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# THE USE OF TELEMEDICINE IN PRIMARY HEALTHCARE SERVICES IN JAKARTA

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**Abstract**

Background: The advancement of digital technology has transformed the healthcare sector, and telemedicine has become an important innovation in providing remote clinical services. Methods: The research method used is a mixed-method approach, combining quantitative and qualitative approaches. Data collection was conducted through questionnaires distributed to 400 telemedicine users. The sample size was determined using the Slovin formula with a 5% margin of error. Results: 75% of respondents used telemedicine more than once in the past year, with 70% of respondents expressing high satisfaction with the services received. The main reasons for using telemedicine include convenience (65%) and time savings. However, several challenges were identified, such as technical issues (30%), lack of physical examinations, and concerns about service quality. Discussion: The main challenges identified include inadequate technological infrastructure, low digital literacy among certain groups, and unclear regulations. Development opportunities include the integration of telemedicine with electronic health records and increased public education. Conclusion: Telemedicine has great potential to improve the accessibility and efficiency of healthcare services in Jakarta. However, improvements in infrastructure, digital literacy, and supportive regulatory frameworks are needed to maximize the benefits of telemedicine within the healthcare system.

**Keywords**: Digital Technology, Telemedicine, Primary Healthcare Facilities, Jakarta

## Introduction

The rapid advancement of digital technology in recent decades has transformed many sectors, including the healthcare sector. Nearly all recent innovations in the health field are related to telemedicine, which refers to the provision of clinical services remotely through information and communication technology.[1,2] Telemedicine can enhance healthcare delivery by expanding access, improving cost efficiency, and increasing effectiveness and productivity in medical services. This is particularly evident in major cities such as Jakarta, where the demand for healthcare services is exceptionally high. Currently, telemedicine in Primary Healthcare Facilities represents a potential strategy to meet the growing demand for medical services and to address several common issues found within the healthcare delivery system.[3]

Primary healthcare services provided by Community Health Centers (Puskesmas) and clinics serve as the frontline for initial medical care. These primary-level health facilities play a crucial role in healthcare delivery, including preventive care, early diagnosis, and the management of chronic medical conditions.[4]


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However, many primary healthcare facilities in Jakarta continue to face challenges such as overcapacity, limited human and technological resources, and prolonged waiting times. Telemedicine, which delivers healthcare services remotely, offers a potential solution to these issues by enabling patients to consult with medical professionals or doctors without the need to travel directly to the healthcare facility. This approach can significantly reduce the burden on healthcare institutions while providing greater convenience and flexibility for patients.[5]

In a metropolitan city like Jakarta, with a population of over 10 million people, the implementation of telemedicine in primary healthcare services has the potential to transform service delivery and significantly improve healthcare efficiency. Urban areas, particularly in developing countries like Indonesia, often face disparities in access to healthcare. These inequalities may stem from traffic congestion, geographic barriers, and the uneven distribution of healthcare facilities across regions. Telemedicine can help bridge these gaps by making access to healthcare more equitable and widespread, especially for populations living in densely populated or underserved areas lacking adequate medical infrastructure.[6,7] In addition, telemedicine can support continuity of patient care by offering follow-up monitoring after treatment and providing consultations for individuals with chronic medical conditions from the comfort of their homes.

The COVID-19 pandemic has demonstrated that telemedicine has become a vital innovation in maintaining healthcare services while minimizing the risk of viral transmission.[8–10] In Jakarta, the use of telemedicine increased significantly during the pandemic, as many primary healthcare providers began utilizing digital platforms for doctor consultations, electronic prescriptions, and remote patient monitoring. This shift in service delivery methods highlights the potential of telemedicine to be further developed into a sustainable model of healthcare in the future.

However, telemedicine also faces several challenges in its implementation, particularly within primary healthcare services. Technological infrastructure, digital literacy, and regulatory frameworks must be strengthened to ensure the broader and more efficient adoption of telemedicine.[11] In addition to these factors, there are concerns regarding the quality of care delivered through telemedicine, including data privacy and security, as well as the readiness of healthcare providers to adopt this mode of service delivery.

This study evaluates the current use of telemedicine by the public in Primary Healthcare Facilities in Jakarta, as well as the challenges and its impact on healthcare delivery. By analyzing the experiences of both healthcare providers and patients in utilizing telemedicine services, this research aims to provide recommendations for the sustainable implementation of telemedicine in the future. In the long term, the findings of this study are expected to contribute to understanding how telemedicine can be integrated into the Indonesian healthcare system to improve access, efficiency, and the quality of medical care, particularly within primary healthcare services.

