FACTORS INFLUENCING READINESS TELEMEDICINE

IMPLEMENTATION DURING COVID-19: A SYSTEMATIC REVIEW

Alzagladi B[1], Andriani H[2]

[1] Hospital Administration Studies Program, Faculty of Public Health Universitas Indonesia
[2] Faculty of Public Health Universitas Indonesia

ABSTRACT   **Background**: The Coronavirus Disease 2019 (COVID-19) pandemic has made a rapid and changing health care services. Moreover, currently with the COVID-19 pandemic, telemedicine can be used for providing safe care, without the physical presence of the patient or caregivers at healthcare or hospitals. The implementation of telemedicine may help improve healthcare service during COVID-19 pandemic. Several studies have identified both barriers and facilitating factors that influence the readiness of telemedicine implementation at healthcare facility. The purpose of this study is to explore and identify the factors that influencing the readiness of telemedicine implementation. **Methods**: This article is a systematic review which is a method that uses review, analysis, structured evaluation, classification, and categorization based on the evidence that has been previously produced. This review uses the Preferred Reporting Items for Systematic Review and Meta-Analysis method, or commonly known as PRISMA. This review was conducted by searching published articles from 2020 to 2021, from Scopus, Science Direct, Springer Link and ProQuest database. **Results:** Of the 99 studies identified, 5 were included in this study. Reported factors that influenced the readiness of implementation telemedicine were divided into five categories: technology, policy, people, resources, and organization. Concerns about the telemedicine system's functionality were methods of using good data, infrastructure planning, human resources, effective management, and good technical implementation. **Conclusions:** By using a narrative synthesis, we identified the success factors of readiness telemedicine implementation are infrastructure planning, human resources, effective management, and good technical implementation.

BACKGROUND

Telemedicine is "the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries" (WHO, 2010). The implementation of telemedicine may help improve healthcare service during COVID-19 pandemic (Smith, W.R, 2020). Telemedicine has several advantages such as the avoidance of unnecessary journeys of patients or healthcare professionals, the reduction in hospitalization stay and rehospitalization rate, providing faster and better-oriented care, improving care access in rural areas, and enhancing medical follow-up (Lockamy, A & Smith, D.L., 2009)

The implementation issues of telemedicine, it is necessary to take some conditions into account. Telemedicine is not just a ready-to-use technology, its implementation requires changes not only in the infrastructure but also in the organization of work (Barlow, J.G., 2015). Several studies have identified both barriers and facilitating factors that influence the readiness of telemedicine implementation at healthcare facility. The purpose of this study is to explore and identify the factors that influencing the readiness of telemedicine implementation.

METHODS

Systematic review is a method that uses review, analysis, structured evaluation, classification, and categorization based on the evidence that has been previously produced. This review uses the Preferred Reporting Items for Systematic Review and Meta-Analysis method, or commonly known as PRISMA which consists:

a. Document identification

Identifying the keywords of the research question then determining the research database as an area to search for articles. Using databases such as ProQuest, Scopus, Science Direct and other official sources, and adjusted according to research titles, abstracts and keywords to search for articles. In this review, the database sources used include Scopus, Science Direct, Springer Link and ProQuest. The keywords used are:
1) Telemedicine
2) Implementation
3) Readiness
4) Factors influencing
5) COVID-19 pandemic

b. Inclusion Criteria

The inclusion criteria were:
1) National and international research articles related to Factors Influencing Readiness Telemedicine Implementation During COVID-19
2) The database sources used are ProQuest, Science Direct, Springer Link, and Scopus.
3) English journals and articles published during 2020 until 2021.

