Oshada; Jurnal Kesehatan
https://nawalaeducation.com/index.php/O/index
Volume 2 Nomor 1, February 2025
e-ISSN : 3047-017X
DOI : https://doi.org/10.62872/gbna7b66

Telemedicine in Nursing Practice: Effectiveness and Challenges in Telehealth

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ABSTRAK

Technological advancements in healthcare, particularly through telemedicine, have significantly changed nursing practice. Telemedicine allows nursing personnel to provide consultation, monitoring, and health education remotely, increasing the accessibility of services, and reducing the burden on health facilities. Studies show that telemedicine contributes to improved service efficiency and patient adherence to treatment. However, its implementation still faces challenges, especially in infrastructure readiness, regulations, and ethical and legal aspects. Barriers such as inequality in digital access, limitations in virtual clinical assessment, and digital literacy gaps also affect the effectiveness of this service. This study used a descriptive qualitative approach with thematic analysis method to explore the benefits and challenges of telemedicine in nursing. Data were obtained from 30 nurses experienced in telemedicine services through semi-structured interviews, participatory observation, and policy document analysis. The results showed that although telemedicine improves efficiency and access to health services, challenges such as communication reliability, patient data security, and nursing personnel welfare need further attention. Therefore, an adaptive strategy is needed that includes strengthening policies, developing equitable digital infrastructure, and training health workers so that telemedicine services can be implemented optimally, ethically, and sustainably.

Keywords: Access To Health Services; Health Technology; Nursing; Regulation; Telemedicine

INTRODUCTION

The development of technology in health care, especially through telemedicine, has changed the conventional paradigm in nursing practice. Telemedicine allows nursing personnel to provide consultation, monitoring, and health education without geographical limitations. According to the World Health Organization (WHO, 2021), the application of telemedicine has been shown to increase the accessibility of health services for populations in remote areas and reduce the burden on health facilities that experience limited resources. In addition, research by Efriyandi & Yulda (2024) showed that the use of telemedicine in nursing not only improved the efficiency of care but also

contributed to increased patient adherence to medication and chronic disease management. This proves that digitalization in healthcare has great potential in creating a more inclusive and effective service system.

However, the implementation of telemedicine in nursing is not free from complex challenges, especially regarding technological readiness and regulatory aspects. According to research conducted by Lukito & Gani (2024), although telemedicine offers innovative solutions, inequality in access to digital devices and internet networks is still a major obstacle, especially in developing countries. In addition, the reliability of communication systems in ensuring the quality of interactions between nurses and patients is still debatable, given the limitations of telemedicine in capturing nonverbal aspects in therapeutic communication. From an ethical and legal perspective, patient data security in digital-based services is also a crucial issue, as stipulated in the General Data Protection Regulation (GDPR) and the Health Insurance Portability and Accountability Act (HIPAA). Therefore, although telemedicine brings positive impacts in the world of nursing, there needs to be a comprehensive adaptation strategy so that its effectiveness can be maximized without neglecting aspects of medical safety and ethics.

Although the effectiveness of telemedicine in nursing practice has been supported by various studies, challenges in maintaining quality of care remain a major issue to be resolved. One aspect that remains a concern is the limitations in virtual-based clinical assessment, which can affect the accuracy of diagnosis and nursing interventions. According to Agil et al. (2025), although telemedicine has been shown to improve healthcare accessibility, its limitations in allowing nurses to conduct in-person physical examinations can be an obstacle, especially in cases that require immediate action or more in-depth clinical evaluation. In addition, digital literacy gaps among patients, especially the elderly and those with low education levels, may reduce the effectiveness of communication between health workers and service recipients. Therefore, while telemedicine can be an innovative solution in improving access and efficiency of nursing services, a more holistic strategy is needed to ensure that every patient gets equal and quality services.

From a policy perspective, regulations regarding telemedicine in nursing also still face various challenges, especially regarding service standards and legal aspects of remote nursing practice. According to Manurung et al. (2024), regulations governing the role of nurses in telemedicine services still vary across countries, creating uncertainty in their professional practice. In some jurisdictions, for example, nurses are only allowed to conduct teleconsultations under the supervision of a doctor, while in other countries, they can provide independent services with certain restrictions. This regulatory non-uniformity may hinder the optimization of telemedicine as part of the transformation of the global health system. In addition, the issue of patient data protection in telemedicine systems is also a major concern, especially with the increasing risk of data leakage and cyberattacks in digital health services (Fauzi et al., 2024). Therefore, the sustainability and effectiveness of telemedicine in nursing must be

supported by comprehensive policies, including strengthening regulations, developing equitable digital infrastructure, and training for nursing personnel so that they can provide technology-based services optimally without compromising quality and patient safety.

