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Telehealth Model in Improving Health Service during COVID-19 Pandemic

Modelo de telesalud para mejorar el servicio de salud durante la pandemia de COVID-19

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SUMMARY

Objectives: *This review aimed to systematically describe, evaluate, and conclude regarding the telehealth model that can improve the quality of health services during the COVID-19 pandemic.* **Methods:** *A systematic literature search was carried out on four databases namely Scopus, ScienceDirect, PubMed, and ProQuest to identify studies written in English in the last three years on the implementation of telehealth in improving the quality of health services during the COVID-19 pandemic.* **Result:** *Based on the 11 studies that have been analyzed, the telehealth models used in improving health services are video, audio, Virtual Urgent Care, and web-based. Telehealth can improve the quality of health services in rural and urban areas.* **Conclusion:** *Synchronous/real-time telehealth through video is the most widely used model in improving health services during the COVID-19 pandemic. Therefore, research studying the effectiveness of the telehealth model is needed to strengthen the results of this study.*

Keywords: *Telehealth, health services, quality improvement, COVID-19.*

RESUMEN

Objetivos: *Esta revisión tiene como objetivo describir, evaluar y concluir sistemáticamente acerca del modelo de telesalud que puede mejorar la calidad de los servicios de salud durante la pandemia de COVID-19.* **Métodos:** *Se realizó una búsqueda sistemática de literatura en cuatro bases de datos, a saber, Scopus, ScienceDirect, PubMed y ProQuest, para identificar estudios escritos en inglés en los últimos tres años sobre la implementación de la telesalud para mejorar la calidad de los servicios de salud durante la pandemia de COVID-19.* **Resultado:** *Con base en los 11 estudios que se han analizado, los modelos de telesalud utilizados para mejorar los servicios de salud son video, audio,*

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atención de urgencia virtual y basado en la web. La telesalud puede mejorar la calidad de los servicios de salud en áreas rurales y urbanas. **Conclusión:** *La telesalud sincrónica/en tiempo real a través de video es el modelo más utilizado para mejorar los servicios de salud durante la pandemia de COVID-19. Por lo tanto, se necesita investigación que estudie la efectividad del modelo de telesalud para fortalecer los resultados de este estudio.*

Palabras clave: *Telesalud, servicios de salud, mejora de la calidad, COVID-19.*

INTRODUCTION

The novel Coronavirus Disease 2019 (COVID-19) has had a major impact on the global economy, and society. It presents enormous challenges for healthcare providers (1). World Health Organization (WHO) reported that the number of COVID-19 confirmed positive cases worldwide as of February 25, 2022 was more than 112 000 000 cases, with 2 490 776 deaths attributed to COVID-19 (2). Furthermore, according to the Center for Strategic and International Studies, the total number of confirmed cases in Southeast Asia was 2 531 723 cases (3).

The COVID-19 pandemic has changed the way health services are provided to patients and families (4). Social distancing is an effort to suppress the virus transmission (5), by reducing human contact (6), or preventing the transmission of COVID-19 by tracing, Testing and treatment (7), which are also the main reason for changing the way health services are provided from face-to-face to digital services (8). Telehealth, a health service based on Information and Communication Technology (ICT) with a high-speed telecommunication system can be adopted to reduce infection during quarantine and social distancing (1).

By definition, telehealth is a term that refers to the use of electronic services to support various services, such as patient care, patient education, and monitoring (9). Telehealth has been widely used to prevent the spread of COVID-19 in health services. Patients and healthcare providers do not need to meet as they can communicate through the application (10). Not only as a strategy for preventing COVID-19, but telehealth is also inexpensive and easy to access for the public (11). Study results show that telehealth can improve healthcare services and patient satisfaction during a pandemic (12-14).

Several reviews have been carried out to evaluate the use of telehealth, in particular, regarding patient and nurse satisfaction (14), but did not specifically discuss the best model for telehealth use. Thus, the process of conducting studies and obtaining results must be studied through evaluation and research to guide best telehealth practices in the future (4). Based on the foregoing description, it was conducted a systematic reviews to describe, evaluate, and conclude telehealth models that can improve the quality of health services during the COVID-19 pandemic.

