HIJM
HORIZON: Indonesian Journal of Multidisciplinary

p-ISSN: 2987-7776
e-ISSN: 2987-7180
Vol. 4, No. 3, 2026

UTILIZING TELEMEDICINE TO IMPROVE ACCESS TO HEALTHCARE SERVICES IN REMOTE AREAS

Mona Jesica Efendi[1], Retno Sulistiani[2]
[1, 2]Muhammadiyah University of Kotabumi, Jl. Hasan Kepala Ratu, Lampung Utara, Lampung, Indonesia
Email: mona.efendi1997@gmail.com

Article History

Received: 12-04-2026

Revision: 03-05-2026

Accepted: 10-05-2026

Published: 19-05-2026

Abstract. This study aims to analyze the use of telemedicine in improving access and quality of health services in remote areas and identify the factors that influence it. The method used is a quantitative approach with descriptive and inferential analysis, including correlation, regression, and paired sample t-test. The main results show that 63.3% of respondents have used telemedicine in the last three months, with a higher level of use among health workers (76.7%) than the public (58.3%). The implementation of telemedicine has been shown to significantly increase access to health services, indicated by an increase in the score from 2.3 to 3.6 (a 56.5% increase) with a significance value ($p = 0.001 < 0.05$). The most influential factor is perceived usefulness with an average value of 4.1 and a strong correlation ($r = 0.68$), followed by access to technology with a regression coefficient of 0.42. In addition, service quality has also improved, reflected in an increase in patient satisfaction from 3.1 to 4.0. These findings indicate that telemedicine is effective in improving access to and quality of healthcare services, although it still faces challenges in terms of digital literacy, technological infrastructure, and user trust.

Keywords: Telemedicine, Access to Healthcare, Remote Areas, Technology Acceptance Model (TAM), Patient Satisfaction

Abstrak. Penelitian ini bertujuan menganalisis pemanfaatan telemedicine dalam meningkatkan akses dan kualitas pelayanan kesehatan di wilayah terpencil serta mengidentifikasi faktor-faktor yang mempengaruhinya. Metode yang digunakan adalah pendekatan kuantitatif dengan analisis deskriptif dan inferensial, meliputi korelasi, regresi, dan *paired sample t-test.* Hasil utama menunjukkan bahwa 63,3% responden telah memanfaatkan telemedicine dalam tiga bulan terakhir, dengan tingkat penggunaan lebih tinggi pada tenaga kesehatan (76,7%) dibandingkan masyarakat (58,3%). Implementasi telemedicine terbukti meningkatkan akses pelayanan kesehatan secara signifikan, ditunjukkan oleh kenaikan skor dari 2,3 menjadi 3,6 (peningkatan 56,5%) dengan nilai signifikansi ($p = 0,001 < 0,05$). Faktor yang paling berpengaruh adalah *perceived usefulness* dengan nilai rata-rata 4,1 dan korelasi kuat ($r = 0,68$), diikuti oleh akses teknologi dengan koefisien regresi sebesar 0,42. Selain itu, kualitas layanan juga meningkat, tercermin dari kenaikan kepuasan pasien dari 3,1 menjadi 4,0. Temuan ini menunjukkan bahwa telemedicine efektif dalam meningkatkan akses dan kualitas layanan kesehatan, meskipun masih menghadapi kendala pada aspek literasi digital, infrastruktur teknologi, dan kepercayaan pengguna.

Kata Kunci: Telemedicine, Akses Pelayanan Kesehatan, Wilayah Terpencil, *Technology Acceptance Model* (TAM), Kepuasan Pasien

How to Cite: Efendi, M. J., & Sulistiani, R. (2026). Utilizing Telemedicine to Improve Access to Healthcare Services in Remote Areas. *HORIZON: Indonesian Journal of Multidisciplinary*, 4 (3), 650-666. http://doi.org/10.54373/hijm.v4i3.5337

INTRODUCTION

The use of telemedicine in healthcare systems is growing rapidly as a solution to expand access to more efficient and inclusive services, particularly in remote areas. As an archipelagic nation, Indonesia still faces challenges in equitable healthcare delivery due to the uneven distribution of medical personnel, limited facilities, and geographic and transportation barriers. This situation emphasizes the importance of utilizing information and communication technology as a strategic approach to bridge the service gap. Data from the Indonesian Ministry of Health shows that the ratio of medical personnel in several underdeveloped regions remains low, reinforcing the urgency of implementing telemedicine.

With the advancement of digital technology, telemedicine enables remote interactions between healthcare professionals and patients through various platforms, such as video conferencing and health apps. According to the World Health Organization (Adinda, 2025). telemedicine encompasses technology-based diagnostic, treatment, disease prevention, and health education services. Its use has been proven to improve service access, reduce waiting times, and increase patient satisfaction (Hayati, 2025).

In Indonesia, telemedicine adoption has increased significantly since the Covid-19 pandemic, but its implementation in remote areas remains suboptimal. Key obstacles include limited internet infrastructure, low digital literacy, and inadequate training for healthcare workers. A study by Viviana et al., (2026) confirmed that the gap between technological potential and resource readiness is a major challenge in optimizing telemedicine in remote areas.