## Methods

This study employs a mixed-method approach, combining both quantitative and qualitative methods, using primary data as the main source. The quantitative method is applied to analyze numerical data such as percentages, means, and rates that require detailed statistical analysis. The qualitative approach is used to explore and explain social influences that cannot be measured numerically.

### Population and Sample

The study population consists of telemedicine users at Primary Healthcare Facilities in Jakarta. The sample size was determined using the Slovin formula:

n=N1+N(e2)n = \frac{N}{1 + N(e^2)}n=1+N(e2)N

Where:

- $n$ = sample size
- $N$ = population (estimated number of telemedicine users in Jakarta)
- $e$ = margin of error (5%)

Assuming a population of 100,000 telemedicine users in Jakarta and a margin of error of 5%, the required sample size is approximately 400 respondents. Samples were randomly selected from several clinics and healthcare facilities in Jakarta.

**Data Collection**

Data were collected through online questionnaires distributed to active telemedicine users within the past year. The questionnaire included items on the frequency of telemedicine use, user satisfaction, and challenges encountered during service utilization.

**Data Analysis**

This study utilizes two main methods of analysis:

1. Quantitative Descriptive Analysis:
   This method is used to describe users' perceptions of telemedicine and its potential development within primary healthcare services. Questionnaire data are processed and presented in the form of tables, graphs, or diagrams.
2. Scoring Analysis:
3. A Likert scale is used to assess user preferences regarding specific aspects of telemedicine, such as convenience, accessibility, and quality of service. Responses on the Likert scale are converted into scores, which are then analyzed using interval analysis techniques.

In addition to the quantitative analysis, a qualitative approach is also applied. Qualitative data are obtained through interviews with healthcare professionals—including general practitioners and nurses—involved in telemedicine services, as well as patients who have used telemedicine services within the past year.

Qualitative data were gathered from interviews with 20 healthcare professionals and 20 patients who had previously engaged in telemedicine consultations. Participants were selected through purposive sampling to represent a variety of backgrounds, including age, gender, and levels of experience with telemedicine. The interviews covered participants' experiences using telemedicine, challenges they encountered, and their suggestions for improving telemedicine services in the future.

The qualitative data were analyzed thematically. Manual coding was performed, and NVivo 12 was used to organize and manage the data.

Data triangulation was conducted by comparing findings from the interviews with the quantitative survey results.

**Results and Discussion**

This study reveals both the strengths and limitations of using telemedicine in primary healthcare services in Jakarta. Through quantitative data analysis from respondents and qualitative data from interviews with healthcare professionals, the findings provide an overview of how telemedicine is currently utilized and developed within the healthcare landscape of Jakarta.

**Table 1. Respondent Demographics**

| Age Range | Gender | Education Level | Occupation | Frequency of Telemedicine Use (per year) |
|---|---|---|---|---|
| 18–25 | Male | High School | University Student | 3 |
| 26–35 | Female | Bachelor's | Private Employee | 5 |
| 36–45 | Male | Bachelor's | Civil Servant | 7 |
| 46–55 | Female | Postgraduate | Entrepreneur | 2 |
| 56–65 | Male | High School | Retired | 1 |

**Telemedicine Use in Primary Healthcare Facilities**

The study results indicate that telemedicine usage has increased in primary healthcare facilities in Jakarta following the end of the COVID-19 pandemic. Approximately 75% of respondents reported having used telemedicine more than once in the past year. Around 60% of users stated they used telemedicine for non-emergency consultations such as routine check-ups and follow-up visits for chronic conditions.

These findings align with global trends, where telemedicine is recognized as an effective tool for monitoring patients requiring continuous care without the need for in-person visits. This suggests that telemedicine is gradually becoming a viable complement to traditional healthcare services, especially in urban settings.

