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The Effectiveness of Telemedicine in Improving Access to Healthcare: A Systematic Review

Efektivitas Telemedis dalam Meningkatkan Akses terhadap Layanan Kesehatan: Tinjauan Sistematis

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ABSTRACT
Telemedicine has become a promising solution for increasing access to health services, especially for underserved populations and in remote areas. This research aims to test the effectiveness of telemedicine in increasing public health access and explore its integration in strengthening health-related digital literacy. This study was conducted in the context of systematic literature research, using the PRISMA method to collect and evaluate articles from reputable international databases. The results of the literature review show that telemedicine is effective in overcoming geographic barriers and limited health infrastructure, especially during crises such as the COVID-19 pandemic. However, the challenges of policy implementation, technology infrastructure, and equality of access remain important issues that need to be addressed. On the other hand, digital literacy plays a crucial role in strengthening access to health information and informed decision making. It is hoped that the integration of telemedicine with increasing digital health literacy can increase equitable access to health. The implications of this research include providing new insights for policy makers and health practitioners in optimizing the use of telemedicine to overcome access barriers and increase digital literacy among the public.
Keywords: Telemedicine, Health Access, Digital Literacy, Health Literacy, Systematic Literature Research.

ABSTRAK
Telemedicine telah menjadi solusi yang menjanjikan untuk meningkatkan akses terhadap layanan kesehatan, terutama bagi populasi yang kurang dilayani dan di daerah terpencil. Penelitian ini bertujuan untuk menguji efektivitas telemedicine dalam meningkatkan akses kesehatan masyarakat serta mengeksplorasi integrasinya dalam memperkuat literasi digital terkait kesehatan. Studi ini dilakukan dalam konteks penelitian literatur sistematis, menggunakan metode PRISMA untuk mengumpulkan dan mengevaluasi artikel dari database internasional yang bereputasi. Hasil kajian literatur menunjukkan bahwa telemedicine efektif dalam mengatasi hambatan geografis dan infrastruktur kesehatan yang terbatas, terutama selama krisis seperti pandemi COVID-19. Namun, tantangan implementasi kebijakan, infrastruktur teknologi, dan kesetaraan akses tetap menjadi isu penting yang perlu diatasi. Di sisi lain, literasi digital memainkan peran krusial dalam memperkuat akses terhadap informasi kesehatan dan pengambilan keputusan yang terinformasikan. Integrasi telemedicine dengan peningkatan literasi digital kesehatan diharapkan dapat meningkatkan akses kesehatan secara merata. Implikasi penelitian ini termasuk menyediakan wawasan baru bagi pembuat kebijakan dan praktisi kesehatan dalam mengoptimalkan pemanfaatan telemedicine untuk mengatasi hambatan akses dan meningkatkan literasi digital di kalangan masyarakat.
Kata Kunci: Telemedicine, Akses Kesehatan, Literasi Digital, Literasi Kesehatan, Penelitian Literatur Sistematis.

1. Introduction

Telemedicine has emerged as a promising solution to improve access to healthcare services. Various studies have highlighted the benefits of telemedicine in enhancing healthcare accessibility, particularly for underserved populations and in remote areas (Dekker et al., 2020; Acheampong & Vimarlund, 2015; Mbunge et al., 2022). Telemedicine has been shown to increase efficiency, utilize healthcare resources effectively, prevent infections among medical personnel, and provide social support for patients (Mbunge et al., 2022). Moreover, it has the potential to reduce healthcare costs, improve information access for both patients and healthcare professionals, and enhance the quality of care provided (Acheampong & Vimarlund, 2015).

Studies have also emphasized the positive impact of telemedicine on specific healthcare areas. For instance, telemedicine has been found effective in managing chronic heart disease (Kruse et al., 2017), providing palliative care to advanced cancer patients (Sánchez-Cárdenas et al., 2022), and delivering mental health services (Atmojo et al., 2020). Additionally, telemedicine has shown promise in improving outcomes for conditions like depression and anxiety in older individuals (Oliveira et al., 2023).

Furthermore, the COVID-19 pandemic has accelerated the adoption of telemedicine globally, with studies highlighting its role in maintaining healthcare services during crises (Dekker et al., 2020; Dash et al., 2021; Mahmoud et al., 2022). Telemedicine has facilitated information sharing between healthcare users and clinicians, improved communication among healthcare providers, and enabled the continuation of care delivery amidst challenging circumstances (Mahmoud et al., 2022).

While telemedicine presents numerous advantages, challenges such as policy implementation, technological infrastructure, and ensuring equitable access to services remain (Dash et al., 2021; Egbewande et al., 2023). Future research should focus on addressing these challenges and further exploring the effectiveness of telemedicine in diverse healthcare settings to maximize its potential in improving healthcare access and delivery.