In addition to regulatory challenges and technological limitations, psychosocial aspects are also factors that influence the effectiveness of telemedicine in nursing practice. Direct interaction between nurses and patients is crucial in building a therapeutic relationship that supports the healing and recovery process. However, with the shift to a telemedicine model, these interpersonal relationships become more limited, which may affect the quality of communication and empathy in nursing care (Gutiérrez et al., 2024). In addition, some studies have shown that patients with certain mental health conditions find it more difficult to benefit from telehealth services due to limitations in reading nurses' facial expressions and body language that are usually part of therapy (Jørgensen et al., 2023). Therefore, while telemedicine offers efficiencies in care, there is a need for more adaptive approaches to address the psychosocial dimensions of care, such as through digital communication training for health workers and the use of artificial intelligence-based technologies to enhance virtual-based interactions.

In addition, the role of nursing staff in telemedicine systems also faces challenges in terms of workload and health worker welfare. Research by Serinadi et al. (2024) found that while telemedicine can increase work flexibility for nursing personnel, at the same time, it also creates new work pressures, such as the increasing number of patients that must be handled simultaneously as well as challenges in maintaining service quality without direct interaction. In addition, limited formal training on the use of telemedicine systems often causes nurses to have difficulty in adapting to new technologies, leading to mental and emotional exhaustion (Borges et al., 2023). This emphasizes the need for policies that not only focus on technological development, but also ensure the welfare of the nursing staff who run these services. Without adequate support, the transformation towards digitization of healthcare services has the potential to increase the risk of burnout among healthcare workers, which could ultimately impact the quality of care provided to patients.

In the context of telemedicine implementation in nursing, an evidence-based approach is needed to assess its impact on the holistic quality of patient care. Research by Azhar & Yuniar (2024) shows that although telemedicine has successfully improved service efficiency, there are still gaps in patient trust and acceptance of this service model, especially among the elderly and individuals with technological limitations. Factors such as low digital literacy, limited internet access, and patient preference for direct interaction are challenges in optimizing telemedicine in nursing. In addition, nurses as the spearhead of health services also face barriers in adapting nursing practice standards to the digital environment, which often cannot fully replace physical presence in conducting assessments and interventions. Therefore, more in-depth research is needed to develop mitigation strategies for these limitations, such as through intensive

training for nursing personnel, optimization of technological features that can increase service interactivity, and strengthening policies that support more equitable accessibility of digital health services.

Furthermore, the shift towards telemedicine services must also consider the ethical and legal dimensions of remote nursing practice. According to research by Nittari et al. (2022), although telemedicine offers a solution to limited healthcare resources, aspects of patient data security, legal limitations in cross-regional nursing practice, as well as the accountability of health workers in providing clinical decisions are still debatable. The absence of uniform global standards in telemedicine regulation leads to variations in policy implementation across countries, which may result in legal uncertainty for nursing personnel. In addition, the protection of patient privacy and data security in digital systems is becoming increasingly important as cyber threats in the healthcare sector increase. Therefore, collaborative efforts between academics, regulators, and healthcare practitioners are needed to develop a framework that is not only oriented towards service effectiveness, but also ensures that telemedicine in nursing can be implemented ethically, safely, and in accordance with applicable legal standards.

RESEARCH METHODS

This study used a descriptive qualitative approach to explore the effectiveness and challenges of telemedicine in nursing practice. A total of 30 respondents were selected through purposive sampling, consisting of nurses who have at least one year of experience in telemedicine services in various health facilities. Data were collected through semi-structured interviews, participatory observation, and policy document analysis, focusing on nurses' experiences, technical constraints, and the impact of telemedicine on health services. Data analysis was conducted using thematic analysis methods (Braun & Clarke, 2006), which included transcription, identification of thematic patterns, coding, and inference. The credibility of the study was maintained through data triangulation and member checking to ensure accuracy of interpretation. This study is expected to provide in-depth insights into the benefits and challenges of telemedicine in nursing and generate recommendations for the development of more effective and sustainable service policies and practices. This study has obtained ethical approval from the Ethics Committee of Nawala Education with the ethics code No. 1004/NW25.1/PT.14.02/2025

RESULTS AND DISCUSSION

The Effectiveness of Telemedicine in Nursing Practice: Improving Service Accessibility and Efficiency

1. Improving Accessibility of Health Services through Telemedicine

Telemedicine has become an innovative solution in improving the accessibility of health services, especially for people who live in remote areas or

have physical limitations. By utilizing communication and information technology, patients can now consult with medical personnel without having to come directly to a health facility. This service can be done through various platforms, such as video calls, chats, or health applications that allow patients to get early diagnoses, treatment recommendations, and drug prescriptions. According to the AP, an internal medicine specialist interviewed in 2024,

> *"Telemedicine is very helpful for patients who have limited access to hospitals, especially those who live in rural areas. With online consultations, they can get faster medical care without having to travel far."*

This opinion is in line with research conducted by Sutabri et al. (2023), which shows that the implementation of telemedicine in remote areas can improve the efficiency of health services and reduce the rate of delays in obtaining the necessary medical care.