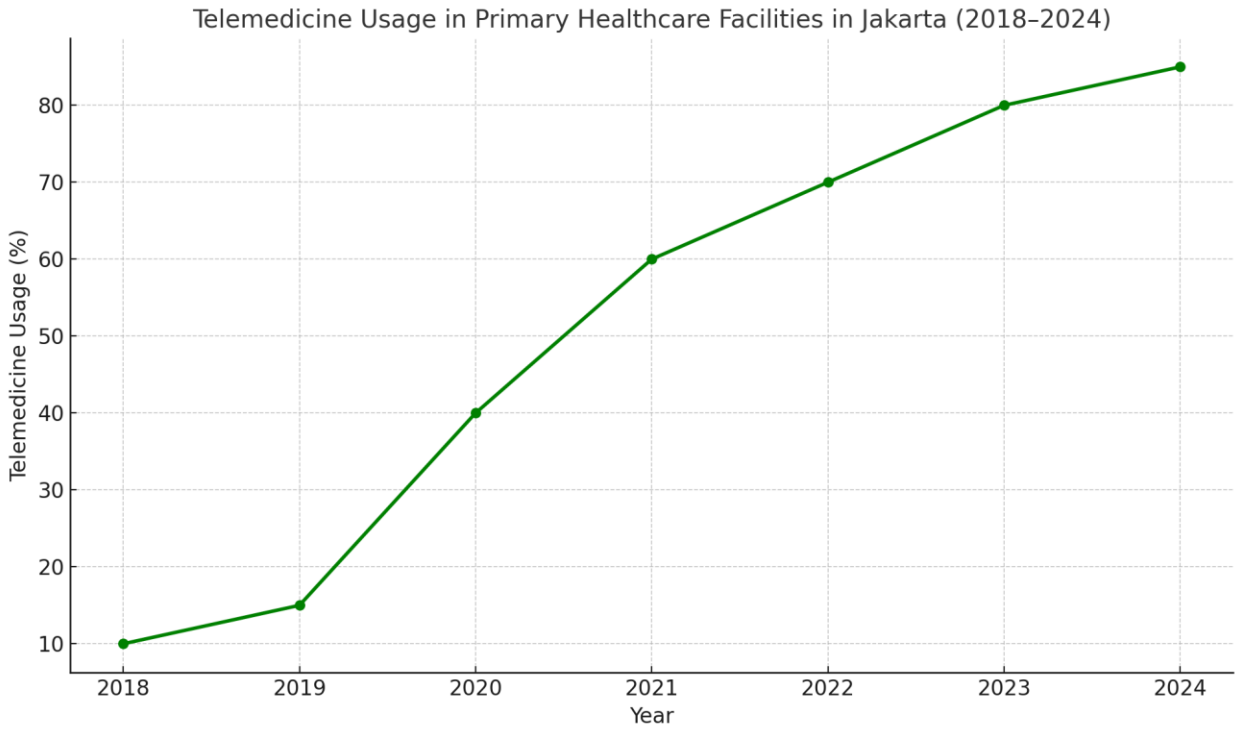


**Figure 1. Increase in Telemedicine Usage Before and After the COVID-19 Pandemic in Jakarta**

Moreover, telemedicine is frequently utilized in densely populated urban areas, where traffic congestion and long travel times to healthcare facilities pose significant challenges. Approximately 65% of respondents stated that convenience was the primary reason for using telemedicine, in addition to saving time and avoiding traffic congestion in Jakarta. This indicates that telemedicine can help overcome several geographical and logistical barriers faced by Jakarta residents when seeking primary healthcare services.

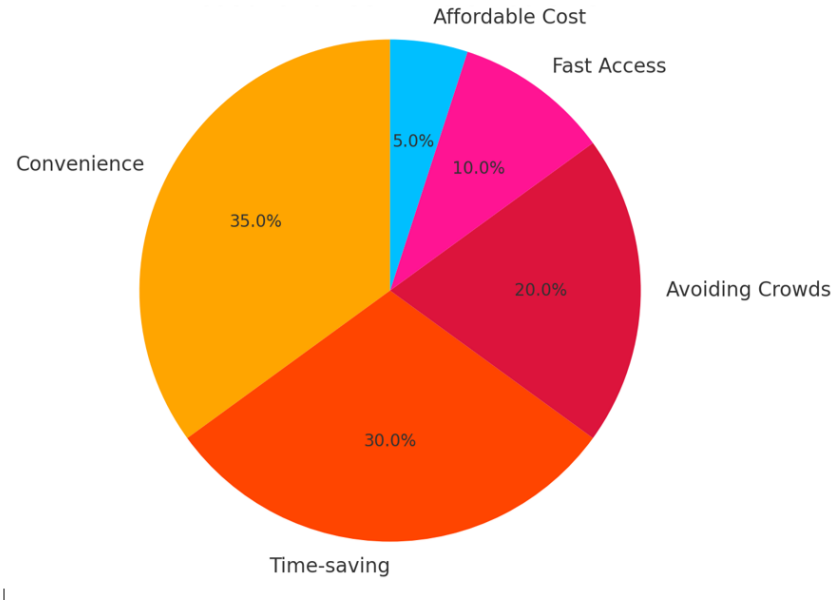


**Figure 2. Reasons for Respondents to Use Telemedicine**

**Health Worker Perspectives**

In interviews, several healthcare personnel expressed the need for clear guidelines outlining what is and is not permissible during telemedicine consultations. This suggests that the lack of clear regulation creates legal uncertainty regarding telemedicine services. Connectivity issues, particularly unstable internet connections, were also cited as a major obstacle, which ultimately reduces the overall quality of care. Other respondents complained about complicated telemedicine applications, reinforcing quantitative findings that improvements in technological infrastructure and digital literacy are needed within the community.