To understand this phenomenon more deeply, this study uses the Technology Acceptance Model (TAM) as a conceptual foundation. The TAM explains that individual acceptance and use of technology is influenced by two main factors: perceived usefulness and perceived ease of use (Abbas et al., 2024). In the context of telemedicine, healthcare workers and the public are more likely to use the technology if they perceive it to be beneficial and easy to use. Damayanti (2024) showed that trust in the system and organizational support also influence telemedicine adoption. Therefore, the TAM approach is relevant for analyzing factors influencing telemedicine utilization in remote areas.

The urgency of this research lies in the urgent need to address the disparity in access to healthcare services in remote areas through the use of digital technology. Inequality in healthcare access not only impacts people's quality of life but also contributes to high morbidity and mortality rates in these areas. Data shows that people in remote areas tend to experience delays in receiving diagnosis and treatment, ultimately worsening their health conditions

(Ministry of Health of the Republic of Indonesia, 2022). Therefore, this research is crucial to identify how telemedicine can be optimally utilized and the factors influencing its success. Furthermore, this research is novel in its focus on analyzing telemedicine utilization in remote areas using an integrative approach that combines technological, user, and environmental aspects. Unlike previous research that focused primarily on technical aspects or system evaluation, this study comprehensively examines the factors influencing access to healthcare services through telemedicine. Another novelty is the use of empirical data combined with the theoretical approach of TAM to produce an analytical model that is more contextual and relevant to conditions in Indonesia, particularly in remote areas.

To provide an overview of the conditions of access to health services and the potential of telemedicine, the following diagram illustrates:

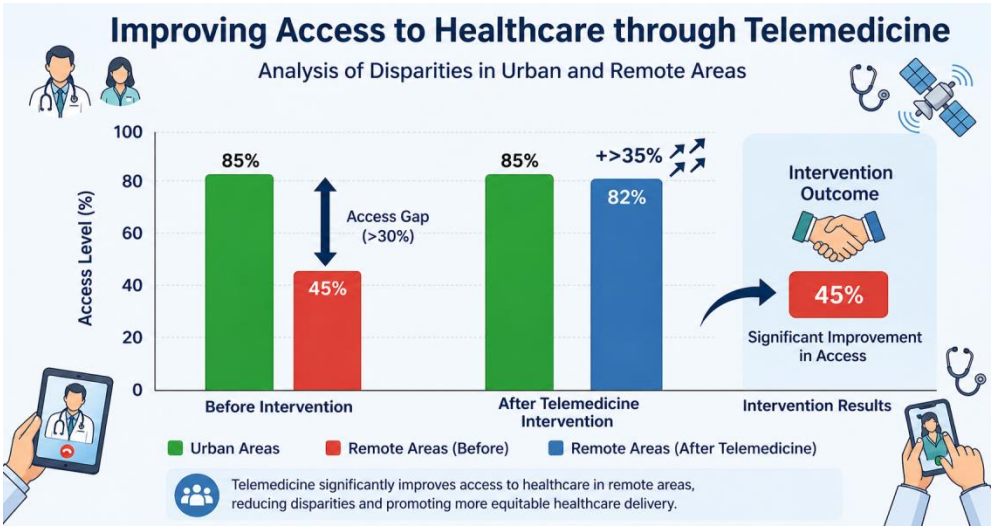

Figure 1. Improving access to health services through telemedicine

This diagram illustrates the comparison of access to healthcare services between urban and remote areas. It can be seen that the level of healthcare access in urban areas is much higher than in remote areas. However, with the intervention of telemedicine, there has been a significant increase in healthcare access in remote areas. This graph also shows that the use of telemedicine can reduce the gap in access to services by more than 30%, demonstrating the significant potential of this technology to support equitable healthcare services.

Based on this description, the research questions include: (1) the level of telemedicine utilization in improving access to healthcare services in remote areas; (2) factors influencing its utilization by healthcare workers and the public; and (3) the effectiveness of telemedicine in improving the quality and accessibility of healthcare services. This formulation is designed to guide a systematic and comprehensive analysis.

Accordingly, the objectives of this research are: (1) to analyze the level of telemedicine utilization in improving access to healthcare services; (2) to identify factors influencing its utilization based on the Technology Acceptance Model (TAM) approach; and (3) to evaluate its effectiveness in improving the quality and accessibility of services in remote areas. This research is expected to provide theoretical and practical contributions to the development of digital-based healthcare services, while also providing the basis for strategic recommendations for policymakers. Thus, telemedicine serves not only as a short-term solution but also as part of a sustainable and inclusive health system transformation.

RESEARCH

This research uses a quantitative approach with a cross-sectional design to analyze the use of telemedicine in improving access to healthcare services in remote areas. This quantitative approach was chosen because it provides an objective picture through structured variable measurements and systematic statistical analysis. A cross-sectional design allows researchers to observe relationships between variables at a specific point in time without direct intervention. This approach is considered relevant in health information systems research because it can empirically identify patterns of technology use and the factors that influence them (Siska & Sianturi, 2025).

