TELEMEDICINE USE IN HEALTH FACILITY DURING COVID-19 PANDEMIC: LITERATURE REVIEW

Penggunaan Telemedicine di Fasilitas Kesehatan Selama Pandemi Covid-19: Tinjauan Literatur

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Abstract

Background: The policy of imposing restrictions on community activities during the Covid-19 pandemic is a challenge to the accessibility of health services. Therefore, we need the best solution for safe access to health services.
Aims: This study aims to analyze telemedicine use in health facilities during the Covid-19 pandemic by looking at comparisons and similarities in use and reviewing the inhibiting and supporting factors for the success of telemedicine.
Methods: The research method is a literature review that was obtained through the Scopus database and published in 2020-2021 in English. Cleaning of articles was carried out with the inclusion and exclusion criteria so that seven articles were reviewed.
Results: The lack of multidisciplinary use, healthcare practitioners' inability to connect with patients, under-integrated systems, and lack of technological knowledge and capacity all hinder telemedicine adoption. Positive patient feedback, a well-supported telemedicine service system, and partnerships with specialists all help make telemedicine more effective.
Conclusion: During a pandemic, the use of telemedicine in healthcare settings is extremely beneficial for healthcare providers and patients during healthcare consultations, and there are supporting aspects such as WHO recognition and simplicity of operation. However, obstacles remain, such as a lack of specialized knowledge and multidisciplinary technology.

Keywords: covid-19, health facilities, telemedicine

Abstrak

Latar Belakang: *Kebijakan pemberlakuan pembatasan kegiatan masyarakat selama pandemi Covid-19 menjadi tantangan pada aksesibilitas layanan kesehatan. Sehingga dibutuhkan solusi terbaik untuk akses layanan kesehatan yang aman.*
Tujuan: *Penelitian ini bertujuan untuk menganalisis penggunaan telemedicine di fasilitas kesehatan selama pandemi Covid-19 dengan melihat perbandingan dan persamaan penggunaan serta meninjau faktor penghambat dan pendukung kesuksesan telemedicine.*
Metode: *Metode penelitian adalah literature review. Artikel didapatkan melalui database scopus yang dipublikasikan pada tahun 2020-2021 dan berbahasa Inggris yang berjumlah 56. Cleaning artikel dengan kriteria inklusi dan eksklusi, sehingga didapatkan artikel yang diulas berjumlah tujuh artikel.*
Hasil: *Faktor penghambat penggunaan telemedicine, yaitu penggunaan belum bersifat multidisiplin, kekhawatiran praktisi kesehatan yang tidak bisa bounding dengan pasien, sistem yang belum terintegrasi, serta minim pengetahuan dan kemampuan teknologi. Faktor pendukung penggunaan telemedicine, yaitu respon positif dari pasien, sistem pelayanan telemedicine didukung penuh oleh pemerintah negara dan terintegrasi dengan spesialis.*
Kesimpulan: *Penggunaan telemedicine di fasilitas kesehatan pada masa pandemi sangat membantu penyedia layanan kesehatan dan pasien dalam konsultasi kesehatan. Faktor pendukung berupa pengakuan WHO dan kemudahan operasional. Namun, masih ada faktor penghambat, seperti belum multidisiplin dan kurangnya pengetahuan dalam penggunaan teknologi.*

Kata kunci: *covid-19, fasilitas kesehatan, telemedicine*

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Introduction

The Covid-19 pandemic has made society cautious about coronavirus and, thus, implement health protocols (World Health Organization, 2020). As SARS-CoV-2 may cause mortality, WHO (World Health Organization) has confirmed the status of coronavirus as a pandemic (Calton, Abedini and Fratkin, 2020).

Mann *et al.* (2020) explained the need of telemedicine as the impact of pandemic era in the United States. The growth of this health service was rapid, making health insurance companies in the United States develop their business by providing telemedicine services which could be accessed from home (Mann *et al.,* 2020).

Current global situation needs the best solution in terms of access to safe and comfortable health services during Covid-19 era, since most health providers, like hospitals, focus more on Covid-19 patients. This situation triggers the development of e-Consults by practicians to see patient with non-procedural urological needs that are carried to emergency room (Gadzinski *et al.*, 2020). Nonetheless, the use of telemedicine in developing countries has yet to be effective due to limited technology access (Combi, Pozzani and Giuseppe, 2016).