METHODS

This review used a systematic and critical way of thinking in examining various studies using the PRISMA 2009 checklist, an evidence-based reporting guideline for systematic reviews and meta-analyses. Furthermore, the Critical Appraisal Skill Programme (CASP) and Fineout-Overholt & Gallagher-Ford Critical Appraisal Checklist were used in this review to assess the feasibility of articles to be included in the study. Literature searching was conducted in PubMed, Scopus, ScienceDirect, and ProQuest. The research question was structured based on PICOT (patient, intervention, comparison, outcome, and time). PICOT and keywords were based on the databases (Table 1).

The research question formulated in this study is: *'What are the models of Telehealth to improve the quality of health services during the COVID-19 pandemic?'*

There were 11 studies identified from the four databases. The studies were published in the last 3 years, were written in English, and were conducted on humans during the COVID-19 pandemic (Figure 1). In excluding articles with titles and abstracts that do not fit with the research question, the criteria are the sample in the study which is very small, and the article is not the result of the research.

Table 1. Research question based on PICOT (patient, intervention, comparison, outcome, and time).

Authors (year)	Methods	Intervention	Instrument	Results
Tan et al., (15)	RCT	Nurse-led telephonic palliative care	Edmonton Symptom Assessment System Revised Palliative performance scale	The preliminary results indicate that seriously ill patients are willing to engage with nurses and participate in discussions on ACP.
Imlach et al., (16)	Mixed-method	Telehealth Consultation	Levesque's concept	Patients reported high satisfaction with telehealth in general practice during the lockdown.
Chunara et al., (17)	Cohort	Telemedicine	Priori's significance to COVID	Controlling for individual and community-level attributes, Black patients had 0.6 times the adjusted odds (95% CI: 0.58–0.63) of accessing care through telemedicine compared to white patients
Smith et al., (18)	Cohort	Virtual Urgent Care	Can't tell	A total of 18,278 unique adult patients completed 22,413 VUC visits. Separately, 718 patient-scheduled visits were incomplete; the majority were no-shows. 50.9% of all patients and 74.0% of patients aged 60 years or older had comorbidities. Of VUC visits, 6.8% had a subsequent VUC encounter within 72 hours; 1.8% had a subsequent ED visit. Of patients with enhanced follow-up, 4.3% were referred for ED evaluation. Mortality was 0.20% overall; 0.21% initially and 0.16% with enhanced follow-up (p = 0.59). Males and black patients were significantly overrepresented in decedents.
Datta et al., (19)	Quality Improvement	Home telemedicine services	Can't tell	Among 223 telehealth patients, 85.7% used both synchronous audio and video technology. During the visits, 39% of patients had their anticonvulsants adjusted while 18.8% and 11.2% were referred to laboratory/diagnostic testing and specialty consults, respectively. In a post-visit survey, the highest degree of satisfaction with care was expressed by 76.9% of patients. The degree of satisfaction tended to increase the further a patient lived from the clinic (p = 0.05)
Samara et al., (20)	Quality Improvement	Palliative Care Needs Rounds via Telehealth	Can't tell	There was no statistical difference between face-to-face and telehealth groups in the average number of care home residents being discussed at Needs Rounds, anticipatory medication prescribing, GP participation, and completion of ACP at case conferencing. This implies that telehealth Needs Rounds and case conferences are as effective as face-to-face for identifying residents at risk of dying and planning for the end-of-life care
Hron et al. (21)	Qualitative Study	Inpatient Telehealth Program	Can't tell	Within 7 weeks of go-live, we hosted 1,820 inpatient telehealth sessions (13.3 sessions per 100 bedded days). We logged 104,647 minutes of inpatient telehealth time with a median session duration of 22 minutes (range 1–1,961). There were 5,288 participant devices used with a mean of 3 devices per telehealth session (range 2–22). Clinicians found they were able to build rapport and perform a reasonable physical exam.
Choi et al., (22)	RCT	Health-care Systems for Patients/ Elderly with Coordinated care using icT (RESPECT)/ Health-RESPECT	EuroQol-5 dimension	Health-RESPECT supports medical staff decisions by remote consultation with distant professionals, but patient participation was limited
Mojdehbakhsh et al., (23)	Quality Improvement LR	Telemedicine	SQUIRE 2.0 GUIDELINES Telemedicine Satisfaction Survey (TeSS)	The TeSS had a 74.8% response rate. Patients rated the following aspects of the telemedicine encounter as good or excellent: call quality (96.5%), personal comfort (92.9%), length-of-visit (94.7%), treatment explanation (93.8%), and overall experience (88.5%). Moreover, 82.3% of patients would use telemedicine again. Additionally, 6.25 metric tons of CO emissions from travel were prevented from being produced.
Paterson et al., (24)		Telehealth	Can't tell	Telehealth reduces the travel burden on patients for consultation, affords a timely solution to discuss distressing side effects, initiate interventions, and enables possible treatment additions and/or changes
Ohligs et al., (25)	Mixed-Method	TeleDoc	Can't tell	One nursing home was equipped with a telemedical system based on the results of the requirement analysis and tele-medically connected to a GP. Over seven months, 56 routine and emergency teleconsultations took place. Only one of that required hospital admission. In addition to video telephony, electrocardiography and assessment of vitals such as pulse, blood pressure, oxygen saturation, and auscultation of the heart and lungs were applied frequently.

