were of moderate quality. Also, no studies were excluded based on the level of quality assessment. Each article was assessed based on criteria appropriate to the type of study, such as literature review and meta-analysis.

Table 1. Results of Critical Assessment of Article Quality Using JBI (Joanna Briggs Institute)

Item Pertanyaan	McGrowder *et al*., (2021) [13]	Monaghesh & Hajizadeh, (2020) [14]	Tebeje & Klein, (2021) [9]	Anthony Jnr, (2021) [6]	Khoshrounejad *et al.*, (2021) [15]
Is the review question clearly and explicitly stated?	√	√	√	√	√
Were the inclusion criteria appropriate for the review question?	√	√	√	√	√
Was the search strategy appropriate?	√	√	√	√	√
Were the sources and resources used to search for studies adequate?	√	√	√	√	√
Were the criteria for appraising studies appropriate?	√	√	√	√	√
Was critical appraisal conducted by two or more reviewers independently?	X	x	√	√	√
Were there methods to minimize errors in data extraction?	X	X	X	X	√
Were the methods used to combine studies appropriate?	X	X	√	X	√
Was the likelihood of publication bias assessed?	√	√	√	X	X
Apakah rekomendasi untuk Were recommendations for policy and/or practice supported by the reported data?	√	√	√	√	√
Were the specific directives for new research appropriate?	√	√	√	√	√

1.2 Telehealth services during the COVID-19 pandemic

Five studies show that telehealth is effective in supporting the care of COVID-19 patients. Telehealth enables the integration of multiple health services in a central clinic-led virtual network, spanning locations such as regional clinics, prevention centers, and private practices. It allows routine care to continue while non-emergency procedures are postponed, allowing resources to be focused on critical patients. In

addition, telehealth supports the implementation of social distancing and medical distancing, which is important in preventing virus transmission (14).

Telehealth plays an important role in reducing disease transmission by directing patients to appropriate care, keeping online services safe, and protecting all parties from infection. During the COVID-19 pandemic, telehealth was used for triage, monitoring, remote treatment, and follow-up, which contributed to lower morbidity and mortality (14).

For medical personnel experiencing mild symptoms, telehealth allows them to continue working remotely, make clinical decisions, seek second opinions, share experiences across regions, and access services such as teleradiology and online training. Therefore, to ensure sustainable access to essential health services, telehealth must be a key component in the COVID-19 pandemic response (14).

1.3 Types of Telehealth Used During the COVID-19 Pandemic

The COVID-19 pandemic has had a huge impact on society, the economy and the healthcare system. While the crisis poses tremendous challenges to the medical care system, it is also driving the rapid and widespread adoption of telehealth and digital health services (16). Telehealth and digital services encompass a wide range of medical activities performed by healthcare professionals remotely without direct physical contact with patients (16;17).