This article aims to analyze the use of telemedicine in health providers during Covid-19 pandemic, compare the difference and similarities of its utility, as well as examine the barriers and proponent of telemedicine use.

Method

This study is a literature review with descriptive analysis which is able to describe certain research problem (Snyder, 2019). Literature review is needed to enhance the knowledge of research field that being analyzed, and as the base of comparison for previous research as well as improvement for future study (Winchester and Salji, 2016; The Writing Center, 2020).

To define inclusion and exclusion criteria, researchers used PICOT formulation of research questions. Population (P) is the whole object that will be analyzed using theme chosen by researchers. Intervention (I) is action that will be carried out to the issue. Comparison (C) is alternative actions to issue, while Outcome (O) is the result of previous study. PICOT also includes Theory (T) that explains the process or reason behind I and O relationship. Articles analyzed in this study were indexed by Scopus. We conducted the data collection from January 10th to July 5th, 2020.

Data Collection

The purpose of this research is to retrieve comprehensive information of telemedicine utility across countries. Articles were collected from Scopus with keywords "telemedicine" and "Covid-19" and "health facilities". Inclusion criteria used in this research were articles published in 2020-2021, written in English, and matched the aim of study. Researches did not limit the articles based on country or method. The process of data collection was explained through PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta Analysis*) diagram.
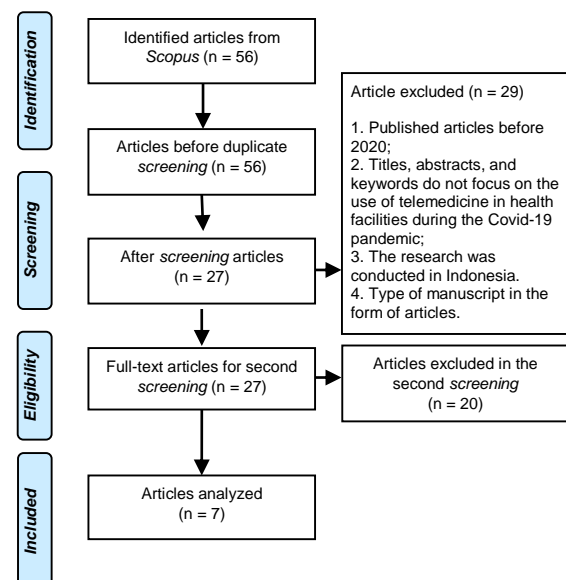