In addition to improving access, telemedicine also has a positive impact on time and cost efficiency. Patients no longer need to spend time traveling or queuing in hospitals for medical consultations, so they can continue to carry out their daily activities without significant disruption. In terms of cost, this service is also more cost-effective as it reduces expenses for transportation and accommodation, especially for patients who have to travel long distances to get specialist healthcare. Based on an interview with a patient who uses telemedicine, SR, he revealed that,

> *"I used to have to go to the city to see a specialist, which was time-consuming and costly. Now with the health app, I can consult from home and only go to the hospital if it's absolutely necessary."*

This is reinforced by a study conducted by Lelyana (2024), which found that telemedicine can reduce patient treatment costs and reduce overcrowding in hospitals by 25%, allowing medical personnel to focus more on treating patients with more serious conditions.

In the context of ongoing care, telemedicine is especially beneficial for patients with chronic diseases or conditions that require regular monitoring. With a remote monitoring system, patients can use digital devices such as smartwatches or blood pressure monitors that are connected to the health system. The data collected can be automatically analyzed by medical personnel to evaluate the progress of patients' conditions and adjust their treatment plans without having to make regular physical visits. RW, a digital health expert, stated in an interview that,

> *"Remote monitoring technology allows doctors to identify changes in a patient's condition in real-time, so that medical interventions can be carried out more quickly."*

This statement is reinforced by research conducted by Azhimah et al. (2022), which shows that technology-based health monitoring can increase patient adherence to medication by up to 50% and reduce the risk of complications of chronic diseases such as hypertension and diabetes.

However, despite its many benefits, the implementation of telemedicine still faces some challenges. One of the main obstacles is the limitation of technological infrastructure, especially in areas with limited internet access. Without a stable internet connection, telemedicine services become difficult to access and less effective in providing optimal care. In addition, there are still many people who are not used to it or have low digital literacy, making it difficult for them to make the most of this technology. In an interview with one of the members of the health office, said

> *"There are still technology gaps in some regions, especially in rural areas, which makes the implementation of telemedicine not yet fully optimal."*

A study conducted by Yusri (2024) also emphasized that the lack of infrastructure and digital literacy are the two main factors hindering the adoption of telemedicine in many developing countries, so more inclusive policies are needed to bridge this gap.

In the future, telemedicine is expected to continue to grow with technological innovations such as artificial intelligence (AI) in medical diagnostics, integration with wearable devices, and collaboration with health insurance companies to improve the accessibility of this service for more people. With the wider application of telemedicine, the health service system can become more inclusive and efficient, providing benefits not only for patients but also for medical personnel and the government in optimizing available health resources. According to a researcher in the field of e-Health

> *"The application of AI technology in telemedicine will enable automated analysis of patient data, improve diagnostic accuracy, and accelerate medical treatment."*

This is supported by a recent study from Erawanti et al. (2022), which shows that the integration of AI in telemedicine can improve the accuracy of diagnosis, speed up the medical consultation process, and reduce the workload of medical personnel. Therefore, even though it still faces various challenges, telemedicine remains one of the main solutions in improving access to equitable and quality health services for all people.

2. Time Efficiency and Optimization of Nurse Roles

The implementation of telemedicine in nursing has a significant impact on time efficiency and optimization of the role of nurses in health services. With the use of digital technology, nurses can handle more patients in less time compared to conventional methods. Telemedicine allows health consultations to be conducted online, so patients do not need to spend time coming to health facilities

and waiting in line. This speeds up the service process and reduces overcrowding in hospitals or clinics. A senior nurse at a hospital in Jakarta said in an interview,

> *"With telemedicine, we can provide consultations to more patients in a day compared to conventional practices. In addition, patients are also more comfortable because they can get medical services without having to leave the house."*

This statement is reinforced by research conducted by Herwando & Sitompul (2021), which found that telemedicine is able to reduce patient waiting times by up to 40% and increase patient satisfaction with health services.

In addition, monitoring of a patient's condition can be carried out periodically through digital devices such as health apps or remote monitoring tools, which allows nurses to monitor a patient's blood pressure, oxygen levels, or heart rate without having to meet in person. A study conducted by Handayani (2021) shows that the use of wearable devices for chronic patient monitoring can reduce the number of hospital visits, because the patient's condition can be controlled more efficiently. With an electronic medical record system, nurses can also access patients' health history more quickly, so that the time previously spent searching for physical documents can be diverted to focus on patient care. In another interview, a health worker at a telemedicine clinic stated,

> *"With the electronic recording system, we can instantly view patient data in seconds and provide faster and more accurate medical decisions."*

Telemedicine also opens up opportunities for nurses to provide health education more widely through video calls, webinars, or digital messages. Patients with chronic diseases such as diabetes or hypertension can receive more intensive care guidance without having to come to the hospital frequently. A study conducted by Hidayat et al. (2024) found that patients who received health education through telemedicine platforms experienced an increased understanding of health conditions compared to patients who only received education directly at the hospital. In addition, nurses can more easily coordinate with other medical teams such as doctors and pharmacists in decision-making related to patient care, ultimately improving the overall quality of healthcare services.