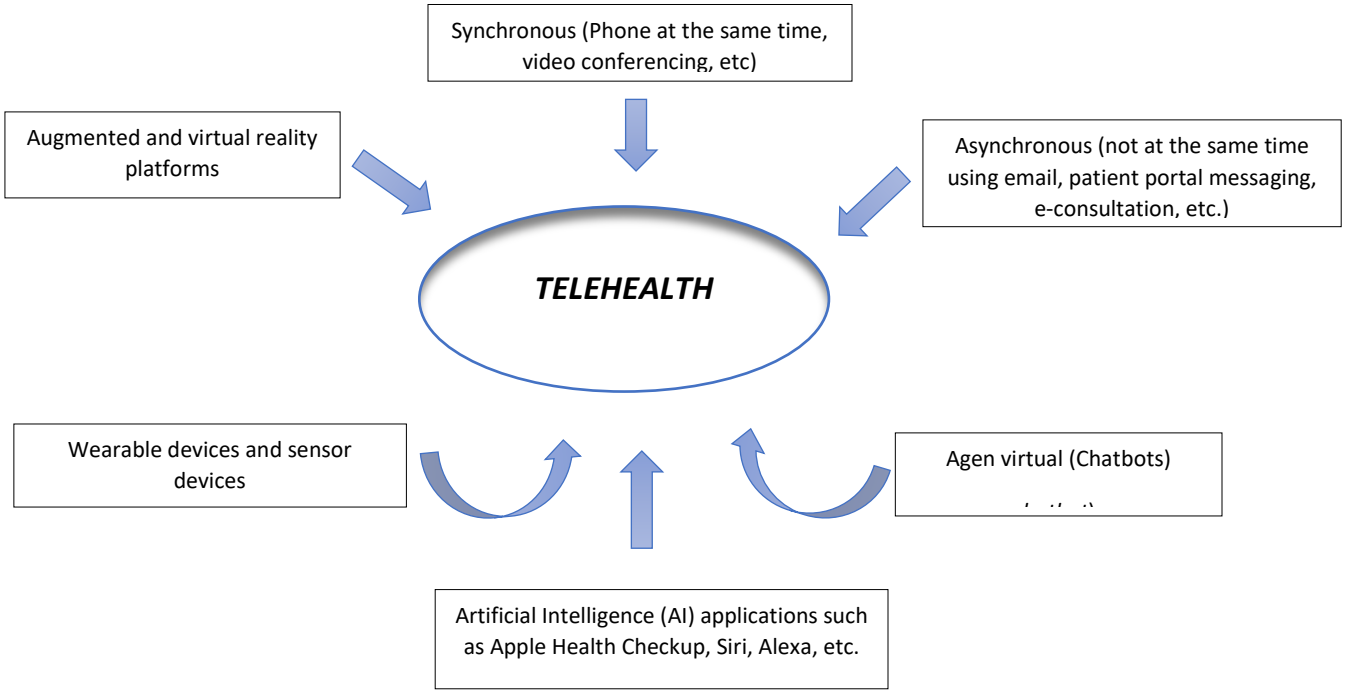


Figura 3. Types of telehealth for use in managing COVID-19

Figure 7 shows that telehealth and digital health services allow patients to receive medical care synchronously or asynchronously (18;19). Synchronous services take place in real-time, such as via telephone or video conferencing, allowing direct interaction between doctors and patients. This form is commonly used in initial consultations, counseling, medical evaluations, and follow-up examinations (5). Meanwhile, asynchronous services are performed without a face-to-face meeting at the same time, such

as through email, messages on patient portals, or e-consultations. In addition, other technologies such as virtual agents (chatbots) and wearable health devices are also used to support these services (19).

Asynchronous entails collecting, summarizing, storing, and disseminating data for patients to review at a later time (5). This typically consists of emails, recorded video messages, and medical record annotations. Findings from Song et al. (2020)17 revealed that asynchrony may include platforms such as online consultation clinics, where certified medical experts are available 24 hours/day to conduct primary screenings via remote consultation. In addition, asynchronous telehealth platforms include COVID-19 information pages, which provide the latest information updated in real time such as the Johns Hopkins corona website, (2020)20, and the VG live corona website updates in Norway (Vg.no, 2020)21 that provide information on the current status of COVID-19. The platform also provides instructions for home quarantine procedures, personal protection guidelines, and when to seek medical attention (17). Respectively, other categories of telehealth and digital care can include;

1.1.1 Telecare

Telecare, similar to synchronous care, is conducted through online consultations via video or telephone to provide health advice or respond to patient-reported symptoms (22).

1.1.2 Global Positioning System (GPS)

GPS sensors in remote applications are used to warn users to avoid areas with a high risk of COVID-19 (23; 24).

1.1.3 Chatbots

Virtual agents (chatbots) are used to answer common questions, provide recommendations, and connect quarantined patients with doctors. WHO also launched a chatbot via WhatsApp to disseminate the latest information and advice related to COVID-19. The chatbot interacts with users via text or voice to deliver health information (25).

1.1.4 Augmented reality dan virtual

New innovations in augmented and virtual reality platforms are usable but not easily accessible or scalable (24).

Wearables, such as smartwatches, are used in telemonitoring to collect patient health data, such as breath rate, oxygen levels, and blood pressure, which are then sent to doctors for symptom screening (23;24). In addition, the patient can measure body temperature with a home thermometer and the doctor can visually assess the patient's general condition, including whether they appear sick or show symptoms. The doctor may also guide the patient to self-palpate the neck area to detect enlarged lymph nodes. In addition, look for coughing, either dry or with phlegm, and examine the oropharynx for erythema, exudates, lesions, or enlarged tonsils.