Figure 1. PRISMA Diagram of Literature Selection Process

Table 1. Literature Review Matrix

Authors, Country	Research Method	Research Purpose	Respondent	Mechanism of Telemedicine	Result
Conde-Blanco, et al., Spain	Online Survey	Effectivity of telemedicine use during pandemic	66 respondents of epileptologist in *Spanish Epilepsy Society and Catalan Neurology Society* epilepsy study group.	1. First visit through audio call; 2. *Folow up visit* using video conference platform such as *Skype, WhatsApp*, etc.; 3. Patients who want to consult the neurology and blood test would get their telemedicine schedule arranged after lockdown.	1. 56% respondents had experience with telemedicine and the rest just tried telemedicine in pandemic era 2. 88% respondents received telemedicine service using telephone while 4,5% respondents through video call, and 8% others come to the clinic and have conversation through the phone. . 3. From 60% of respondents who underwent surgery, only 27,4% explained it through phone. 4. About 78,8% of respondents showed interest to keep using telemedicine, and other 10% respondents showed less interest.
Aiken et al., United States	*Regression Discontinuity Design* (RDD), a quasi experimental evaluation method to evaluate program with intersection point, in order to decide eligible respondents	Assessment of increased demand in clinical abortion due to less accessible service in clinic	Online consultation form filling by 49,932 people.	Civilians requested *Self-management Abortion-care*, but government still required patients to come to health services to get mifepristone.	1. The demand of self-managed online telemedicine for clinical abortion had reached 49.932 cases since 2019 and had 27% of increase in March-May 2020. 2. Highest demand came from Texas (94%). 3. There were possibilities that society would choose non-medical services if their demands could not be fulfilled in pandemic era.
Ghai et al., India	Descriptive	Not explained	Not explained	1. Patients used audio, video, email, and fax as communication tools. 2. Ethical codes of services provided online must be the same with offline services while health practitioners must complete cumpolsory online course; 3. Health practitioners must show registration number while giving services, and patients were not allowed to give personal data without written consent. 4. Consultation given must be in line with health services category	1. Ministry of Health built telemedicine service for chronic illness. 2. The regulation included technical guide, rules, and so on related to audio, video, fax, and email use as tools. 3. Government considered telemedicine essential service as it helped to prevent exposure of coronavirus to people inn hospitals. 4. *Telemedicine* could minimize operational costs and human resources.
Darr et al., United Kingdom	Online survey using four validation indicators.	Covid-19 impact evaluation to pediatric ENT outpatient service by collecting patients feedback.	225 patients were randomly selected to be reviewed, and 20 patients were chosen to assess *Virtual Outpatient Clinic* (VOPC) service satisfaction.	1. Health providers gave information and pre-consultation confirmation through email and telephone; 2. New patients and follow-up patients used telephone to consult; 3. Patients used video conference through *AccuRx and Zoom* to consult their surgery results or any visualization that must be assessed by practitioners.	1. 514 patients participated in 144 provided VOPC which were handled by seven professionals. 2. Most of patients utilized follow-up services (170 patients). 3. 79% patients visited VOPC with scheduled arrangement 4. Virtual tools used by patients were telephone (185 patients) and video conference (15 patients). 5. From 20 patients chosen, 99% of them felt satisfied and veru satisfied about patient-doctor relation which was reliable and private. 6. About 98% respondents gave positive feedback related to consultation. VOPC bring impact to the decrease of direct visit to clinics, from 15% before pandemic to 2,5% during pandemic.

Authors, Country	Research Method	Research Purpose	Respondent	Mechanism of Telemedicine	Result
Al-Sofiani et al., Saudi Arabia	Online Survey	Description of telemedicine protocol in diabetes clinic provided for patients and health care providers (HCP) as well as patients and HCP satisfaction virtual report	More than 300 patients in the first four weeks	1. Patients used gadget with audio and video that was connected to internet. Platform used for service including zoom, *Continuous Glucose Monitoring (CGM)* system, and *Self Monitoring of Blood Glucose* (SMBG) to share patients latest condition through pictures; 2. Patients fulfilled scheduling form via google form; 3. Health practitioners arranged schedule and duration of consultation; 4. Health services prepared and sent medicines to patients; 5. Routine virtual education session; 6. Patient satisfactory survey	1. From more than 300 patients who came to the clinic in the first four weeks, about 145 from 150 patients evaluated their experience in receiving services. About 210 patients expressed satisfaction, and patient request feature received 450 requests with blood glucose level check was the most requested service (31%). 2. 93% of respondents stated that services were easy to access and 71% of them explained the fulfilled purpose of check up Ramadan virtual session was considered adding knowledge to 97% respondents. 4. About 88% respondents agreed that session would be held yearly even after pandemic was over.
West, United States	Descriptive	Unexplained	Unexplained	1. Cancer outpatients could access the system through website and application in smartphone named *AccessHope*. 2. Patients performed the consultation with oncologist through *Live* or *televideo*; 3. Patients with medical records who wanted to be undergo further assessment, *AccessHope* would offer the service from the nearest clinics.	1. Centers for Medicare and Medicaid service (CMS) stated that 80 services would be provided through telemedicine system, and payment of service would be standardized as usual on-site visits. Family members information would also be integrated to the system. 2. Some cancer clinics integrated conference video of patients with the oncologists. Digital supervision was provided as well, improved from the previous method using web camera.
Biswas et al., India	Online survey	Assessment of doctors giving palliative care to cancer patients and its obstacles, result discussion, and response evaluation of care with telemedicine.	314 patients who used telemedicine patients in March 25th – May 13th 2020	1. Health services integrated data to system in Android clinic; 2. Before pandemic, patients follow-up was conducted using audio calls only; 3. Patients accessed contacts in official clinic website; 4. Patients used calls and video calls from *WhatsApp, Massanger, E-mail,* and *Skype* which were provided 24 hours in a week under practitioners supervision.	1. About 167 patients used audio calls and messages (53.18%), 84 patients used video calls (26.75%), 224 patients used telemedicine to take opioids under practitioners supervision, 157 pasien (50%) sought for check-up and symptoms detection, and 86 patients (27.39%) needed more opioids. 2. The reasons of telemedicine use included difficult transportation access (124%), categorized as terminal patient (88%) and afraid of being exposed to Covid-19 (71%). 3. Patient satisfaction level showed that 208 patients were satisfied and very satisfied, while 106 patients felt unsatisfied and very unsatisfied.