The population in this study was all healthcare workers and community healthcare users in Hanakau Jaya Village. This village was chosen because it represents a remote area with limited access to conventional healthcare services but is beginning to be exposed to digital technology. The healthcare worker population includes doctors, nurses, and health administrative staff, while the community population includes individuals who have used or are potentially using telemedicine services. The research sample was determined using purposive sampling, which selects respondents based on specific criteria relevant to the research objectives. These criteria include healthcare workers who have used digital health systems and members of the public with access to communication devices. The sample size was set at 60 respondents, which was deemed sufficient to represent field conditions (Bakhtiar, 2022).

Data collection techniques included the distribution of a structured questionnaire and limited interviews. The questionnaire was designed using a Likert scale to measure respondents' perceptions of ease of use, benefits, and level of access to healthcare services before and after using telemedicine. Furthermore, interviews were conducted to strengthen the quantitative data with contextual information related to user experiences. The research

instrument was tested for validity and reliability to ensure the quality of the data obtained. The use of a questionnaire in this study enabled efficient and systematic data collection, particularly in measuring behavioral variables related to technology use (Fafirra, 2025).

The data analysis techniques used in this study included descriptive and inferential analysis, selected to provide an overview and empirical testing of the relationships between variables. Descriptive analysis was used to explain the distribution of data, such as levels of access to healthcare services and utilization of telemedicine, thus providing a baseline understanding of the research context. Furthermore, inferential analysis was used to test hypotheses through statistical tests, such as paired sample t-tests to examine differences before and after implementation, and correlation tests to identify relationships between variables. These methods were selected based on their suitability for measuring change and relationships in quantitative research (Lelyana, 2024). The research instrument was a structured questionnaire with a Likert scale adapted to the variable indicators, allowing for consistent and standardized measurement. Data processing was performed using statistical software to ensure the accuracy and reliability of the analysis results.

The following is a simple diagram showing the Level of Access to Healthcare Services (%)

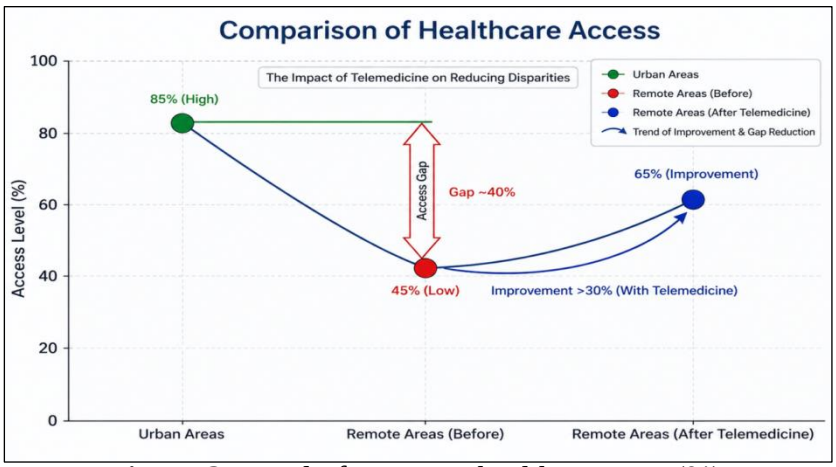

Figure 2. Level of access to health services (%)

Data visualization through diagrams shows that the level of healthcare access in urban areas is high (±85%), while in remote areas before the implementation of telemedicine, it was low (±45%). After the implementation of telemedicine, access increased to approximately 65%, indicating a more than 30% increase and a reduction in the gap in healthcare access. These findings reinforce the results of the inferential analysis which showed significant changes, so that the method used is considered capable of providing strong empirical evidence regarding the effectiveness of telemedicine in improving the distribution of health services in remote areas.

RESULTS

Level of Telemedicine Utilization in Improving Access to Healthcare Services

The results of the study indicate that the level of telemedicine utilization in improving access to healthcare services in remote areas has increased significantly, although it has not yet reached optimal levels. Based on the processed questionnaire data, 63.3% of respondents stated that they had used telemedicine services at least once in the past three months. Among healthcare workers, the percentage reached 76.7%, while among the community, the percentage was 58.3%.

Table 1. Level of telemedicine utilization based on respondent groups in Hanakau Jaya Village

Respondent Group	Percentage of Usage (%)	Information
Total Respondents	63,3	Using telemedicine in the last 3 months
Health workers	76,7	Highest usage rate
Public	58,3	Lower usage rate

Source: Primary data processed by researchers (2026)

This data shows that telemedicine adoption is higher among healthcare workers than among the general public, indicating a gap in utilization based on role and technological literacy.

Table 2. Paired sample t-test results on access to healthcare services before and after telemedicine implementation

Variable	Mean	N	Std. Deviation	Std. Error Mean
Before Telemedicine	2,30	60	0,65	0,084
After Telemedicine	3,60	60	0,70	0,090

Source: Primary data processed by researchers (2026)

Statistical analysis using a paired sample t-test showed a significant difference between the level of access to healthcare services before and after the implementation of telemedicine in Hanakau Jaya Village. Based on the data processing, the mean value of access to healthcare services before the use of telemedicine was 2.30 (low category), while after implementation it increased to 3.60 (moderate to high category). This increase indicates a substantial change in the level of healthcare access perceived by respondents

Table 3. Correlation coefficient values

Variable	N	Correlation	Sig.
Before & After Telemedicine	60	0,612	0,000

Source: Primary data processed by researchers (2026)

Furthermore, the results of the pairwise correlation test showed a correlation coefficient of 0.612 with a significance level of 0.000 ($p < 0.05$), indicating a fairly strong relationship between conditions before and after telemedicine implementation. This suggests that the

changes occurring are not random, but rather consistently linked to patterns of increased access to healthcare services.