Some healthcare professionals appreciated the flexibility of telemedicine services, as they helped reduce the number of patients visiting clinics in person. A notable recommendation that emerged from the interviews was the hope that telemedicine platforms will eventually integrate with patients' electronic medical records, greatly facilitating diagnosis and treatment planning.

**Patient Satisfaction with Telemedicine Services**

Analysis confirmed that patient satisfaction with telemedicine services is generally high. Using a Likert scale to measure satisfaction, 70% of respondents reported a positive view—45% stated they were "satisfied," and 25% stated they were "very satisfied" with the telemedicine services received. This satisfaction primarily stemmed from the convenience, time savings, and ease of access that telemedicine offers. Several patients also mentioned that telemedicine enabled them to consult healthcare professionals without needing to take time off work or endure long wait times at primary care facilities.

However, despite the overall high satisfaction levels, approximately 20% of respondents expressed concerns about the quality of care received via telemedicine. These users felt that virtual consultations were less thorough compared to in-person visits, especially in cases requiring physical examinations. This highlights a limitation of telemedicine—certain conditions still necessitate direct evaluation, and the absence of physical exams may affect diagnostic accuracy in some cases.

**Table 2. Respondents' Satisfaction Level in Using Telemedicine**

| Satisfaction Category | Number of Respondents | Percentage (%) |
|---|---|---|
| Very Satisfied | 160 | 40% |
| Satisfied | 140 | 35% |
| Neutral | 60 | 15% |
| Dissatisfied | 20 | 5% |
| Very Dissatisfied | 20 | 5% |
| Total | 400 | 100% |

**Perspective of Healthcare Providers on Telemedicine**

From the perspective of healthcare providers, the overall view of telemedicine is generally positive, although several areas are still considered inadequate. Interviews with doctors and other healthcare professionals revealed that telemedicine helps reduce the number of in-person visits, allowing them to focus more on cases that require physical presence. Some providers noted that telemedicine is highly flexible, particularly useful for patient triage and follow-up care.

However, healthcare providers also identified a number of challenges. One key concern is the absence of standardized guidelines for telemedicine procedures in primary care services. Physicians expressed concern about the legal implications of diagnosing and prescribing treatments based solely on virtual

consultations. Another major challenge is the level of technological literacy among patients and some medical staff. Despite Jakarta being a metropolitan area with widespread technological access, a digital gap persists—especially among elderly patients or those with limited experience using smartphones and telemedicine platforms.

A study by Aydemir S, Ocak S, et al. (2021) on the use of telemedicine in a pediatric hospital in Turkey during the COVID-19 pandemic showed that telemedicine not only maintained healthcare delivery but also offered a sustainable solution to improve access and response times for vulnerable populations, such as children.[12-17] This study is highly relevant to the use of telemedicine in Jakarta, as it aims to expand access to healthcare services for urban populations with diverse medical needs.

**Technological and Infrastructure Challenges**

One of the key challenges identified in this study is the technological infrastructure that supports telemedicine services. Although telemedicine platforms are becoming increasingly popular, 30% of respondents reported experiencing technical issues during consultations, including poor video quality, internet connectivity problems, and difficulties navigating telemedicine applications. These technical problems often hinder the effectiveness of consultations and cause patient frustration, reducing their interest in using telemedicine in the future.

Primary healthcare providers also face infrastructure limitations. Physicians reported that system disruptions and slow internet connections occasionally interrupted consultations, which negatively affected both patient care and time efficiency. These findings highlight the urgent need to strengthen technological infrastructure to ensure that telemedicine can function effectively—particularly by securing reliable internet access across Jakarta.

Challenges related to internet connectivity infrastructure are consistent with findings from a study by Kobeissi et al. (2023), which indicated that infrastructure limitations were a major barrier to telemedicine adoption in Japan following the COVID-19 pandemic.[18]

Low digital literacy also presents a significant barrier to the implementation of telemedicine in several countries. A study by Valdes et al. (2022) highlighted that the lack of telemedicine training significantly impacts the quality of service delivery.[19]

**Opportunities for Improvement and Development**

Despite the aforementioned challenges, there remain significant opportunities for the further development of telemedicine in primary healthcare services in Jakarta. One key area for improvement is the integration of telemedicine with Electronic Health Records (EHRs). Approximately 40% of healthcare professionals suggested that integrating telemedicine platforms with patients' electronic medical records would enable more comprehensive patient management. Such integration would also ensure that virtual consultations are as informative and thorough as in-person visits—particularly for patients with chronic conditions requiring routine monitoring.