Result and Discussion

About 56 articles were screened in the first phase and 29 articles were excluded because of unmet inclusion criteria. After conducting second phase of screening, researchers selected 7 articles to be analyzed further based on phenomena, result, and conclusion explained by related study. Those 7 studies were conducted in United States, India, Spain, Saudi Arabia, and United Kingdom. The result of literature review on related 7 articles were described in table 1.

Conde-Blanco *et al.* (2020) study in Spain explained that pandemic made 44% respondents utilized telemedicine for the first time, and 78,8% respondents intended to use telemedicine after pandemic era. Research conducted in United States (Aiken et al., 2020) also stated the urgency of telemedicine service for clinical abortion, which should be fulfilled to prevent the use of non-medical services by society. Meanwhile, West (2020) study that was also took place in United States showed the use of integrated video conference for both patients and practitioners.

Telemedicine in India was initiated by the Ministry of Health as an effort to avert the spread of Covid-19 among patients with chronic illness, as well as operational costs and human resources efficiency (Ghai et al., 2020). Telemedicine method was described through government regulation that explained the use of audio, video, fax, and email for giving services. Other study in India justified in detail the implementation of telemedicine using calls and messages for palliative care (Biswas et al.,2020).

Based on Darr *et al.* (2020) study in United Kingdom and Al-Sofiani *et al.* (2020) in Saudi Arabia, *telemedicine* service carried out in pandemic era resulted in high patient satisfaction level. Research conducted in United Kingdom showed that 99% patients felt satisfied and very satisfied of telemedicine care, and 210 out of 300 patients who used telemedicine stated similar level of satisfaction.

All 7 articles explained the possibilities of telemedicine service even if the pandemic era had passed. Telemedicine would be utilized for both clinical and non-clinical service. Telemedicine use was carried out as a form of operational costs and human resources efficiency in government level of program. Telemedicine might optimize the reliable and private relation between patients and practitioners. Telemedicine could be provided using digital supervision and video conference, which would surely bring ease to patient with difficult access to health providers.

The results of 7 articles indicated the massiveness of telemedicine care during pandemic. Telemedicine also made it easier for society to access health information from many platforms, such as *WhatsApp*, messanger, email, and so on.

Table 2. Similarity and Dissimilarity of Telemedicine Use in Health Providers during Covid-19 Pandemic Era

Aspect	Similarity	Dissimilarity
The use of tools	Communication tools with calls and video conferences based were used in all reviewed article.	Specific integrated system was used for certain medical tests (*Continuous Glucose Monitoring* (CGM) and *Self Monitoring of Blood Glucose* (SMBG) were only stated in Al-Sofiani, *et al.* study)
Services given to patients	Patients follow-up services were explained in all reviewed articles.	Health services website was used (Palliative care official website in India which studied by Adhikari, *et al.* and *AccessHope* website from *City of Hope Comprehensive Cancer Center* in West H. J. study)
The use of media	Telephone was the most used tool in all reviewed articles.	Menyelesaikan *cumpolsory online course* untuk praktisi kesehatan hanya ditemukan di klinik *telemedicine* untuk penyakit kronis di India (Babita Ghai *et al.*)
Services session	Patients must come to the clinics to take their prescription (all reviewed articles, except diabetes clinic in Al-Sofiani, *et al.* study).	Education session to support health services provided Sesi Edukasi sebagai komponen pendukung pelayanan pasien (*Virtual "Diabetes and Ramadan" Educational Sessions* in Al-Sofiani *et al.* study which included education related to dietary, sport, blood glucose moitoring, and carbohydrate calculation during Ramadan).