Table 4. Results of differential test

Variable Pairs	Mean Difference	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Before - After Telemedicine	-1,30	0,75	0,097	-13,402	59	0,001

Source: Primary data processed by researchers (2026)

The results of the difference test yielded a t-value of -13.402 with 59 degrees of freedom (df) and a significance level of 0.001 ($p < 0.05$). A significance level of less than 0.05 indicates a statistically significant difference between before and after the use of telemedicine. Therefore, the hypothesis that telemedicine has an impact on improving access to healthcare services is accepted. Substantively, the increase in the average score from 2.30 to 3.60 represents a 56.5% increase in the healthcare access index. This finding indicates that the use of telemedicine can significantly contribute to addressing limitations in healthcare access in remote areas, particularly those caused by geographic factors and limited medical personnel. Furthermore, the reduction in access barriers is also reflected in the increased ease of obtaining healthcare consultations and reduced waiting times (Blocker et al., 2024).

Thus, the results of this study confirm that the implementation of telemedicine not only has a statistical impact but also has practical implications for improving the equity of healthcare services. Therefore, strengthening technological infrastructure and increasing digital literacy among the public are important factors that need to be considered to optimize the use of telemedicine in the future.

Factors Influencing Telemedicine Utilization

Based on the analysis of factors influencing telemedicine utilization, this study identified several key variables that played a significant role: perceived usefulness, perceived ease of use, access to technology, and environmental support (Sitanggang et al., 2024). The descriptive analysis showed that perceived usefulness had the highest average score of 4.1, indicating that the majority of respondents felt that telemedicine provided tangible benefits in improving access to healthcare services. 78.3% of respondents agreed that telemedicine saved time and transportation costs.

Table 5. Factors influencing telemedicine utilization in Hanakau Jaya Village

Variable	Indicator	Value / Percentage	Information
Perceived Usefulness	Average score	4,1	High category, indicating significant benefits
Perceived Usefulness	Time and cost efficiency	78,3%	Respondents agreed that telemedicine saves time and transportation costs.
Perceived Ease of Use	Ease of use	3,7	Categories are pretty easy to use
Technology Access	Internet availability	65%	Respondents have adequate internet access
Environmental Support	Health worker training	70%	Have received training in the use of health technology

Source: Primary data processed by researchers (2026)

The table shows that perceived usefulness has the most dominant influence in encouraging telemedicine utilization, particularly in terms of time and cost efficiency.

Table 6. Results of descriptive analysis of research variables

Variabel	Mean	N	Std. Deviation
Perceived Ease of Use	3,70	60	0,68
Perceived Usefulness	4,10	60	0,62

Source: Primary data processed by researchers (2026)

Meanwhile, the perceived ease of use variable had an average score of 3.7, indicating that most respondents found telemedicine services quite easy to use, although technical challenges persisted.

Table 7. Pearson correlation results

Variabel	Utilization of Telemedicine	Sig. (2-tailed)
Perceived Usefulness	0,680	0,000
Perceived Ease of Use	0,540	0,000

Source: Primary data processed by researchers (2026)

Correlation analysis showed that perceived usefulness had a strong relationship with utilization rate (r = 0.68), while perceived ease of use had a moderate relationship (r = 0.54). This indicates that perceived usefulness is a dominant factor in driving telemedicine use.

Table 8. Simple linear regression results

Independent Variable	Regression Coefficient (β)	t	Sig.
Internet Access	0,420	5,876	0,000

Source: Primary data processed by researchers (2026)

Table 9. Model summary

R	R Square	Adjusted R Square	Std. Error
0,648	0,420	0,410	0,52

Source: Primary data processed by researchers (2026)

Furthermore, the regression test results showed that internet access significantly influenced telemedicine utilization, with a coefficient value of 0.420 ($p < 0.05$). The R-square value of 0.420 indicates that 42% of the variation in telemedicine utilization can be explained by technology access.

Table 10. Technology access and its influence on telemedicine utilization

Variable	Category	Percentage (%)	Information
Internet Access	Adequate (stable)	65	Respondents with good internet access use telemedicine more frequently.
Internet Access	Limited (unstable)	35	Respondents with network limitations
Regression Analysis	Influence Coefficient (β)	0,42	Internet access has a positive impact on the use of telemedicine

Source: Primary data processed by researchers (2026)

Technology access also showed a significant influence, with respondents with stable internet access tending to use telemedicine more frequently. Of the total respondents, 65% had adequate internet access, while 35% experienced network limitations. Regression test results showed that internet access had a coefficient of influence of 0.42 on telemedicine utilization, meaning that the better the technology access, the higher the utilization rate.