Additionally, public education and awareness regarding the advantages and limitations of telemedicine could help bridge the digital divide. Providing tutorials or support services for patients unfamiliar with telemedicine platforms may encourage broader adoption—especially among older adults and populations with limited digital literacy.

A study by Yang Y, Gong X, et al. (2024) highlighted disparities in the quality of direct-to-consumer telemedicine services in China. This research offers useful insights for considering how the quality of

telemedicine services in Jakarta can be improved, particularly by emphasizing the need for regulation and standardization to maintain the quality of care.[13,14]

**Policy and Regulatory Considerations**

As telemedicine usage continues to expand—particularly in Jakarta—there is a growing need for a robust regulatory framework to safeguard patient safety, data privacy, and quality of care. Healthcare providers have voiced the necessity for clear guidelines outlining the types of consultations appropriate for telemedicine, as well as legal protections for practitioners. This study concludes that the government and health authorities must collaborate to develop policies that address these concerns while promoting telemedicine as a sustainable and effective model for primary healthcare delivery.

The findings of this study demonstrate that telemedicine is playing an increasingly important role in Jakarta's primary healthcare landscape, driven by advances in digital technology and the demand for more accessible health solutions. Telemedicine has improved multiple aspects of healthcare delivery, including alleviating system overload, reducing resource limitations, and minimizing waiting times at healthcare facilities. For many patients, telemedicine offers a flexible and convenient method of receiving medical care—reducing the need for in-person visits and providing timely medical advice, especially in Jakarta's densely populated urban environment.

The rising adoption of telemedicine in Jakarta—especially during and after the COVID-19 pandemic—demonstrates its potential to transform healthcare delivery models. Patients benefit from increased convenience and time efficiency, particularly for non-urgent appointments and follow-up visits. Healthcare providers also recognize the value of telemedicine in optimizing workflow and focusing attention on more critical cases. However, this study also highlights several challenges that must be addressed to fully harness the potential of telemedicine.

Haider Z, Aweid B, et al. (2022) discussed the use of telemedicine in orthopedics during and after the COVID-19 pandemic, emphasizing its relevance in monitoring non-emergency conditions and providing continuous care for chronic illnesses. This aligns with findings in Jakarta, where telemedicine has helped reduce the burden on primary healthcare facilities in managing chronic cases.[15]

**Technological and Infrastructure Limitations**

Technological and infrastructure limitations—such as connectivity issues and system failures—remain major barriers that affect the overall effectiveness of telemedicine. These challenges underscore the urgent need to enhance digital infrastructure to ensure consistent and reliable telemedicine services. Moreover, the digital divide among certain patient groups—particularly older adults and individuals with low technological literacy—must be addressed through targeted education and support services to promote equitable access.

Healthcare providers also expressed concern over the lack of consistent guidelines for telemedicine, along with legal and ethical challenges in remotely diagnosing and treating patients. To mitigate these concerns, a regulatory framework is needed to establish clear standards for the appropriate use of telemedicine, data privacy protection, and the quality of care delivered via virtual consultations.

A study by Cheshire W, Barrett K, et al. (2021) on physician empathy in telemedicine for stroke patients offers important insights into patients' perceptions of interaction quality in virtual healthcare settings. These findings are particularly relevant to the development of telemedicine in Jakarta, where aspects such as empathy and trust in telemedicine services still require improvement.[16]

Meanwhile, Yaghobian S, Ohannessian R, et al. (2020) conducted a national survey on telemedicine education and training in medical schools across France. This study highlights the importance of education and training for healthcare professionals in implementing telemedicine, serving as a valuable reference to ensure that healthcare providers in Jakarta are adequately prepared to adopt this technology effectively within Primary Healthcare Facilities.[17]

## Conclusion

The findings of this study demonstrate that telemedicine has the potential to become a sustainable and integrated component of the primary healthcare system in Jakarta. However, to fully realize this potential, additional efforts are required to improve technological infrastructure, ensure the readiness of healthcare providers, and implement supportive regulatory policies. By addressing these challenges, telemedicine can serve as a vital tool to enhance accessibility, quality, and efficiency in healthcare delivery for the people of Jakarta.

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