The doctor can calculate the patient's respiratory frequency and observe the patient's deep breathing and respiration by using accessories such as shortness of breath, respiratory muscles, or speech impairment. Finally, bio-peripherals such as pulse oximeters can be included for remote examination. Artificial Intelligence (AI) apps such as Siri, Alexa, etc. can be used during self-quarantine to monitor and transmit body temperature, heart rate, and oxygen saturation data (26). Some recently launched AI apps include Apple's health check app that provides a screening and information portal (22). Siri give me guidance is the latest update of Siri that offers simple voice-based symptom-related recommendations on important telehealth app links for information related to COVID-19 (22). Alexa's daily check-up on Alexa

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mainly focuses on parents to be digitally screened for possible COVID-19 symptoms with responses from a daily questionnaire (24).

Table 2. Summary of Key Characteristics of Studies Included in the Review

Author and Year	Tittle	Purpose	Types of Methodology	Types of Telehealth	Conclusion
McGrowder *et al*. (2021)	*The utilization and benefits of telehealth services by health care professionals managing breast cancer patients during the COVID-19 pandemic.*	To examine the use of telehealth services through its various means of delivery among BCa patients specifically in the areas of screening, diagnosis, treatment modalities, as well as satisfaction among patients and healthcare professionals	*Litirature Review*	Teleteknologi, Telerehabilitas, *Telemedicine*	This literature review examines the evidence of telehealth service utilization through its various means of delivery among BCa patients specifically in the areas of screening, diagnosis, treatment modalities, and satisfaction among patients and healthcare workers.
Monaghesh and Hajizadeh (2020)	*The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence*	To identify the role of telehealth services in preventing, diagnosing, treating and controlling disease during the COVID-19 outbreak.	*Systematic Review*	Video conference langsung, dan email	Based on the findings of this review study, clinicians and patients are strongly advised to implement telehealth tools as an appropriate option to prevent and contain COVID-19 infections.
Tebeje and Klein, (2021)	*Applications of e-health to support person-centered health care at the time of COVID-19 pandemic.*	To explore how e-health apps are being used to support person-centered healthcare during COVID-19.	*Systematic Review*	*e-Health*	This study identified 60 articles and selected 8 studies that met the inclusion criteria. Most studies used e-health technologies to facilitate clinical decision support and team care. Patient engagement and access to healthcare from home is increasing with the implementation of telehealth and mobile health.
(Anthony Jnr (2021)	*Implications of telehealth and digital care solutions during COVID-19 pandemic: qualitative literature review.*	To provide human, infrastructural and institutional determinants that influence the adoption of telehealth and digital care solutions during the pandemic.	*Qualitative literature review*	*Telehealth*, *Telemedicine*	This study provides implications for informing medical staff about the potential of digital technologies to provide support during and after the pandemic.
Khoshrounejad *et al*. (2021)	*Telehealth-based services during the COVID-19 pandemic: A systematic review of features and*	To systematically review the features and challenges of telehealth-based services developed to support COVID-19 patients and healthcare providers	*Systematic Review*	*Synchronous: phone and video calls, video conferencing, mobile apps, and mixed reality*	*Telehealth can be a solution in providing services during the pandemic in terms of prevention, screening, triage, diagnosis, treatment and follow-up. The barriers identified indicate the need for clear guidelines, scientific evidence, and*

Author and Year	Tittle	Purpose	Types of Methodology	Types of Telehealth	Conclusion
	challenges.			*Asyinchronous: Mobile apps, email, websites, text messaging and teleradiology software*	*innovative policies to implement telehealth services among the community*.