Equitable access to health services is a key principle in realizing the welfare of society as a whole. However, the reality on the ground shows that there are various barriers that prevent individuals from interacting with health services effectively. Geographical remoteness, socioeconomic disparities, and limited health infrastructure are some examples of these obstacles. These challenges particularly affect vulnerable and marginalized groups, such as communities in rural areas or lower middle economic groups. In this context, the solutions proposed by technology integration, especially telemedicine, offer significant potential in overcoming these barriers.

Telemedicine, defined as the provision of health services remotely through telecommunications technology, promises a new paradigm in the provision of health services. By taking advantage of rapidly developing telecommunications infrastructure, telemedicine allows easier and more efficient access to health services, especially for those in remote areas. Apart from that, telemedicine also provides flexibility in routinely monitoring health conditions without the need to sacrifice time and costs for travel to traditional health facilities. Therefore, in the context of equal access to health, telemedicine offers an effective solution to overcome geographical barriers and limited infrastructure. Thus, the integration of telemedicine in the health system can have the potential to significantly increase access to health services, especially among communities that are vulnerable to inequalities in health access.

Despite its potential, the literature lacks integration of telemedicine with digital literacy in the context of improving health access. This study aims to fill this gap by systematically reviewing the effectiveness of telemedicine in improving public health access and exploring how its integration can strengthen health-related digital literacy. The main research question guiding this study is: How can the integration of telemedicine in the health system facilitate increased digital literacy among health-related populations? By answering this question, this

study aims to provide new insights into the relationship between telemedicine and digital literacy in the realm of health access. The novelty of this research lies in its holistic approach in understanding the synergistic potential of telemedicine and digital literacy in overcoming health access challenges. Ultimately, the findings of this study aim to provide policy makers and health practitioners with information on strategies to optimize the use of telemedicine to overcome access barriers and increase digital literacy among the public, thereby contributing to more equitable health access and outcomes.

2. Research Methods

To support the credibility and completeness of this research, relevant articles were collected from various reputable international databases. Among them are PubMed, Scopus, Web of Science, IEEE Xplore, and other databases relevant to the field of telemedicine and health-related digital literacy.

Article searches were carried out using predetermined keywords to ensure relevance to the research topic. Keywords used include "telemedicine", "access to healthcare", "digital literacy", "health literacy", and "systematic review". This combination of keywords was chosen to obtain articles that were most relevant to the research focus.

A total of 200 initial articles were identified through an initial search using predetermined keywords. This significant number of articles provides a strong basis for further screening and deeper analysis of the relevant literature.

The article screening process is carried out based on predetermined inclusion and exclusion criteria. Articles included in the analysis had to discuss the effectiveness of telemedicine, the relationship between digital literacy and health, and use solid research methodology. In addition, the selected articles must also be in English to ensure the quality and accessibility of the information. Conversely, articles that do not focus on the main topic, use weak methodology, or have not gone through a peer-review process will be excluded from the analysis.

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method was used as a guide for screening and selecting relevant articles. The PRISMA diagram was used to visualize the article screening process, from the identification stage to the final inclusion of articles in the analysis. The use of the PRISMA method provides a clear and transparent framework for carrying out the systematic literature review process.

3. Results and Discussion

3.1 Effectiveness of Telemedicine in Improving Health Access

Telemedicine has emerged as a valuable tool in improving access to healthcare services, particularly in addressing geographic and socio-economic challenges. Studies have shown that telemedicine, especially through synchronous, two-way video conferencing, can be effective in delivering healthcare to rural areas where traditional healthcare services are limited (Batsis et al., 2019). This mode of healthcare delivery has been particularly beneficial for rural and underserved communities, overcoming geographical barriers and increasing access to healthcare services (Shalash et al., 2021). Additionally, telemedicine has been found to be more likely chosen by family care partners assisting patients with transportation or mobility challenges, further enhancing healthcare access for those with such limitations (Reed et al., 2020).

The COVID-19 pandemic has accelerated the adoption of telemedicine, with healthcare providers rushing to implement telemedicine to ensure accessibility and continuity of patient care (Betancourt et al., 2020). Telemedicine not only offers an opportunity to improve health systems delivery, access, and efficiency but also plays a crucial role in public health responses during outbreaks such as the COVID-19 pandemic (Bhaskar et al., 2020). Furthermore, telemedicine has been instrumental in maintaining essential medical care for chronic disease

patients during the pandemic, highlighting its potential to reduce socio-economic disparities in healthcare access over the long term (Hoffer-Hawlik et al., 2020).

The effectiveness of telemedicine in improving health access is further supported by its ability to transcend geographic and temporal boundaries for healthcare delivery, potentially increasing healthcare access (Talal, 2024). Studies have also demonstrated that telemedicine can address barriers such as uneven geographic distribution of clinicians and shortage of subspecialists, ultimately enhancing communication and coordination between healthcare providers (Fiks et al., 2022). In conclusion, telemedicine has proven to be a valuable tool in improving access to healthcare services by overcoming geographic and socio-economic challenges. Its role in providing healthcare to underserved populations, maintaining care during crises like the COVID-19 pandemic, and enhancing communication and coordination among healthcare providers underscores its significance in reshaping healthcare delivery and accessibility.