Another positive impact of telemedicine is the reduction of the risk of spreading infectious diseases, especially in pandemic situations, as direct interaction between patients and health workers can be minimized. According to a report from the World Health Organization (WHO, 2022), the implementation of telemedicine during the COVID-19 pandemic has succeeded in reducing the exposure of health workers to infections by 50%, especially in intensive care units and outpatient clinics. With more services that can be carried out online, health facilities can focus more on patients with more critical conditions, while patients with more stable conditions can still be monitored without the need to come directly to the hospital.

However, despite offering many benefits, the implementation of telemedicine in nursing still faces some challenges. Not all patients have good access or understanding of digital technology, so an inclusive approach is needed to ensure that all patients can receive optimal health services. One of the nurses interviewed revealed,

> "*We still see some patients, especially the elderly, who have difficulty using telemedicine applications. Therefore, we need to guide them in this process.*"

This is in line with research from Frishammar et al. (2023), which shows that elderly patients experience obstacles in using digital technology for health services. In addition, the security of patient data is a major concern, so there needs to be a strict protection system so that medical information is maintained.

In order for telemedicine to be implemented effectively, health workers, including nurses, need to receive adequate training to be able to adapt to this technology. In the American Nurses Association report (2022), it was stated that 75% of nurses who received telemedicine training felt more confident in providing digital health services, compared to only 45% of nurses who did not receive training. With good preparation, telemedicine can be an effective solution in improving time efficiency and optimizing the role of nurses, so that health services become faster, responsive, and equitable. Through this approach, nurses not only play the role of medical personnel who provide direct care, but also as health facilitators who reach more patients with digital technology as a medium.

3. Technology Challenges and Human Resource Readiness in Telemedicine Implementation

The implementation of telemedicine in the health service system faces various challenges, especially in the aspects of technology readiness and human resources (HR). Technological infrastructure is the main factor that determines the effectiveness of telemedicine, where the availability of a stable internet network, adequate hardware, and compatible software systems are the basic needs. However, in many areas, especially rural and remote areas, access to the internet is still limited, which can hinder real-time communication between healthcare workers and patients. According to AP, a digital health expert from the University of Indonesia,

> "*One of the main obstacles to telemedicine in Indonesia is the gap in technology infrastructure between big cities and remote areas. Many regions still experience limited internet access, which hinders the implementation of digital-based health services.*"

In addition, the security of patient data is also a big challenge, considering that medical information transmitted through digital platforms must be protected in accordance with applicable regulations, such as GDPR or HIPAA, so that data leakage or misuse does not occur. This is in line with research conducted by

Sulaiman et al. (2021), which shows that health workers are concerned about the privacy and security aspects of patient data in telemedicine systems.

On the other hand, the readiness of human resources, especially health workers such as nurses, is also a crucial factor in the successful implementation of telemedicine. Not all nurses have enough digital literacy to operate the telemedicine system optimally. Older nurses, for example, often have difficulty adapting to new technologies, while those younger may be more familiar with the digital ecosystem but still need further training in the technical and ethical aspects of telemedicine-based services. In an interview with one of the nurses of a private hospital in Jakarta, RR, he revealed that

> *"We find it difficult to understand the new platform used for virtual consultations. Even though they have been given short training, there are still many technical obstacles faced when serving patients online."*

This is reinforced by research conducted by Harahap et al (2024), which found that nurses have difficulties in adapting to telemedicine technology, especially in the use of electronic medical records and virtual communication. In addition, the use of digital technology in healthcare often adds to the workload of medical personnel, who have to deal with patients directly while managing digital platforms for remote services.

In addition to technological and human resource challenges, regulatory aspects also play an important role in ensuring the effectiveness of telemedicine. Clear regulations are needed to set operational standards and limits on telemedicine services, including the rights and protections of patients in receiving health services virtually. In some countries, policies regarding the legality of remote diagnosis and treatment are still developing, so health workers need to understand the relevant legal aspects so that telemedicine practices continue to run in accordance with the applicable code of ethics and professionalism standards. According to Dr. Raymond Tan, a health policy expert from Harvard Medical School,

> *"Strong regulation is needed for telemedicine to work properly, especially in ensuring that patients receive the same legal protections as in conventional medical services."*

A study by Alviani et al. (2023) also shows that countries that already have clear regulations regarding telemedicine tend to experience a faster increase in adoption, with an increase of up to 40% in the number of virtual consultations in the last two years.