c. Exclusion Criteria

The exclusion criteria were:
1) National and international research articles that are not related to the problem under study.
2) Articles cannot be downloaded in full text.
3) Articles are literature review.
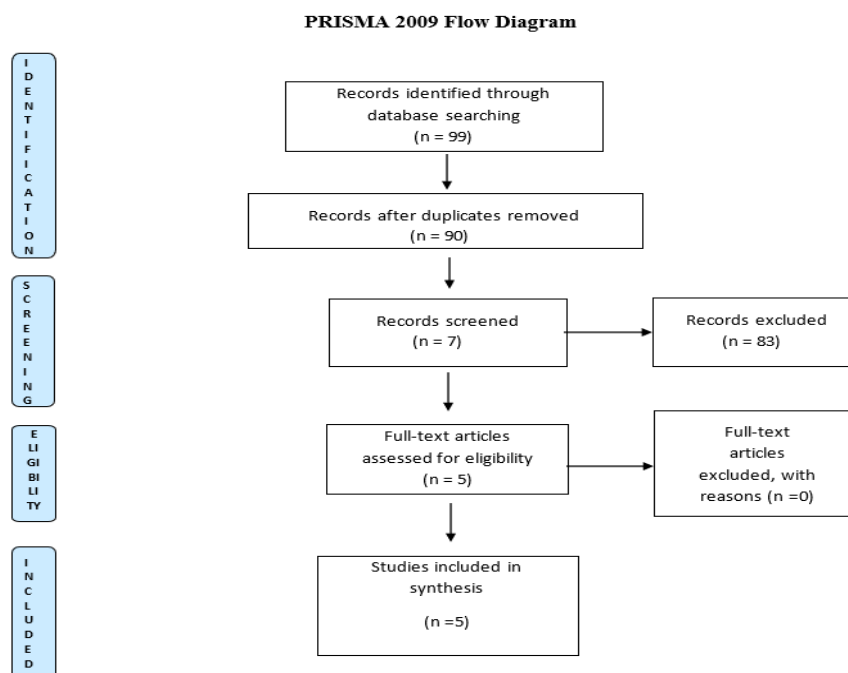
PRISMA 2009 Flow Diagram

Figure 1. Preferred reporting items for systematic reviews and meta-analysis (PRISMA) figure that demonstrates the study selection process

d. Data Extraction

The total search results obtained as many as 99 articles according to 5 database sources used. Checking for duplications manually by Microsoft Excel, duplicated articles were found, so that the total that will be further processed is 90 articles. To assess the selected articles, the author uses Critical Appraisal. The purpose of using the Critical Appraisal instrument tool is to see the quality of journals that are good, adequate or inadequate as relevant material in according to PICO and inclusion criteria. Thus, the search resulted in 5 articles that were thoroughly reviewed according to the systematic review approach as seen in figure 1

Data analysis

Data synthesis involves collating and summarising the results of the included studies. Synthesis can be descriptive (non-quantitative). Themes that emerged in the process of the data synthesis were thematically analysed. The definition and explanation of the terminologies given in the articles were studied again throughout the themes to ensure consistency and independence.

RESULT

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Table 1. Summary of Result

No	Title	Author	The Aims	Method	Result
1	Exploring the telemedicine implementation challenges through the process innovation approach: A case study research in the French healthcare sector	Ali Khodadad-Saryazdi	This research aims to understand a developing phenomenon that is telemedicine in France requires positioning from an exploratory perspective.	Qualitative research, case study	Telemedicine requires technical, cultural, and strategic changes. The process actors and their beliefs, information technology and systems, promoting activities, as well as limits and restrictive rules can play a determinant role in these changes. The technical adaptation is not unrelated to cultural adaptation. The conformity of telemedicine technical tools with user needs promotes its adoption
2	A Narrative Review of Factors Historically Influencing Telemedicine Use across Six Medical Specialties in the United States	Rangachari, Pavani; Mushiana, Swapandeep S; Herbert, Krista.	This paper draws factors influencing telemedicine use within a medical specialty.	Narrative Review	The review is identifying a comprehensive set of policy, organizational, and individual (and interaction) factors influencing telemedicine use.
3	Outpatient Telemedicine Implementation in the United States during the COVID-19 Global Pandemic: A Systematic Review	Lieneck, Cristian; Weaver, Eric; Thomas, Maryon.	The objective of this systematic review is to determine the underlying themes (constructs) regarding facilitators and barriers experienced by ambulatory care organizations when implementing telemedicine during the pandemic.	Systematic review	Researchers identified three barriers impacting the implementation and use of telemedicine resources: patient telemedicine limitations, lack of clinical care telemedicine guidelines, and training, technology, and financial considerations.
4	Factors Influencing Telemedicine	Saira Naim Haque; DeStefano,	The aim of this study is to understand the	Qualitative study	Several factors influenced the implementation and use of telemedicine in critical