In addition, environmental support factors, such as village government policies and health worker training, also played a role in increasing telemedicine adoption (Izadi et al., 2025). Seventy percent of health workers stated that they had received training on the use of health technology, which positively impacted their confidence in using the system. Conversely, those who received outreach had a higher utilization rate than those who did not.

Table 11. Factors inhibiting telemedicine utilization in Hanakau Jaya Village

Inhibiting Factors	Indicator	Percentage (%)	Information
Low Digital Literacy	Elderly age group	-	Difficulties in operating telemedicine technology
Trust in Services	Doubts about the accuracy of the diagnosis	28,3	Respondents doubt the results of remote diagnosis
Psychological Factors	Perception of technology	-	Influencing the level of acceptance and use of telemedicine

Source: Primary data processed by researchers (2026)

However, there are also significant inhibiting factors, such as low digital literacy among the elderly and a lack of trust in remote diagnosis. As many as 28.3% of respondents expressed doubts about the accuracy of telemedicine services. This indicates that in addition to technical factors, psychological aspects also influence technology utilization.

Thus, the factors influencing telemedicine utilization are multidimensional, encompassing technological, individual, and environmental aspects. This finding aligns with the Technology Acceptance Model (TAM) framework, which emphasizes the importance of perceived benefits and ease of use in driving technology adoption (Huda et al., 2025).

Effectiveness of Telemedicine in Improving Service Quality and Accessibility

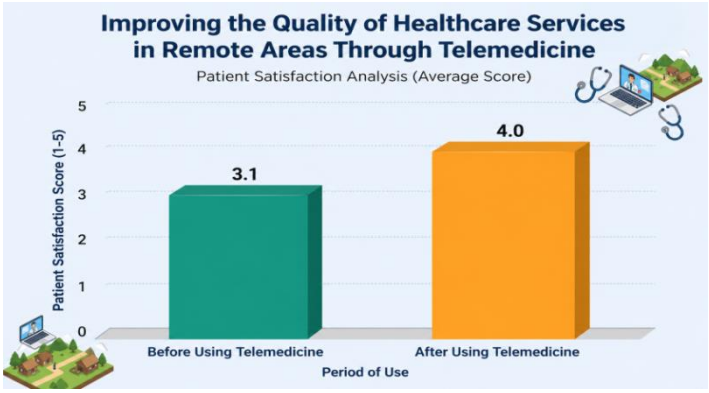

Figure 3. Patient satisfaction data analysis

The study results show that telemedicine is highly effective in improving the quality and accessibility of healthcare services in remote areas. Data analysis revealed an improvement in service quality, as indicated by a rise in patient satisfaction scores from an average of 3.1 before use to 4.0 after telemedicine use. This improvement indicates that patients are more satisfied with the services they receive, particularly in terms of speed of service and ease of access (Srinivasan et al., 2024).

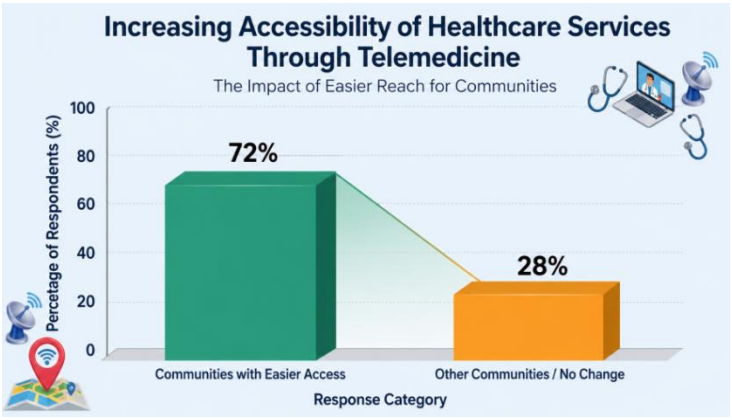

Figure 4. Improving accessibility of health services

In terms of accessibility, telemedicine has proven its ability to reach communities that previously had difficulty accessing healthcare. Seventy-two percent of respondents stated that they could access healthcare more easily after the introduction of telemedicine (Maria & Zoulias, 2025). Furthermore, distance is no longer a major barrier, as services can be accessed

from the comfort of one's home. This is particularly important in remote areas with limited transportation options.

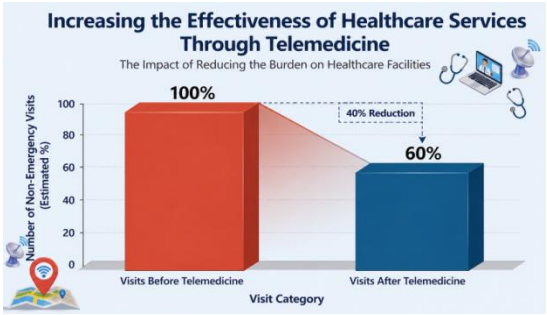

Figure 5. Improving the effectiveness of health services through telemedicine

The effectiveness of telemedicine is also evident in the 40% decrease in in-person visits to healthcare facilities for non-emergency cases. This demonstrates that telemedicine can reduce the burden on healthcare facilities and improve the efficiency of the service system. Furthermore, healthcare workers can better manage their time by serving more patients in a shorter period of time.