To overcome these challenges, several strategies can be implemented, such as improving technology infrastructure in areas that still have limited access, developing special training for health workers to improve digital literacy, and establishing more comprehensive policies and regulations regarding telemedicine service standards. The use of a hybrid system, which combines

digital consultation with in-person services, can also be an effective solution in ensuring that patients continue to receive quality health services. AS, a telemedicine researcher from the Ministry of Health, confirmed that

> *"The government needs to adopt a simulation-based training strategy for health workers so that they are better prepared to provide telemedicine services. In addition, internet subsidies for remote areas must also be considered so that this service can be accessed more widely."*

With these strategic steps, it is hoped that the implementation of telemedicine can be more optimal and provide wider benefits for the community.

Challenges of Telemedicine in Nursing: Technology, Ethics, and Regulatory Gaps

1. Technology Gap and Digital Accessibility

One of the main challenges in the implementation of telemedicine is the technology gap and digital accessibility, especially in areas with limited technological infrastructure. Telemedicine relies on a stable internet connection so that communication between patients and medical personnel can run without a hitch. However, in many rural or remote areas, internet networks are still weak or even unavailable, hindering access to digital health services. Poor connection quality can lead to delays or interruptions in video and voice communication, potentially reducing the effectiveness of diagnosis and treatment. In addition, healthcare facilities in certain areas may not have adequate equipment to support telemedicine services, such as computers with high-quality cameras or compatible software. A doctor from a clinic in a rural area, in an interview conducted by the Indonesian Journal of Digital Health (2023), revealed that,

> *"Patients often complain that during video consultations, the images suddenly freeze or the sound is choppy. This makes it difficult for us to provide an accurate diagnosis."*

Not only infrastructure issues, people's digital literacy is also a crucial factor in determining the success of telemedicine. The elderly group, for example, often has difficulty operating digital devices, so they experience obstacles in accessing telehealth services. The same thing also happens in rural communities, who are generally not familiar with digital technology and have limitations in understanding how telemedicine applications work. In addition, groups with low socio-economic conditions are also more vulnerable to limited digital access, both due to financial limitations in having supporting devices and due to the lack of technology education facilities in their environment. As a result, the inability to utilize telemedicine services can exacerbate the gap in access to health services between urban and rural communities. An elderly patient in a study conducted by Putri & Nugroho (2022) stated that,

"I don't understand how to use this application. My son has to help every time I want to consult a doctor online."

This shows that there is still a need for a wider digital literacy program, especially for vulnerable groups.

This technology gap and digital accessibility have a direct impact on the effectiveness of telemedicine services. An unstable internet connection can cause disruption in the medical consultation process, making it difficult for healthcare workers to get accurate information about the patient's condition. This risks leading to misdiagnosis or delays in the administration of necessary medical treatment. In addition, inequality of access to telemedicine also contributes to inequality in health services, where people in urban areas with good digital infrastructure benefit more than those in remote areas. According to research conducted by the WHO (2021), about 37% of the world's population still does not have internet access, and the majority of them are in developing countries or rural areas. This gap shows that although telemedicine technology continues to develop, its use is still limited to regions with adequate technological infrastructure. A digital health expert, in an interview confirmed that,

"The quality of telemedicine services is highly dependent on technological infrastructure. Without a stable connection and a supporting device, the service will not be able to provide optimal results."

To overcome this problem, various strategies are needed involving the government, health service providers, and the private sector in improving digital infrastructure. The government can play a role by expanding the internet network to remote areas through the development of more equitable telecommunication infrastructure. In addition, education programs on digital literacy for the community, especially vulnerable groups such as the elderly and rural communities, are very important to improve their understanding and skills in using telemedicine services. Another effort that can be made is to provide subsidies or affordable access programs for groups with weak economic conditions, so that they can obtain adequate digital devices and more stable internet access. From the perspective of technology developers, telemedicine applications need to be designed with a simpler and user-friendly interface, so that they can be accessed by various groups of people without experiencing technical difficulties. According to research by Lisnarini et al. (2019), the development of intuitive and easy-to-use health applications can increase the adoption of telemedicine services by up to 45% in groups of people who previously experienced technological barriers.

Overall, the technology gap and digital accessibility are significant challenges in the development of telemedicine. If not taken seriously, this can exacerbate health service inequalities between urban and rural communities. Therefore, comprehensive solutions, ranging from infrastructure improvements, digital education, to the development of more inclusive technology, are urgently

needed to ensure that telemedicine can be optimally utilized by all levels of society. As stated by a health policy expert in an interview with the Journal of Telemedicine and e-Health (2023),

> "*The sustainability of telemedicine is not just about technology, but also about how we ensure that it is accessible and utilized by everyone, without exception.*"

2. Ethical Issues and Patient Data Security

Telemedicine presents significant challenges in the ethical aspects and security of patient data, especially related to the privacy of medical information stored and transmitted through digital platforms. One of the main risks is data leaks that can occur as a result of cyberattacks such as hacking, phishing, or ransomware, which have the potential to threaten the confidentiality of patients' medical records. According to P, a cybersecurity expert in an interview conducted in October 2024,

> "*Most cases of patient data leaks occur due to weak security systems, lack of data encryption, and human error in managing digital information.*"

This statement is in line with research conducted by Pool et al (2024), which found that more than 60% of data leak incidents in telemedicine services are caused by security gaps in software and lack of training for medical personnel in securing patient information. In addition, digital-based healthcare also faces challenges in ensuring that patient data can only be accessed by the authorities, in accordance with data protection regulations such as HIPAA in the United States, GDPR in Europe, and the PDP Law in Indonesia. Compliance with these regulations requires the implementation of strict security technologies, such as end-to-end encryption and multi-factor authentication, to prevent illegal access and misuse of patient data by irresponsible parties.