	Implementation and Use in Frontier Critical Access Hospitals: Qualitative Study	Sydney; Banger, Alison; Rutledge, Regina; Romaire, Melissa.	factors that influenced telemedicine uptake and use in a set of frontier critical access hospitals in the United States.		access hospitals, including making changes to workflow and infrastructure as well as practitioner acceptance and availability. Participants also cited technical assistance and support for implementation as supportive factors.
5	Use of Telemedicine in Substance Use Disorder Services During and After COVID-19: Online Survey Study	Molfenter, Todd; Roget, Nancy; Chaple, Michael; Behlman, Stephanie; Cody, Olivia; et al.	This study aimed to fill an existing knowledge gap by surveying the use of telephone and video technologies in SUD services, while simultaneously assessing the projected use of these technologies beyond COVID-19 and evaluating the readiness of organizations to use them.	online survey study	Readiness telemedicine implementation such as to use telephone and video technologies was high across numerous factors, though telephonic services were considered more accessible. Consistent with the TAM, perceived usefulness and ease of use influenced the intent to use both telephone and video technologies.

DISCUSSION

According first research, the results demonstrate that telemedicine is the use of IT technology that triggers process change. Telemedicine involves changes in the patient's admission and care processes. The enabling role of technology in process modification emphasizes its place in generating process innovation. The adaptation maintains an indispensable part in implementing complex innovations (Hendy et al., 2012), such as telemedicine. Hendy and Barlow (2013) explain that what makes an innovation accepted is not only its evidence of benefits but the adaptation effort that should be done according to norms and rules of the organizational context. In this work, with an organizational level analysis, it is shown that context adaptation is a series of actions to make the fit between process innovation and the system. This context adaptation reveals in three forms of technical, strategic, and cultural readjustment (Khodadad-Saryazdi, A., 2021).

Second article was identifying a comprehensive set of policy, organizational, and individual (and interaction) factors influencing telemedicine use. the review highlights the crucial role that hospital and specialty-society organizations could play in creating conditions needed for

successful and sustainable telemedicine use at the specialty level, by concurrently addressing both the tangible barriers (e.g., reimbursement, training, workflow, design, implementation) and intangible barriers (e.g., provider attitudes, cultures) influencing telemedicine use (Rangachari, Pavani et al. 2021).

Third article is systematic review, that was identified three primary facilitators to the implementation and establishment of telemedicine services for the outpatient segment of the United States health care industry: patient engagement, operational workflow and organizational readiness, and regulatory changes surrounding reimbursement parity for telemedicine care. Researchers identified three barriers impacting the implementation and use of telemedicine resources: patient telemedicine limitations, lack of clinical care telemedicine guidelines, and training, technology, and financial considerations (Lieneck et al., 2021).

Other article find factors that influenced telemedicine implementation and use include workflow, practitioner availability and acceptance, infrastructure and cost, and sustainability. Workflow changes included adding telemedicine to staff responsibilities, education, training, and outreach. Providers are the big issue of adopting telemedicine because they have to give the referrals. This article highlights the importance of practitioner outreach as a facilitator so that telemedicine services are available to patients (Saira Naim Haque, 2021). Other finding of this article said that telemedicine implementation required a few infrastructure and operational changes, which could be barriers to

implementation and use. Infrastructure modification included technical and physical changes (Yusif S, 2017).

The last study is online survey study. according this study, organizational readiness for technology use, systematic differences emerged between telephone and video technologies. Relative to video services, respondents perceived telephonic services as more advantageous in terms of access, ease of use, affordability, and ease of sustainability. By contrast, video services were perceived as more valuable in terms of the likelihood of reimbursement and having the support of a clinical champion. Respondents preferred video services to telephonic services for all but two services. These findings are consistent with those of previous studies reporting that video-based counseling is associated with higher patient satisfaction but is substantially more expensive and not necessarily associated with superior levels of abstinence (Richter KP et al., 2015). With the emergence of new videoconferencing tools, telephonic counseling would likely still have value owing to its simplicity, affordability, and reach, particularly among patients with limited access to video-based technologies (Molfenter, Todd et al., 2021).

CONCLUSIONS

By using a narrative synthesis to synthesize the evidence, we identified the success factors of readiness telemedicine implementation are method of using good data, infrastructure planning, human resources, effective management, and good technical implementation.

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