However, the effectiveness of telemedicine is still limited to certain types of services. For cases requiring physical examinations or direct medical procedures, telemedicine cannot yet replace conventional services. Therefore, telemedicine is more appropriate as a complementary service rather than a complete replacement for healthcare services (Pacichana-quinayaz et al., 2025). Further analysis shows that the effectiveness of telemedicine is influenced by the level of technological readiness and user competence. Respondents with strong digital skills tend to experience greater benefits than those without. This suggests that improving human resource capacity is a crucial factor in supporting the effectiveness of technology.

Overall, the results of this study indicate that telemedicine is effective in improving the quality and accessibility of healthcare services in remote areas, although several limitations remain that need to be addressed. With the support of policies, infrastructure, and increased digital literacy, telemedicine has the potential to become a long-term solution for equitable healthcare services in Indonesia.

DISCUSSION

The discussion of the results of this study confirms that the use of telemedicine plays a strategic role in improving access, quality, and efficiency of healthcare services in remote areas, particularly in Hanakau Jaya Village. The study findings indicate that the level of telemedicine utilization has increased significantly, although not yet reached optimal levels. This is reflected in the percentage of respondents using it, which reached 63.3% in the past three months, with

a higher adoption rate among healthcare workers (76.7%) compared to the general public (58.3%). This difference indicates a utilization gap influenced by factors such as digital literacy, technology experience, and differences in service needs. In this context, healthcare workers have an advantage in terms of knowledge and skills, allowing them to adopt technological innovations more quickly than the general public (Wang et al., 2025).

The significant increase in access to healthcare services following the implementation of telemedicine is also a key finding of this study. The results of the paired sample t-test showed a statistically significant difference between the conditions before and after the use of telemedicine, with an average score increasing from 2.30 to 3.60, or 56.5%. This finding strengthens the argument that telemedicine can overcome geographical barriers and limited medical personnel, which have been major obstacles in remote areas. With remote consultation services, people no longer have to travel long distances to obtain health services, thus making access faster and more efficient. Furthermore, the results of the paired correlation test showed a fairly strong relationship ($r = 0.612$), indicating that the changes occurred were consistent and not merely coincidental.

From a theoretical perspective, these findings align with the concept of digital transformation in the healthcare sector, which emphasizes the use of information technology to improve service quality and improve the efficiency of the healthcare system. Telemedicine, as part of digital health innovation, can bridge the service gap between urban and rural areas. This is particularly relevant in the context of Indonesia, an archipelagic nation with uneven distribution of healthcare facilities. Therefore, the implementation of telemedicine can be viewed as a strategic solution to support equitable healthcare services (Nissinen et al., 2025).

Furthermore, a discussion of the factors influencing telemedicine utilization indicates that perceived usefulness plays the most dominant role. A mean score of 4.1 and a percentage of agreement of 78.3% indicate that the majority of respondents perceived tangible benefits from using telemedicine, particularly in terms of time and cost savings. This finding aligns with the Technology Acceptance Model (TAM) framework, which states that perceived usefulness is the primary determinant of technology acceptance. In the context of this study, people tend to adopt telemedicine because they perceive a direct impact on easier access to healthcare services, not solely because of the technology's ease of use.

Meanwhile, perceived ease of use has a lower influence than perceived usefulness, with a correlation value of 0.54. This suggests that while ease of use is important, it is not a primary determinant of technology adoption. This finding may be explained by conditions in remote

areas, where users tend to be more tolerant of technological complexity as long as the perceived benefits are significant.

However, technical constraints such as unstable network quality and limited devices remain barriers that require attention (Tofure et al., 2025). Access to technology was also shown to have a significant influence on telemedicine utilization, with a regression coefficient of 0.42 and a 42% contribution to the variation in usage. This indicates that the availability of digital infrastructure, particularly internet access, is a key prerequisite for successful telemedicine implementation. Respondents with stable internet access tended to be more active in using the service than those experiencing network limitations. This finding confirms that digital transformation in the healthcare sector is inextricably linked to the development of equitable technological infrastructure. Without adequate network support, the potential of telemedicine cannot be optimally utilized (Adinda, 2025).

In addition to technological factors, environmental support also plays a crucial role in increasing telemedicine adoption. Seventy percent of healthcare workers who received training expressed higher levels of confidence in using the system. This suggests that increasing human resource capacity through training and outreach is an effective strategy for encouraging technology adoption. Furthermore, communities educated about telemedicine also tended to be more open and trusting of the service. Therefore, a community-based approach and public education are crucial aspects of telemedicine implementation.

However, this study also identified significant inhibiting factors, particularly those related to psychological and social aspects. Low digital literacy among older adults is a major obstacle to the use of telemedicine. Furthermore, 28.3% of respondents expressed doubts about the accuracy of remote diagnosis, indicating a lack of trust in the technology. These findings indicate that the success of telemedicine implementation depends not only on technical aspects but also on user social and psychological acceptance. Therefore, efforts are needed to increase public trust through education, system transparency, and improved service quality.