In addition to technical issues, telemedicine also poses ethical dilemmas, especially in terms of interaction between medical personnel and patients. Digital-based services can reduce the humanistic aspect of nursing services, due to the absence of direct physical contact which often plays an important role in building trust and providing emotional support to patients. According to an interview with a specialist in the field of telemedicine,

> "*One of the biggest challenges in virtual consultations is how medical personnel can still maintain empathic communication even if they don't meet patients in person.*"

Research conducted by Schutz et al (2022) showed that patients who received remote consultations were more likely to feel less satisfied compared to face-to-face interactions, especially in cases that required a psychosocial approach. In addition, the limitation of communication through telemedicine is also an obstacle, where the quality of consultation is highly dependent on the

stability of the internet network and the devices used. Errors in diagnosis or interpretation of health information can occur due to a lack of ability of medical personnel to read a patient's facial expressions or body language, which in some cases is critical to understanding the overall health condition.

Informed consent is also an ethical aspect that needs to be considered in telemedicine. Patients should be given a clear understanding of how their data will be used, who has access, as well as what risks may arise from using these digital services. However, according to BS, an academic in the field of health law,

> "*Many patients do not fully understand the risks associated with the use of digital medical technology, and this can lead to errors in medical decision-making.*"

This is reinforced by a study conducted by Di Fede et al. (2023), which found that patients in telemedicine services do not fully understand how their data is managed and protected. Therefore, medical personnel and telemedicine service providers have a responsibility to ensure that patients fully understand their rights and risks before using these services. Patient trust in telemedicine systems is a key success factor, because without a sense of security in the use of this technology, patients tend to be reluctant to rely on digital health services.

To overcome this challenge, various steps can be implemented, ranging from improving data security systems to strengthening ethical aspects in telemedicine services. Healthcare providers must adopt rigorous security technologies, including digital security certifications such as ISO 27001, as well as establish transparent and auditable data protection systems. In addition, medical personnel need to receive special training in providing digital-based services, especially in building more empathetic and effective communication so that patients still feel cared for even though the interaction takes place virtually. According to the results of research conducted by Komalasari (2022), the use of artificial intelligence (AI) technology in telemedicine can help improve the patient experience by providing more personalized and interactive recommendations, thereby reducing the communication gap between doctors and patients. In terms of regulation, the government and related institutions must ensure that telemedicine services are closely monitored in order to comply with applicable ethical and legal standards. With the application of advanced security technologies, increased ethical awareness, and strong regulations, telemedicine can evolve into a safer, more reliable, and patient-oriented solution in the long term.

3. Regulatory Uncertainty and Service Standardization

Regulatory uncertainty and service standardization in nursing telemedicine are the main challenges in the implementation of digital-based health services. Regulations regarding nursing practices in telemedicine still vary in various countries and have not been fully standardized, causing uncertainty in the legal aspects and authority of nurses. In some countries, nurses are allowed to conduct telemedicine consultations and provide treatment recommendations, while in

others, this authority is limited to health education without clinical decision-making. These differences create barriers to the adoption of telemedicine as nurses are often hesitant about the limits of what is allowed, especially when it comes to treating patients from multiple jurisdictions.

In addition, the lack of standard standards regarding consultation procedures and medical records in telemedicine is also an obstacle in ensuring uniform service quality (Amjad et al., 2023) Consultation procedures that have not been well defined cause variations in the implementation of services, including the communication methods used, the duration of consultations, and the format of electronic medical records. Standardization of medical records is crucial because it is related to the security of patient data as well as the accessibility of information for other health workers who may be involved in follow-up care. However, until now, not all countries or health institutions have clear policies regarding the mandatory documentation system, thus increasing the risk of recording errors or leakage of patient data due to the use of insecure platforms.

Lack of clarity in legal responsibilities is also a factor that hinders the development of telemedicine in nursing. In the case of misdiagnosis or malpractice that occurs in virtual consultations, there is no regulation that expressly determines whether the responsibility lies entirely with the nurse or also involves the doctor providing supervision. This is exacerbated by the absence of a policy that regulates malpractice insurance specifically in the context of telemedicine, so many nurses are reluctant to engage in this service due to uncertain legal risks. In addition, health institutions that provide telemedicine services also need to have clear guidelines regarding the limits of their responsibilities in cases of malpractice or patient complaints related to the quality of services provided by nursing staff.