4. DISCUSSION

1.1 The role of telehealth in the COVID-19 pandemic

Telehealth research has started since the 1960s (27). This technology, which utilizes information and communication technology (ICT), is proven to provide efficient and cost-effective medical services (27;28). In the midst of pressure from the healthcare sector to reduce costs without reducing quality, telehealth is a strategic solution because it allows medical services without direct visits to Health facilities (27). The importance of telehealth becomes even more apparent during global health crises such as the COVID-19 pandemic. In such national and international emergencies, the role of telehealth in supporting the continuity of medical services is significant (28). Its role is even more important during the COVID-19 pandemic, where many countries such as Australia, the United States, Denmark and the United Kingdom adopted telehealth to limit the spread of the virus and reduce direct contact in emergency departments (EDs) (18).

In addition, telehealth technologies, including wearable devices, enable real-time monitoring of basic vital signs such as pulse wave, heart rate and body temperature. The data generated from these devices can be accessed by clinicians to perform continuous remote monitoring of patients (23;24). Telehealth does not limit the ability of physicians to refer patients under quarantine to more appropriate healthcare facilities, such as intensive care, when direct physical care is required. Thus, telehealth and digital care services are an effective solution in reducing the risk of infection transmission between doctors and patients, while ensuring continuity of optimal medical care (28;4).

In Indonesia, telehealth services have been regulated in Permenkes RI Number 46 of 2017 as the legal basis for their implementation. The services include not only medical consultations, but also teleradiology, tele-ECG, tele-USG, and other forms of digital services. This regulation also includes the involvement of various health workers such as doctors, nurses, pharmacists, and nutritionists to support interprofessional collaboration in technology-based health services (29).

1.2 Telehealth on Quality of Care during the COVID-19 pandemic

This review evaluated the literature collected from three research databases by the end of March 2025 on the application of telehealth in improving quality of care during the COVID-19 pandemic. Globally, COVID-19 continues to be a major healthcare dilemma as it spreads relentlessly, disrupting care such as screening, diagnosis, treatment and surveillance (15). Such conditions certainly urge many healthcare facilities and institutions to find innovations to reduce face-to-face encounters (30). One innovation that can be used as an alternative and innovative approach is telehealth. This is because telehealth provides virtual health management through video conferencing, exercise intervention in clinical supportive care, remote pharmacy and decreased patient exposure to health care professionals (6). Figure 2 illustrates telehealth applications during the COVID-19 pandemic.

Telehealth interventions are practical modes of health care service delivery that utilize information and communication technologies to enable patients living in remote, rural as well as urban areas to access

clinical care. This intervention applies to technological methods including electronic messaging services, video conferencing, digital observation, and mobile telephony to facilitate real-time communication between patients and healthcare services so that they can be tailored to experience personalized care (32). The use of technological care systems leverages the power and utility of the internet and provides opportunities at every stage of the care continuum such as diagnosis, treatment including exercise therapy, surveillance as well as clinical trials in the fields of clinical, radiation and surgical oncology (33;34).

Telehealth facilitates real-time direct doctor-patient interaction through video conferencing sessions, allowing greater access to physicians in different areas of expertise, management by multidisciplinary clinical teams and easier transmission of clinical information including imaging, laboratory and histopathology data. Applications of telehealth also consist of remote monitoring of medication side effects, symptom management, emotional and psychological support, individually designed home-based exercise programs under the guidance of a professional, enrollment and participation in clinical trials (35).

Based on other reviews, it is described how telehealth such as the internet, m-health can be rapidly used to provide support for patient-centered health care to prevent and contribute to the control of the COVID-19 pandemic (9). In this review, telehealth to support patient-centered care. In addition, primary video visits are a convenient and efficient way for patients than in-person visits. Preferred virtual care visits were used to analyze patients' virtual care data to identify patients' COVID-19-like symptoms during their virtual visits. Virtual visits can be used to triage patients efficiently and predict areas that may have a high number of COVID-19 cases (36). Patient-centered web-based solutions containing patient data, virtual care, and apps are also considered adequate to conduct evidence-based practices and manage the COVID-19 pandemic (37).