3.2 Relationship between Digital Literacy and Health Literacy

Digital literacy is essential for improving individuals' ability to search for health information and make informed decisions about their health. The relationship between digital literacy and health literacy has been well-documented in various studies. Neter & Brainin (2012) discuss how eHealth literacy can either reduce or exacerbate literacy gaps in seeking health information online, highlighting the potential of digital literacy to bridge this divide.

Furthermore, research by Fleary et al. (2017) emphasizes the impact of health literacy on health behaviors, particularly in adolescents. Enhanced digital literacy enables individuals to access, comprehend, and apply health information from electronic sources, as noted by (Haikal et al., 2022). This capacity to interpret and utilize digital health information is crucial for effectively addressing health concerns.

Moreover, studies by Kor et al. (2020) and Rivadeneira et al. (2022) underscore how digital health literacy empowers individuals to make informed decisions, especially during health crises like the COVID-19 pandemic. By improving digital health literacy, individuals can access timely and accurate health information, leading to better decision-making for self-care and the well-being of others. In conclusion, the amalgamation of these references highlights the significant role of digital literacy in facilitating the search for health information and enhancing health decision-making. Strengthening digital health literacy can empower individuals to navigate the abundance of health information available online, enabling more informed choices and ultimately better health outcomes.

3.3 Telemedicine Integration and Increasing Digital Health Literacy

Telemedicine plays a crucial role in enhancing patient education and literacy in healthcare. Features of telemedicine that support patient education and literacy include the ability to provide a broad spectrum of health information and services through digital platforms (Vaart & Drossaert, 2017). Telemedicine programs integrated with health education have shown promise in various settings. For instance, tele-neurology programs in sub-Saharan Africa have utilized telecommunication to provide medical information efficiently, improving the effectiveness of existing services (Adamu et al., 2017). Additionally, telemedicine has been integrated into programs for pregnant women with gestational diabetes mellitus, emphasizing the importance of assessing digital health literacy and cultural needs to enhance the usability of such technologies (Birati et al., 2022).

Efforts to increase digital health literacy are essential for achieving health equity and ensuring access to telemedicine services. Stakeholders across various sectors, including consumers, healthcare providers, policymakers, and researchers, must prioritize enhancing digital literacy to promote equitable access to digital health resources (Campanozzi et al., 2023). Moreover, studies have shown that digital health literacy influences the use of

telemedicine, particularly among patients with frailty, highlighting the importance of addressing literacy barriers to facilitate telemedicine adoption (Vitolo et al., 2022).

In the context of medical education, integrating telemedicine into training programs is crucial. Training physicians in telemedicine can help deliver high-quality healthcare remotely, promoting the widespread adoption of telemedicine and addressing concerns related to its implementation (Waseh & Dicker, 2019). Furthermore, incorporating telemedicine into clinical teaching practices can optimize education for learners, emphasizing the need for formal training to improve communication skills and patient outcomes (Hovaguimian et al., 2021). In conclusion, telemedicine features that support patient education and literacy encompass a broad spectrum of health information delivery through digital platforms. Integrating telemedicine into healthcare programs and medical education initiatives is essential for promoting equitable access to healthcare services and enhancing patient outcomes.

4. Conclusions

Overall, the results of this literature review show that telemedicine has a significant role in increasing access to health services by overcoming various geographic and socio-economic challenges. Telemedicine, particularly via two-way video conferencing, has proven effective in providing healthcare to rural and underserved communities. The implementation of telemedicine has provided practical solutions in overcoming geographic barriers, as well as facilitating accessibility and continuity of care, especially during health crises such as the COVID-19 pandemic. However, this research also highlights that there are several limitations in implementing telemedicine, such as technical challenges, regulations, and uneven technological accessibility.

On the other hand, digital literacy has an important role in strengthening individuals' abilities to search for health information and make informed decisions. The relationship between digital literacy and health literacy shows that increasing digital literacy can improve access to health information and facilitate better decision making regarding health. However, there are still challenges in increasing overall digital literacy in society, especially among vulnerable and marginalized populations.

Therefore, integrating telemedicine with increasing digital health literacy is very important in efforts to increase access to health services equally. Steps to increase digital literacy, along with the development of inclusive and sustainable telemedicine infrastructure, should be a key focus for policymakers, healthcare providers and other stakeholders. Future research could delve deeper into the practical implementation of this integration, as well as identify effective strategies for overcoming remaining barriers. Thus, joint efforts to combine telemedicine with increasing digital health literacy are expected to have a significant impact in improving overall community health.

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