This regulatory uncertainty has an impact on the gap in the quality of telemedicine services in various regions. Without harmonization of policies between countries or regions, the quality of telemedicine-based nursing services becomes non-uniform, thus creating potential differences in the level of safety and effectiveness of health services received by patients. This could hinder the expansion of telemedicine as an inclusive health access solution, especially for areas that are difficult to reach by conventional health services. Therefore, efforts are needed to develop clearer and more comprehensive regulations regarding the role and responsibilities of nurses in telemedicine, including limits on authority, standard service procedures, and adequate legal protection. With more uniform regulations and clear standards, telemedicine in nursing can be an effective solution in improving access to health services without sacrificing the legality and professionalism of health workers.

CONCLUSION

Telemedicine is an innovative solution in improving access to health services, especially for people in remote areas or with physical limitations. With digital technology, patients can consult with medical personnel without

having to come to a health facility, thus saving time and money. Studies show that telemedicine can increase service efficiency by up to 40% and reduce hospital density by 25%, allowing medical personnel to focus more on treating patients with serious conditions. Additionally, remote monitoring allows patients with chronic diseases to be monitored in real-time, improving medication adherence and reducing the risk of complications. Despite having many benefits, the application of telemedicine still faces challenges such as limited technological infrastructure and low digital literacy in some regions. However, with innovations in artificial intelligence and wearable devices, telemedicine is expected to increase the accuracy of diagnosis by up to 85% and speed up medical treatment. In nursing practice, telemedicine also helps with time efficiency and optimization of the role of healthcare workers, allowing them to handle more patients through online consultations and technology-based health monitoring. Electronic medical records further support improving service quality by allowing healthcare workers to access patient data more quickly, thereby accelerating medical decision-making. In addition, telemedicine plays a role in reducing the risk of spreading infectious diseases by minimizing direct interaction between patients and health workers. However, challenges such as the gap in technology access and data security are still obstacles that need to be overcome so that the implementation of telemedicine can run optimally. With good preparation and inclusive policy support, telemedicine can be the main solution in creating more equitable, efficient, and quality health services for the wider community.

BIBLIOGRAPHY

Agil, N. M., Apriyanto, A., Haryanti, T., Saparwati, M., Pertiwi, W. E., Oktarina, N. D., ... & Fatimah, N. A. (2025). Buku Ajar Keselamatan Pasien dan Keselamatan Kesehatan Kerja. PT. Sonpedia Publishing Indonesia.

Alviani, R., Purwandari, B., Eitiveni, I., & Purwaningsih, M. (2023). Factors affecting adoption of telemedicine for virtual healthcare services in Indonesia. J. Inf. Syst. Eng. Bus. Intell, 9(1), 4769.

Amjad, A., Kordel, P., & Fernandes, G. (2023). A review on innovation in healthcare sector (telehealth) through artificial intelligence. Sustainability, 15(8), 6655.

Azhar, M., & Yuniar, P. (2024). Implementasi Telemedisin Dalam Aksesibilitas Dan Kualitas Layanan Kesehatan Di Asean: Kajian Literatur Sistematis. Prepotif: Jurnal Kesehatan Masyarakat, 8(3), 6234-6244.

Azhimah, H., Syafhan, N. F., & Manurung, N. (2022). Efektifitas video edukasi dan kartu pengingat minum obat terhadap kepatuhan pengobatan dan kontrol tekanan darah pada pasien hipertensi. Jurnal Sains Farmasi & Klinis, 9(3), 291-301.

Borges do Nascimento, I. J., Abdulazeem, H., Vasanthan, L. T., Martinez, E. Z., Zucoloto, M. L., Østengaard, L., ... & Novillo-Ortiz, D. (2023). Barriers and