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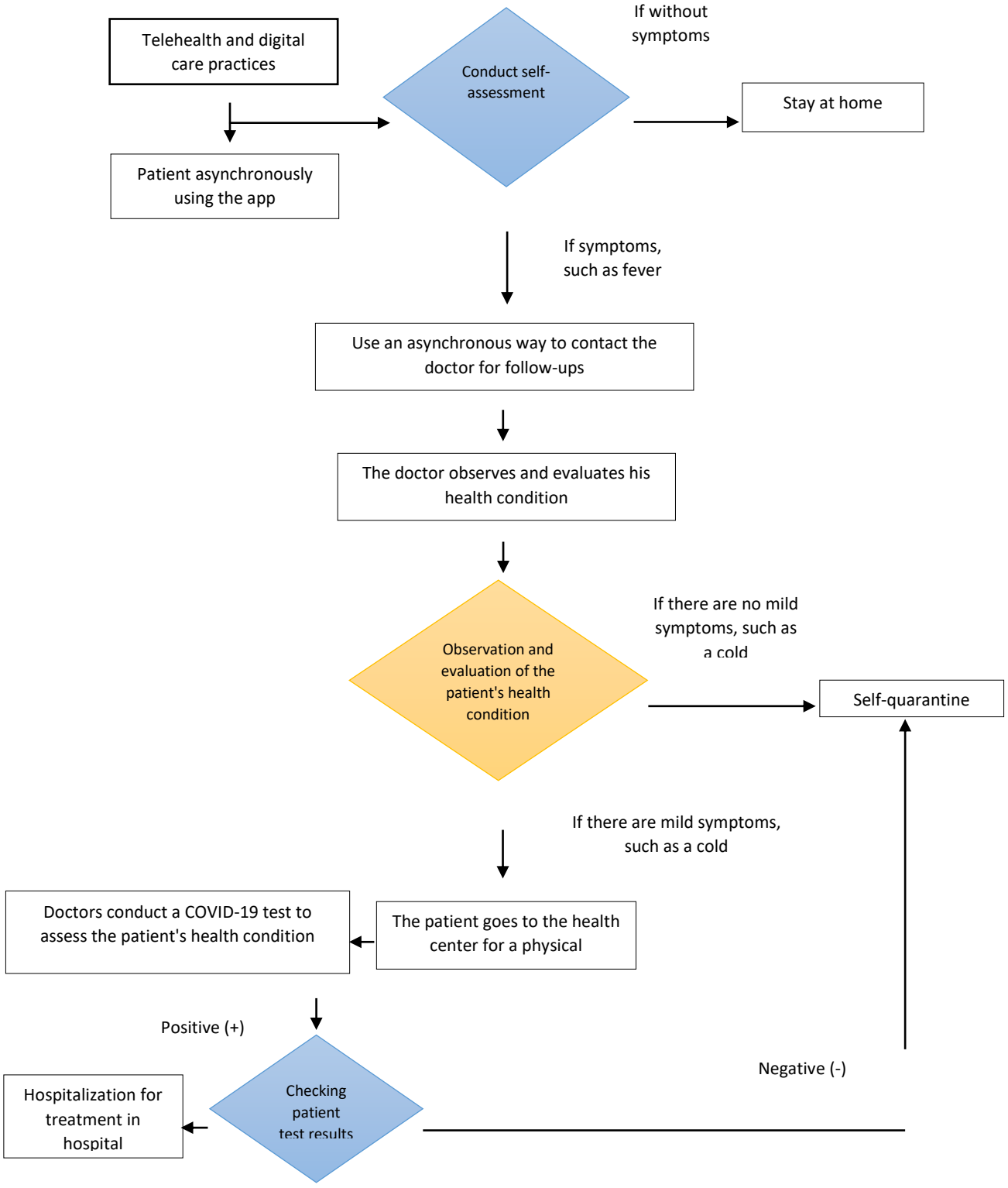

Figure 2. Use of telehealth apps during the COVID-19 pandemic (Antony Jnr, 2021)[6]

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Telehealth strengthens the occupational health of healthcare providers and minimizes epidemic costs by reducing the spread of infections. In addition, telehealth supports the coordination of healthcare providers in patient care. Adverse interactions between treatments can be avoided better than ever, as well as inefficient care between doctors and patients will demand better coordination and communication in their treatment approach (9).