Based on table 2, there was significant similarity of platform used in all reviewed articles. But the integrated health system used to carry out medical check-up was only found in Al-Sofiani, *et al*. All studies performed follow-up services for patients. Different from other studies, Adhikari *et al.* and West H.J found the use of official health services website. Furthermore, all researches stated the use of telephone as the most preferable tool compared to video conferences. Bhabita Ghai et al. showed that *cumpolsory online course* for health practitioners was found in telemedicine clinic for chronic illness in India. During the session, all studies except for Al-Sofiani, *et al.* explained that prescription must be taken directly to the clinic after consultation session. Al-Sofiani et al. stated the availability of education session to support services given to diabetes patients which included dietary and physical exercise suggestion, blood glucose level measurement and monitoring, as well as carbohydrate count during Ramadan.

Based on our synthesis, some articles defined that telemedicine use in health care facilities indicated the effective utilization of telemedicine by patients. Telemedicine was carried out by providers as a way to ensure the availability of services during pandemic with minimizing the spread of coronavirus and enhancing cost and other resources efficiency. Respondents or services users gave positive feedback, stating that most of them felt satistfied and very satisfied to services given (Darr *et al.*, 2020; Al -Sofiani *et al.*, 2020). Moreover, researchers also found some obstacle and supporting factors which contribute to the success of telemedicine services.

Obstacle Factors

The use of telemedicine has not applied based on several disciplines or fields. This is due to the absence of professionals from other fields which also have related work to health services. For example, patients' caretaker must be involved in consultation or services carried out, considering the mental health status of patients during pandemic. Telemedicine should had recognized the current mechanism applied that brings impacts to both patients and their caretakers mental health (Biswas *et al.*, 2020).

Telemedicine is able to provide video conference that enabling all professionals needed for services in one meeting. Regarding to the lack of multidiscipline application of telemedicine, this may be the result of nonexistence regulations related to telemedicine which applied globally. There are some divergent regulations of telemedicine use across the countries, different cultural and social norms, as well as policies that might be contrast with telemedicine practice which carried out across jurisdiction borders.

Furthermore, there are some concerns of practitioners regarding their bounding process with patients. West (2020) explained that first impression was very important in practitioner and patient relation. Most of practitioners observe that the first meeting with patients through telemedicine cannot give *good-enough impression* to patients because the chemistry between practitioners and patients cannot be built directly. Emotional topics will be difficult to be discussed, especially for sensitive topics. Practitioners are worried that this impression may affect the relation with patients negatively.

Meanwhile, there are telemedicine services which have not been integrated systematically. Study by West (2020) showed that health services might provide gadget equipped by internet service and limited service for telemedicine use that can be borrowed by patients. There were several icons shown in gadget to access the system directly, and simplify the process for patients with limited knowledge of technology. Furthermore, health care

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facilities also provided educational video related to several illness.

The lack of knowledge and ability to access technology also became a significant barrier for patients in rural areas (Ghai, Malhotra and Bajwa, 2020). There are large numbers of patients who do not understand how to operate gadget and use internet. Most rural areas also do not have access to internet access. Telemedicine system needs these two components, making it hard for patients to access telecommunication-based health services in such condition. Health care in related countries may need to integrate the system with other family members who are able to use internet, in order to help patients while preparing to access services until the consultation given.

West (2020) also explained that telemedicine session which was merged with on site services made consultation process run inefficiently. Patients hoped that health facilities separated practitioners who worked on site and via telemedicine, as it had impacted the time of services carried out. Patients felt that the service could not be given on time, and practitioners were overworked. The impacts would be significantly felt if the onsite services were full.

Some improvements which must be done to mechanism and technical regulations of telemedicine include tools optimalization, integrated system, and standardized protocols of telemedicine which globally applied. Not only from technical perspective, but also from policy perspectives. Study conducted by Aiken et al. (2020) showed that almost all people from federal states in United States expressed their wants of telemedicine. This is due to the increase of abortion cases and limited access to health services. Thus, telemedicine can be an alternative to prevent non-medical service used by patients.