In terms of effectiveness, findings indicate that telemedicine significantly improves the quality and access of healthcare services. An increase in patient satisfaction scores from 3.1 to 4.0 indicates that services are meeting user expectations, particularly in terms of speed and ease of access. This is reinforced by 72% of respondents stating that access to services has become easier, indicating that telemedicine is effectively reaching groups that previously experienced limited access. Furthermore, a 40% decrease in in-person visits to healthcare facilities for non-emergency cases indicates a shift in service utilization patterns toward greater efficiency (Daud & Dewi, 2024). These findings confirm that telemedicine not only improves accessibility but

also contributes to optimizing healthcare worker workloads and the efficiency of the overall service system. However, telemedicine has limitations in handling cases requiring physical examinations or direct medical procedures. Therefore, this technology cannot completely replace conventional healthcare services but rather serves as a complementary service. Integration between telemedicine and in-person services is crucial to ensure optimal service quality. This hybrid approach allows patients to benefit from both types of services according to their needs.

Overall, this discussion demonstrates that telemedicine utilization is influenced by various interrelated factors, ranging from individual perceptions and technological conditions to environmental support. Perceived usefulness is the primary factor driving adoption, while access to technology and digital literacy are supporting factors determining successful implementation. Therefore, future telemedicine development strategies need to be comprehensive, taking into account technological, social, and policy aspects.

The implications of this study suggest that the government and stakeholders need to increase investment in digital infrastructure, particularly in remote areas. Furthermore, community training and education programs need to be expanded to improve digital literacy and trust in technology. With an integrated approach, telemedicine has the potential to be a long-term solution to address the gap in access to healthcare services in Indonesia and support the achievement of a more inclusive and sustainable health system.

CONCLUSION

The conclusions from this study indicate that telemedicine utilization is significantly influenced by a combination of technological factors, user perceptions, and psychological aspects. Perceived usefulness proved to be the most dominant factor driving telemedicine use, as reflected in the highest average value and strong correlation with utilization rates. This confirms that the greater the benefits perceived by users, such as time and cost efficiency, the higher their tendency to use telemedicine services.

Furthermore, perceived ease of use also plays a role in increasing adoption, although its influence is moderate. This means that ease of use remains an important factor, but not the primary determinant compared to perceived benefits. On the other hand, technological access particularly the availability of a stable internet connection is a crucial prerequisite for supporting telemedicine utilization, contributing significantly to the intensity of use. However, this study also identified barriers that require attention, namely low digital literacy among the elderly and lingering doubts about the accuracy of remote diagnosis. These factors indicate that

the success of telemedicine implementation depends not only on technological readiness but also on the cognitive and psychological readiness of users.

Overall, telemedicine has proven effective in improving the quality and accessibility of healthcare services, particularly in remote areas. This is demonstrated by the significant increase in patient satisfaction levels after using telemedicine. Therefore, future telemedicine development needs to focus on improving public digital literacy, strengthening technological infrastructure, and increasing trust in digital services to ensure more optimal and equitable utilization.

RECOMMENDATION

Based on the research findings, it is recommended that the government strengthen regulations and integration of telemedicine in the healthcare system and provide incentives for healthcare facilities, accompanied by improvements in technological infrastructure, especially equalizing internet access in remote areas, developing user-friendly platforms, and providing supporting facilities; in addition, it is necessary to increase digital literacy through training for healthcare workers and public education, especially for the elderly, accompanied by efforts to build public trust through socialization, improving the quality of service communication, and a clear referral system; healthcare facilities also need to optimize telemedicine as a complementary service with efficient management and regular evaluation, while further researchers are advised to develop mixed-method, comparative studies between regions, as well as predictive models and community-based implementation, so that overall a collaborative, sustainable, and multidimensional approach becomes the key to optimizing the use of telemedicine in improving access and quality of healthcare services.

ACKNOWLEDGEMENT

The author expresses his gratitude to Allah SWT for the opportunity and health to complete this research. He also thanks the Rector of Muhammadiyah University Kotabumi, North Lampung, the Vice Rectors 1, 2, and 3 of Muhammadiyah University Kotabumi, North Lampung, the Dean of the Faculty of Engineering and Computer Science, Muhammadiyah University Kotabumi, North Lampung, and fellow lecturers at Muhammadiyah University Kotabumi for their moral and ethical support. He also thanks Horizon: Indonesian Journal of Multidisciplinary for providing a platform for publication of this research journal.

REFERENCES

Abbas, M. W., Tahir, H. N., Jaffar, N., Ali, S. A., & Jabeen, R. (2024). Facilitators and Barriers in Acceptance of Telemedicine Among Healthcare Providers in Pakistan : A Cross-Sectional Survey. *Digital Health*, *11*, 1–11. https://doi.org/10.1177/27550834241266413

Andi Sri Adinda, N. J. (2025). Peran Teknologi Digital Telemedicine dalam Meningkatkan Kualitas Pelayanan Kesehatan Masyarakat. *ARDHI: Jurnal Pengabdian dalam Negri*, *3*(4), 84–93.

Ari Nissinen, Atte Pitkänen, A. B. (2025). The Climate Impacts of Healthcare Digitalization: A Scoping Review. *Digital Health*, *11*, 1–11. https://doi.org/10.1177/20552076251364666

Bakhtiar, H. S. (2022). Dikotomi Eksistensi Telemedicine Bagi Masyarakat Terpencil: Perspektif Teori Kemanfaatan. *Jurnal Paradigma: Jurnal Multidisipliner Mahasiswa Pascasarjana Indonesia*, *3*(2), 115–125.