In another review telehealth can connect a patient's medical care team and self-care routines (9). Data obtained from patients can help healthcare professionals to make shared decisions and treat diseases based on patient preferences (38). The use of telehealth technology can also be used to rapidly detect COVID-19, protect healthcare providers, and improve clinical outcomes. In addition, this review uses telehealth to control the spread of SARS-CoV-2, minimize treatment contacts, and save medical resources. These systems are capable of creating and supporting healthcare systems (14). Nonetheless, most of them failed to demonstrate the cost-effectiveness of the implemented telehealth technologies and prove their effectiveness on patients' clinical outcomes during the coronavirus pandemic.

Based on the results of research by Singh et al. (2021)10 it was found that more than 80% of 106 respondents stated that the use of telehealth was able to streamline time and costs, and especially telehealth was not dependent on the distance traveled for in-person appointments. Moreover, the perceived time and cost savings were threshold benefits that positively impacted most patients (10). Telehealth is potentially cost-effective, convenient, reduces the burden of patient travel for consultations with healthcare professionals and enables timely discussions on clinical interventions and treatment plans (31). Therefore, further research should be conducted in these areas (39).

1.3 Challenges and Solutions for Using Telehealth During the COVID-19 Pandemic

Although telehealth brings many benefits to healthcare, the implementation of this system also has challenges for patients, and healthcare and service providers. Before the COVID-19 pandemic, telehealth visits via video conferencing were less common due to reluctance to use the technology especially by older patients due to preference for face-to-face consultations, unstable internet connections in remote areas, patient distrust as it was impossible to perform a complete physical examination remotely, and lack of insurance reimbursement (40).

In addition, there are challenges to the use of telehealth including concerns regarding the security of electronically transmitted patient health records, high costs associated with acquisition and implementation, significant maintenance costs, administration and training of healthcare professionals to utilize different platforms effectively, inadequate access to technology or small platforms, literacy and lack of physician attention during clinical consultations (39;7;9). In contrast, privacy concerns were not seen as a factor by either those who participated in telehealth or those who opted out. This pattern suggests that time and cost

efficiency for patients should be the primary concern when implementing telehealth and that sensitive issues such as privacy protection can be readily accommodated (6).

In addition, there must be the necessary infrastructure for wireless connectivity at both ends of the patient-doctor encounter. In clinical encounters via telehealth, continuity of care involves the use of electronic health records. Given the challenges of privacy and security of patient information, telehealth services must meet the requirements of the Act by the Indonesian Minister of Health Regulation Number 46 of 2017 (29). This will ensure that patient information is kept confidential and secured in addition to other cybersecurity measures implemented when telehealth services are established. Nevertheless, despite these challenges, telehealth continues to provide timely and appropriate solutions to the barriers caused by the COVID-19 pandemic in interdisciplinary service delivery (15).

In the existing problems, there are alternatives that can be used to provide solutions in providing care during COVID-19. Solutions and challenges in implementing and providing efficient telehealth services especially among elderly patients, with issues such as low income, unavailability of health insurance, low socioeconomic status, and geographical limitations (39). These can be addressed by improved access with the implementation of clinical telehealth video by private and public healthcare providers in rural and remote areas with increased use of asynchronous and synchronous photo and video formats (13).

5. CONCLUSIONS

Based on a review of five articles, Telehealth has been shown to play an important role in improving the quality of care for COVID-19 patients through digital services such as electronic messaging, video conferencing, and remote monitoring. These interventions are effective in supporting patient screening, diagnosis, treatment, and follow-up, as well as protecting medical personnel and saving resources. However, limitations such as a lack of guidelines, long-term scientific evidence, and supporting policies remain. To ensure the sustainability of telehealth implementation in Indonesian hospitals, practical strategies such as the development of national guidelines, integration of services in the hospital system and JKN, training of health workers, and provision of equitable digital infrastructure are needed. Telehealth has great potential as part of the transformation of adaptive and quality health services.

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REFERENCES

1. Wang Y, Lu M, Yang S, Bien M, Chen Y. Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information. 2020;(January). Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8215880/pdf/main.pdf
2. WHO. Coronavirus Disease (COVID-19) Pandemic [Internet]. World Health Organizarion. 2021. Available from: https://covid19.who.int/region/searo/country/id
3. Plotnikow GA, Matesa A, Nadur JM, Alonso M, Ignacio Nuñez I, Vergara G, et al. Characteristics and

outcomes of patients infected with nCoV19 requiring invasive mechanical ventilation in Argentina. Rev Bras Ter Intensiva. 2020;32(3):348–53.