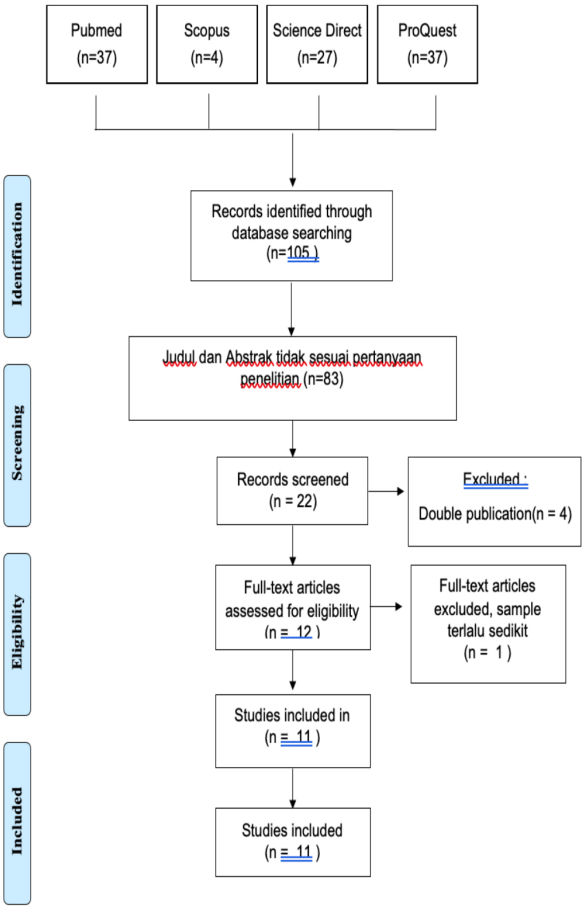

Figure 1. PRISMA 2009 checklist.

RESULTS

We have summarized eleven studies, which consisted of a QI Project, RCT, Cohort, literature review, mixed method, and qualitative studies that met the inclusion and exclusion criteria. Three QI studies were conducted in Madison, US, and Canberra, Australia, Two RCT studies were conducted in New York and Seoul, two cohort studies were conducted in New York, the USA, one article was a literature review carried out in Australia, two studies were mixed method in Aachen, Germany, and Wellington, New Zealand, and one qualitative and quantitative studies in Boston.