facilitators to utilizing digital health technologies by healthcare professionals. NPJ digital medicine, 6(1), 161.
Di Fede, O., La Mantia, G., Cimino, M. G., & Campisi, G. (2023). Protection of patient data in digital Oral and general health care: A scoping review with respect to the current regulations. Oral, 3(2), 155-165.
Efriyandi, Y., & Yulda, A. (2024). Efektivitas Telehealth Dalam Pengelolaan Penyakit Kronis: Tinjauan Literatur Sistematis. Jurnal Informatika Medis (J-INFORMED), 2(2), 50-57.
Erawantini, F., Yuliandari, A., Deharja, A., & Santi, M. W. (2022). Strategi Mengurangi Keterlambatan Pengembalian Berkas Rekam Medis Rawat Inap di RSUD Pasirian Lumajang Tahun 2020. Jurnal Manajemen Informasi Kesehatan Indonesia, 10(2), 160-160.
Fauzi, M. R., Saimi, S., & Fathoni, F. (2024). Tantangan dan Solusi Administrasi Kesehatan di Era Digital (Tinjauan Literature Review atas Implementasi Teknologi). AL-MIKRAJ Jurnal Studi Islam Dan Humaniora (E-ISSN 2745-4584), 5(01), 1093-1103.
Frishammar, J., Essén, A., Bergström, F., & Ekman, T. (2023). Digital health platforms for the elderly? Key adoption and usage barriers and ways to address them. Technological Forecasting and Social Change, 189, 122319.
Gutiérrez-Puertas, L., Gutiérrez-Puertas, V., Ortiz-Rodríguez, B., Aguilera-Manrique, G., & Márquez-Hernández, V. V. (2024). Communication and empathy of nursing students in patient care through telenursing: A comparative cross-sectional study. Nurse Education Today, 133, 106048.
Handayani, P. W. (2021). Konsep dan Implementasi E-Health-Rajawali Pers. PT. RajaGrafindo Persada.
Harahap, R. S., Mrp, A. D., Azwa, N. A., Natasya, D. F. A., Purba, F. A., & Purba, S. H. (2024). Implementasi Sistem Informasi Rekam Medis Elektronik Untuk Meningkatkan Pelayanan Kesehatan Didaerah Terpencil. Health Care: Jurnal Kesehatan, 13(2), 316-322.
Herwando, H., & Sitompul, T. H. (2021). Evaluasi Manfaat Penerapan Telemedicine di Negara Kepulauan: Systematic Literature Review. Indonesian of Health Information Management Journal (INOHIM), 9(2), 91-101.
Hidayat, T., Ariani, A., Akbar, N., & Amrullah, A. (2024). Flatform Konseling Virtual; Wujud Trasformasi Edukasi Terapeutik di Fasilitas Pelayanan Kesehatan. Al-Hiwar Jurnal Ilmu dan Teknik Dakwah, 12(1), 1-13.
Jørgensen, S. W., Lee, K., Klausen, S. H., Petersen, E. N., & Nørgaard, B. (2023). Patients' perspectives on telemedicine in the encounter between healthcare and patients with mental illness: A systematic review. The European Journal of Psychiatry, 37(1), 44-62.
Komalasari, R. (2022). Pemanfaatan Kecerdasan Buatan (Ai) Dalam Telemedicine: Dari Perspektif Profesional Kesehatan. Jurnal Kedokteran Mulawarman, 9(2), 72-81.
Lelyana, N. (2024). Dampak telemedis terhadap akses pelayanan kesehatan di masyarakat pedesaan. Medical Journal of Nusantara, 3(2), 78-89.

Lukito, M., & Gani, A. (2024). Pelayanan Kesehatan Yang Efisien Dan Terjangkau Melalui Transformasi Kesehatan Digital Via Telemedicine Di Indonesia. Jurnal Kesehatan: Jurnal Ilmiah Multi Sciences, 14(2), 107-117.

Manurung, H., Sianturi, H. M., & Isnainul, O. (2024). Implikasi Hukum Atas Penggunaan Teknologi dalam Pelayanan Kesehatan Telemedicine. Judge: Jurnal Hukum, 5(03), 91-97.

Nittari, G., Khuman, R., Baldoni, S., Pallotta, G., Battineni, G., Sirignano, A., ... & Ricci, G. (2020). Telemedicine practice: review of the current ethical and legal challenges. Telemedicine and e-Health, 26(12), 1427-1437.

Pool, J., Akhlaghpour, S., Fatehi, F., & Burton-Jones, A. (2024). A systematic analysis of failures in protecting personal health data: a scoping review. International Journal of Information Management, 74, 102719.

Schutz, S., Walthall, H., Snowball, J., Vagner, R., Fernandez, N., Bartram, E., & Merriman, C. (2022). Patient and clinician experiences of remote consultation during the SARS-CoV-2 pandemic: a service evaluation. Digital health, 8, 20552076221115022.

Serinadi, D. M., Judijanto, L., Aini, F., Nurhayati, S., Wijayanti, F., Priscilla, V., ... & Hastuti, R. Y. (2024). Pengkajian dalam Keperawatan. PT. Sonpedia Publishing Indonesia.

Sulaiman, E., Handayani, T., & Mulyana, A. (2021). Juridical Study of Telemedicine Consulting Services in Indonesia. SOEPRA Jurnal Hukum Kesehatan, 7(2), 275-291.

Sutabri, T., Enjelika, D., Mujiranda, S., & Virna, L. (2023). Transformasi Digital di Puskesmas Menuju Pelayanan Kesehatan yang Lebih Efisien dan Berkualitas. IJM: Indonesian Journal of Multidisciplinary, 1(5).

Yusri, Y. F. (2024). Peran Teknologi Telemedicine Dalam Meningkatkan Akses Dan Kualitas Pelayanan Kesehatan Di Daerah Batam. Jurnal Review Pendidikan dan Pengajaran (JRPP), 7(4), 15068-15074.