4. Bokolo Anthony Jnr. Use of Telemedicine and Virtual Care for Remote Treatment in Response to COVID-19 Pandemic. J Med Syst. 2020;44(7).
5. Rao SS, Loeb AE, Amin RM, Golladay GJ, Levin AS, Thakkar SC. Establishing Telemedicine in an Academic Total Joint Arthroplasty Practice: Needs and Opportunities Highlighted by the COVID-19 Pandemic. Arthroplast Today [Internet]. 2020;6(3):617–22. Available from: http://dx.doi.org/10.1016/j.artd.2020.04.014
6. Anthony Jnr B. Implications of telehealth and digital care solutions during COVID-19 pandemic: a qualitative literature review. Informatics Heal Soc Care [Internet]. 2021;46(1):68–83. Available from: https://doi.org/10.1080/17538157.2020.1839467
7. Hakim AA, Kellish SA, Atabek U, Spitz RF, Hong KY. Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information. Am J Surg [Internet]. 2020;(January). Available from: https://pubmed.ncbi.nlm.nih.gov/32336519/
8. Kaminski J. Informatics in the time of COVID-19. Can J Nurs Inform [Internet]. 2020; Available from: https://cjni.net/journal/?p=6820
9. Tebeje TH, Klein J. Applications of e-Health to Support Person-Centered Health Care at the Time of COVID-19 Pandemic. Telemed e-Health. 2021;27(2):150–8.
10. Singh A, Mountjoy N, McElroy D, Mittal S, Al Hemyari B, Coffey N, et al. Patient perspectives with telehealth visits in cardiology during COVID-19: Online patient survey study. JMIR Cardio. 2021;5(1).
11. Hurst EJ. Evolutions in Telemedicine: From Smoke Signals to Mobile Health Solutions. J Hosp Librariansh. 2016;16(2):174–85.
12. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ. 2021;372.
13. McGrowder DA, Miller FG, Vaz K, Anderson Cross M, Anderson-Jackson L, Bryan S, et al. The Utilization and Benefits of Telehealth Services by Health Care Professionals Managing Breast Cancer Patients during the COVID-19 Pandemic. Healthcare. 2021;9(10):1401.
14. Monaghesh E, Hajizadeh A. The role of telehealth during COVID-19 outbreak : a systematic review based on current evidence. BMC Public Health. 2020;4:1–9.
15. Khoshrounejad F, Hamednia M, Mehrjerd A, Pichaghsaz S, Jamalirad H, Sargolzaei M, et al. Telehealth-Based Services During the COVID-19 Pandemic: A Systematic Review of Features and Challenges. Front Public Heal. 2021;9(July):1–14.
16. Wosik J, Fudim M, Cameron B, Gellad ZF, Cho A, Phinney D, et al. Telehealth transformation: COVID-19 and the rise of virtual care. J Am Med Informatics Assoc. 2020;27(6):957–62.
17. Song X, Liu X, Wang C. The role of telemedicine during the COVID- 19 epidemic in China — experience from Shandong province. 2020;1–4. Available from: https://ccforum.biomedcentral.com/articles/10.1186/s13054-020-02884-9
18. Leite H, Hodgkinson IR, Gruber T. New development: 'Healing at a distance'—telemedicine and

COVID-19. Public Money Manag [Internet]. 2020;40(6):483–5. Available from: https://doi.org/10.1080/09540962.2020.1748855