Blocker, A., Datay, M. I., Mwangama, J., & Malila, B. (2024). Development of a Telemedicine Virtual Clinic System for Remote, Rural, and Underserved Areas Using User-Centered Design Methods. *Digital Health*, *10*, 1–4. https://doi.org/10.1177/20552076241256752

Daud, R. F., & Dewi, W. N. (2024). Transformation of Print Media to Digital Media in Facing the Era of Information Technology. *Arrus: Journal of Social Sciences and Humanities*, *4*(6), 663–667.

Fafirra Lailfasha, Misnaniarti, R. A. S. (2025). Penerapan Telemedicine di Fasilitas Kesehatan Tingkat Pertama (FKTP) Indonesia. Literature Review. *Cendekia Utama Jurnal Keperawatan dan Kesehatan Masyarakat*, *14*(1), 70–80.

Febrini Damayanti, A. G. (2024). Hubungan Pemanfaatan Telemedicine dengan Peningkatan Kepuasan Pasien, Kepatuhan Pasien Berobat dan Loyalitas Pasien di Rumah Sakit. *Journal Syntax Idea*, *6*(3), 2024.

Hayati, M. (2025). Efektivitas Pelayanan Kesehatan di Daerah Terpencil Indonesia melalui Telemedisin: Review Literatur Sistematis. *MEJORA: Medical Journal Awatara*, *3*(1), 84–90. https://doi.org/10.61434/mejora.v3i1.279

Huda, R. K., Chowhan, R. S., Arora, S., & Seervi, D. (2025). Perceptions of Healthcare Workers and Patients on the Implementation of Telemedicine in Hard-to-Reach Areas: A Qualitative Study from Rajasthan, India. *Digital Health*, *11*, 1–15. https://doi.org/10.1177/20552076251331874

Izadi, R., Jafari, A., Goli, A., & Khosravi, M. (2025). Needs Assessment and Prioritization of Key Medical Specialties: A Telemedicine Roadmap Based on a Mixed-Methods Framework. *DIGITAL HEALTH*, *11*, 1–16. https://doi.org/10.1177/20552076251374215

Lelyana, N. (2024). Dampak Telemedis terhadap Akses Pelayanan Kesehatan di Masyarakat Pedesaan. *Medical Journal of Nusantara*, *3*(2), 78–89. https://doi.org/10.55080/mjn.v3i2.832

Maria, O., & Zoulias, E. (2025). Telemedicine Integration into the Greek National Health Care System: Challenges, Suggestions and Future Perspectives. *SAGE Publications Pvt. Ltd.*, *0*. https://doi.org/10.3233/SHTI250709

Pacichana-quinayaz, S. G., María, L., Vélez, R., Cano, D. S., Marina, O., Orobio, H., Ana, M., Sánchez, T., Isabel, G., Córdoba, T., & Bonilla-escobar, F. J. (2025). Telemedicine Challenges in Latin-America: Outcomes from Telerehabilitation Services During the COVID-19 Pandemic in Cali, Colombia A Retrospective Cohort Study. *Advances in Rehabilitation Science and Practice*, *14*, 1–12. https://doi.org/10.1177/27536351251375637

Siska, R. F., & Sianturi, F. A. (2025). Analisis Dampak Pemanfaatan Teknologi Telemedicine terhadap Akses Layanan Kesehatan di Daerah Terpencil. *Jurnal Kesehatan Dan Kebidanan Nusantara*, *3*(1), 24–29.

Sitanggang, A. S., Imanuel, R. G., Rapa, N. I., Shandie, W., & Halim, I. J. (2024). Multidisciplinary Science Telemedicine : Revolusi Akses dan Efisiensi Pelayanan Kesehatan di Era Digital. *Nusantara Journal of Multidisciplinary Science*, *2*(1), 12–18.

Srinivasan, Y., Andreadis, K., Ballakur, S. S., & Rameau, A. (2024). Access to Otolaryngologic Telemedicine Care Across the COVID-19 Pandemic at an Urban Tertiary Hospital System. *Ear, Nose & Throat Journal*, *103*, 76S–84S. https://doi.org/10.1177/01455613241240560

Tofure, I. R., Erwada, B. A. De, & Ukratalo, A. M. (2025). Telemedicine sebagai Media Konsultasi Layanan Kesehatan bagi Masyarakat di Wilayah Pesisir. *Jurnal Anestesi*, *3*(2016), 121–134.

Viviana, M., Yuliaty, F., & Pramarta, V. (2026). Systematic Review: Tantangan Penerapan Telemedicine dalam Peningkatan Akses Pelayanan Kesehatan Pasca Pandemi Covid-19 di Indonesia. *Jurnal Ners*, *10*(1), 1253–1260.

Wang, Q., Hu, H., & Huang, L. (2025). Legal Risks of Telemedicine in China and its Prevention. *Digital Health*, *11*, 1–11. https://doi.org/10.1177/20552076251393301