A study using the Randomized Control Trial (RCT) method conducted by Tan et al. (15), involved 100 outpatient participants with advanced cancer or end-stage organ failure. Most of the sample was women (54 %) whose ages ranged from 50 to 95 years old. Another study conducted by Imlach et al. (16), included 1 048 adults (> 18 years) who were recruited through social media and mailing lists, the majority of respondents were women of European descent (17), their cohort study involved 140,184 patient visits; the majority were white patients. Further, a study conducted by Smith et al. (18) involved 18 278 adult patients who came to Virtual Urgent Care (VUC). The average age of the patients was 40 years old. Another conducted (19) included 223 epilepsy patients as the samples with an average age of 35 years. Most patients were women (59.2 %). Next, the Quality Improvement study conducted (20) involved 127 patients (53 patients received the direct intervention, while 75 patients received service throught).

Hron et al., in their study, used 5 288 participant devices with a mean of three devices per telehealth session (21). In a study conducted by Mojdehbakhsh et al. (23) involving 192 patients at the GynOnc Carbone Cancer Center at the University of Wisconsin, the majority of participants were 63 years old. Another study conducted by Ohligs et al. (25) involved 28 health workers with an average age of 83 years. In addition, a study conducted by Paterson uses an electronic database to find literature on the role of telehealth across the interdisciplinary cancer team. One of the eleven articles in this systematic review did not involve participants in their study since the research design used was in the form of a study protocol of a Randomized Control Trial (24).

Several telehealth models used to improve health service quality during the COVID-19 pandemic were found in the 11 articles reviewed. Their study used a video-based telehealth model such as zoom for epilepsy patients (19). If the patient has difficulty accessing due to the internet connection, the researcher provides services via telephone (audio only). The same model was used in research conducted by Imlach et al. (16), which used telephone and video to provide services for consultation. In this review, four articles use video-only-based telehealth (21,24,25).

In addition to the models described before, there are two other telehealth models identified from the review, namely Virtual Urgent

Care (17). The last telehealth model is the web-based telehealth such as Health-RESPECT developed and validated (22).

DISCUSSION

This systematic review shows that telehealth can improve the quality of health services during the COVID-19 pandemic, as Latifi et al. (26), in their book suggest that the greatest benefit of telemedicine and telehealth in this current crisis is their ability to continue providing health services during the physical distancing period. According to this review, the most widely used study method is the Quality Improvement Project since Quality Improvement is a form of experiential learning that regards improvement to be part of the work process and always involves deliberate actions expected to improve care, guided by data reflecting the effects (27). It is worth noting that the Quality Improvement project is used by healthcare systems to improve their processes or outcomes for a specific population once a problem is identified (28).

The largest number of respondents included in the studies reviewed were 1 048 respondents with most of them being adults and females. This is in line with previous research where the majority of telehealth users are adults (29).

From the included studies, the video-based (real-time/synchronous) telehealth model is the most often used model in improving the quality of health services. This synchronous telehealth model is effective in improving health services in various fields of inpatient and outpatient. This is supported by another systematic review (30), which proves that synchronous telehealth can improve care and has a positive effect on pediatric acute care and allergy care (31), in their book also suggest that synchronous (26).

Various standardized instruments have been used in the included studies reviewed, be it from the guidelines for quality improvement, assessment of satisfaction levels of patients, and procedures for conducting interviews in a qualitative study. Standardized instruments are proven to provide a communicative approach, information dissemination, training processes, and self-management in the use of telehealth (32).

CONCLUSION

This Systematic Review provides an overview of the telehealth model implemented in improving the quality of health services during the COVID-19 pandemic. The results of this review are in line with the general principles of telehealth to provide health services remotely, especially during this pandemic, which is a necessity for individuals, health care providers, and the health system to change the way health services are received and provided. The real-time service model through video is the most widely used in improving health services during the COVID-19 pandemic. Therefore, research on this telehealth model needs to be developed.

A specific instrument in measuring the improvement of health services to be used as a reference in future research is needed. In addition, because most telehealth users are adults, experienced health workers are needed to provide services to adults, one of which is by attending telehealth-based health service training.

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