19. Wosik J, Fudim M, Cameron B, Gellad ZF. Telehealth Transformation: COVID-19 and the rise of Virtual Care. xford Univ Press behalf Am Med Informatics Assoc. 2020;
20. Johns Hopkins. COVID-19 map Johns Hopkins coronavirus resource center. 2020.
21. Vg.no. Live: the Corona virus is spreading in Norway and the world. 2020.
22. Vidal-Alaball J, Acosta-Roja R, PastorHernández N, SanchezLuque U, Morrison D, NarejosPérez S, et al. Telemedicine in the face of the COVID-19 pandemic. Aten Primaria [Internet]. 2020;52(6):418–22. Available from: https://doi.org/10.1016/j.aprim.2020.04.003
23. Kapoor A, Guha S, Kanti Das M, Goswami KC, Yadav R. Digital healthcare: The only solution for better healthcare during COVID-19 pandemic? Indian Heart J. 2020;72(2):61–4.
24. Torous J, Myrick KJ, Rauseo-Ricupero N, Firth J. Digital mental health and COVID-19: Using technology today to accelerate the curve on access and quality tomorrow. JMIR Ment Heal. 2020;7(3).
25. Okereafor K, Adebola O, Djehaiche R, El M, El B. Exploring the Potentials of Telemedicine and Other Non-Contact Electronic Health Technologies in Controlling the Spread of the Novel Coronavirus Disease (Covid-19). 2020;(April).
26. Wright JH, Caudill R. Remote treatment delivery in response to the COVID-19 Pandemic. Psychother Psychosom. 2020;89(3):130–2.
27. Leite H, Gruber T, Hodgkinson IR. Flattening the infection curve – understanding the role of telehealth in managing COVID-19. Loughborough's Res Repos. 2020;20(1):1–148.
28. Whaibeh E, Mahmoud H, Naal H. Telemental Health in the Context of a Pandemic: the COVID-19 Experience. Curr Treat Options Psychiatry. 2020;7(2):198–202.
29. Permenkes RI. Peraturan menteri kesehatan republik indonesia nomor 46 tahun 2017 tentang strategi e-kesehatan nasional [Internet]. 2017. Available from: https://www.regulasip.id/book/5111/read
30. Dorsey ER, Topol EJ. State of Telehealth. N Engl J Med. 2016;375(2):154–61.
31. Sabesan S, Simcox K, Marr I. Medical oncology clinics through videoconferencing: An acceptable telehealth model for rural patients and health workers. Intern Med J. 2012;42(7):780–5.
32. Ignatowicz A, Atherton H, Bernstein CJ, Bryce C, Court R, Sturt J, et al. Internet videoconferencing for patient–clinician consultations in long-term conditions: A review of reviews and applications in line with guidelines and recommendations. Digit Heal. 2019;5:1–27.
33. Chowdhury RA, Brennan FP, Gardiner MD. Cancer Rehabilitation and Palliative Care—Exploring the Synergies. J Pain Symptom Manage [Internet]. 2020;60(6):1239–52. Available from: https://doi.org/10.1016/j.jpainsymman.2020.07.030
34. Pareek P, Vishnoi JR, Kombathula SH, Vyas RK, Misra S. Teleoncology: The Youngest Pillar of Oncology. JCO Glob Oncol. 2020;2019(6):1455–60.
35. White LE, Krousel-Wood MA, Mather F. Technology meets healthcare: Distance learning and telehealth. Ochsner J. 2001;3(1):22–9.
36. Khairat S, Coleman C, Teal R, Rezk S, Rand V, Bice T, et al. Physician experiences of screen-level features in a prominent electronic health record: Design recommendations from a qualitative study.

Health Informatics J. 2021;27(1).

37. Krausz M, Westenberg JN, Vigo D, Spence RT, Ramsey D. Emergency response to COVID-19 in Canada: Platform development and implementation for eHealth in crisis management. JMIR Public Heal Surveill. 2020;6(2).
38. Hickman RL, Clochesy JM, Alaamri M. Effects of an eHealth Intervention on Patient-Provider Interaction and Functional Health Literacy in Adults With Hypertension. SAGE Open Nurs. 2021;7.
39. Ackerman MJ, Filart R, Burgess LP, Lee I, Poropatich RK. Developing next-generation telehealth tools and technologies: Patients, systems, and data perspectives. Telemed e-Health. 2010;16(1):93–5.
40. Jiménez-Rodríguez D, García AS, Robles JM, Salvador MDMR, Ronda FJM, Arrogante O. Increase in video consultations during the COVID19 pandemic: Healthcare professionals' perceptions about their implementation and adequate management. Int J Environ Res Public Health. 2020;17(14):1–14.