Supporting Factors

World Health Organization (WHO) plays the important role in public health issues across the world, including the telemedicine utilization as part of alternative solutions during pandemic. Aiken et al., (2020) described the way WHO gave recommendation about telemedicine and abortion services during pandemic. The WHO statement has impactful meaning to countries or states, to start using telemedicine.

Moreover, most patients respond positively to telemedicine service. Based on Kludacz-Alessandri *et al.*, (2021) study, health providers in several countries which had utilized telemedicine received positive feedback from patients. After analysing all seven articles, researchers concluded that most studies reported more than 70% patient satisfaction proportion to telemedicine service. This accomplishment surely supports the use and possible improvement of telemedicine in health field. Patients and other targets of health program will acknowledge the benefits of telemedicine even after the pandemic is over. If health services can improve and maximize the potentials of telemedicine, telemedicine might be the primary service preferred by patients or society (Kludacz-Alessandri *et al.*, 2021).

Telemedicine system is fully supported by most of governments. Some telemedicine clinics explained the government support in the form of policy. A clinic in India which specialized in chronic illness was handled directly by Ministry of Health in terms of mechanism and other technical issues. The mechanism of telemedicine use had been described in detail, from eligible criteria for doctors until the mechanism of conducting consultation (Ghai, Malhotra and Bajwa, 2020). This support is an important key for telemedicine future, as it will provide the regulation of telemedicine care which also rules the rights and obligation of patients.

West (2020) study in *City of Hope Comprehensive Cancer Center* explained

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how telemedicine integrated some specialists. It had several features such as live video conference or directly with the oncologists. Not only consultation service, they also provided the assessment of patients' medical record and gave recommendation to nearest oncology clinics. Telemedicine was expected to offer psychological aid and stress reliever, whether individual or in groups. (Kholipah and Dhamanti, 2021). Integrated telemedicine service with specialists in certain field will bring greater impact to telemedicine advancement. Telemedicine proved that this kind of service is not less reliable compared to conventional type of service, as providers also come up with professionals in health field. So telemedicine is indeed an excellent alternative to onsite services.

Based on our analysis regarding both obstacle and supporting factors, researchers argue that telemedicine still needs some enhancement in the future. Providers might examine the possibility of patients' participation to ensure their satisfaction of service. Telemedicine future development is also probably affected by obstacle factors explained. Authors believe that government and health providers may boost the quality of telemedicine by providing integrated media or system, more efficient and easier mechanism, and any other supporting policy to reinforce the establishment of telemedicine.

Conclusion

Telemedicine has bright future in health field. Main supporting factors of telemedicine use during Covid-19 pandemic is sufficient service for patients with health practitioners including specialists. Moreover, government support is administered through policy related to telemedicine implementation. Some aspects needed to improve telemedicine success are WHO acknowledgment, patients' positive feedback, supported system by government, and integrated service with specialists. On the other side, main obstacle factors to telemedicine utilization during pandemic are lack of knowledge and ability to use technology, especially for elderly patients. This remains unsolved for patients in area with limited access to technology. Telemedicine still also needs some strengthening from technical and policy aspects.

Health care should implement multidisciplines integrated system to telemedicine service. Furthermore, health providers might add more sessions to build personal bonding between practitioners and patients, using education session for example. Establishment of media and technology as main supporting tools to provide services is an obligatory. Government should improve the types of telemedicine tools, equally distribute access to technology including both technical and educational resources of technology.

Abbreviations

WHO: World Health Organization; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta Analysis; RDD: Regression Discountinuity Design; VOPC: Virtual Outpatient Clinic; HCP: Healthcare providers; CGM: Continuous Glucose Monitoring; SMBG: Self Monitoring of Blood Glucose; CMS: Centers of Medicare and Medicaid Services.

Declarations
Ethics Approval and Consent Participant
This research does not applicable ethics approval and consent participant.

Conflict of Interest
The authors declare that there are no significant competing financial, professional, or personal interests that might have affected the performance.

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