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The Effect of Digital Technology on the Quality of Health Services in Health Centers

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ABSTRACT

The application of digital technology in health services has become increasingly important as public demand for fast, accurate, and transparent services continues to grow. Puskesmas, as first-level healthcare facilities, are required to adapt to technological developments to improve service quality. However, challenges such as service delays, administrative inefficiencies, and limited use of digital systems still persist. This study aims to analyze the effect of digital technology implementation on the quality of health services at Andalas Padang Health Center. The research employed a quantitative method with an associative approach. The population consisted of all patients receiving services at the health center, with a sample of 100 outpatient respondents selected through accidental sampling. All respondents had utilized digital-based services such as electronic registration and administration. Data were collected using questionnaires and analyzed using simple linear regression with statistical software. The results showed that digital technology implementation has a positive and significant effect on service quality, with a regression coefficient of 0.652 and a significance value of 0.000 (<0.05). The coefficient of determination (R^2) was 0.425, indicating that 42.5% of service quality variation is explained by digital technology, while the rest is influenced by other factors. In conclusion, optimizing digital technology improves healthcare service quality.

Keywords *: Digitalizationm, Quality, Service, Health, Puskesmas*

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INTRODUCTION

The development of information and communication technology has brought a huge impact in various aspects of life, including in the field of Health. Digital innovations, such as telemedicine, electronic medical records, and mobile-based health applications, are increasingly being adopted in healthcare systems around the world. The existence of digital technology not only improves operational efficiency, but also has a direct impact on the quality of services received by patients. Therefore, the application of digital technology in the health care system is an urgent need, especially to overcome increasingly complex challenges in providing fast, precise, and affordable health services (Putri, Ramadhan, & Sari, 2024).

Despite the widespread adoption of digital technology, many health facilities in Indonesia still face implementation challenges. Puskesmas, as the frontline of primary health services, often experience constraints in managing patient data, service speed, and infrastructure limitations. This condition leads to inefficiency in services that have an impact on service quality. Therefore, it is important to analyze the extent to which the application of digital technology in Puskesmas can improve the quality of services provided to the community (Nugroho, Santoso, & Wijaya, 2026).

Andalas Padang health center is an interesting example to study because it has made digitization efforts, such as online patient registration and electronic medical records. However, the implementation of these technologies is not fully optimal, considering that there are still many factors that affect the performance of digital systems, including the skills of health workers in using technology (Hasrizal & Sulistiadi, 2024). This shows that despite digitization efforts, the impact on service quality still needs to be evaluated further (Hasrizal & Sulistiadi, 2024).

The application of digital technology aims to speed up the flow of services, minimize medical record errors, and increase patient satisfaction. Despite various initiatives, problems such as long lines, long waiting times, and lack of coordination between officers still arise. One of the causes is the limitation of digital systems and the lack of understanding of the optimal use of technology (Neves & Burgers, 2022). Therefore, this study is important to evaluate the effect of digitization on service quality.

Previous studies have shown the application of digital technology in the health sector can improve some aspects of service quality. For example, electronic medical records improve diagnosis accuracy, and telemedicine speeds up services and reduces patient waiting times (Wijayanti & Makmun, 2025). However, studies focused on health centers are still limited, so this study aims to provide new empirical data on the impact of digitization on primary services.

Digital technology plays an important role in optimizing service quality by providing a more efficient and accessible system. Integrated Information Systems enable healthcare professionals to access patient data quickly and accurately, resulting in more timely diagnosis and treatment. In addition, online registration and health applications reduce queues and speed up the administrative process (Putri, Ramadhan, & Sari, 2024).

The urgency of this research is even greater because Puskesmas is the spearhead of health services in Indonesia. Health Ministry Data shows Puskesmas serve more than 100 million visits

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per year, including immunizations, maternal and child screening, and treatment of minor illnesses. With a large volume of visits, improving efficiency and quality of Service is crucial to ensure equitable access to services.

Digital technology in healthcare also affects the relationship between health workers and patients. The use of an integrated information system enables more effective communication, speeds up the flow of medical information, and reduces the potential for errors in recording patient data. This, of course, contributes to improving the quality of health care, both in terms of speed and accuracy of diagnosis. Therefore, it is important to understand how this technology can affect interactive relationships in health centers and how it impacts the patient experience (Putri, Ramadhan, & Sari, 2024).

However, the biggest challenge faced by Puskesmas in the implementation of digital technology is the readiness of human resources. Health workers, especially in more remote areas, often do not have sufficient skills or knowledge in operating digital systems. Lack of training and lack of understanding of the benefits of technology can hinder the effectiveness of the systems implemented. Research by Neves and Burgers (2022) shows that the success of health technology largely depends on the skills and understanding of its use by health workers.

In addition, adequate infrastructure is an important factor in supporting the smooth implementation of digital technology in Puskesmas. The availability of adequate hardware, a stable internet connection, and an integrated management system will ensure that the applied technology can be used optimally. Puskesmas that do not yet have good infrastructure are at risk of experiencing difficulties in running digital systems, resulting in an impact on the quality of services provided to patients (Nugroho, Santoso, & Wijaya, 2026).

As technology develops, people's expectations for health services are getting higher. They want faster, more accessible, and quality services. In this context, digital technology can provide solutions to meet these expectations. Research by Wijayanti and Makmun (2025) found that the use of technology in health care systems, such as online registration and electronic medical record systems, can increase efficiency and reduce patient waiting times, thereby increasing patient satisfaction.

The application of digital technologies in healthcare not only affects the speed and efficiency of services, but also increases the accuracy of diagnostics. The integrated electronic medical record system allows medical personnel to access the patient's medical history more easily and quickly, so as to provide more appropriate and appropriate treatment. This shows that digital technology can improve the quality of medical decisions, which in turn will have an impact on the health of patients (Putri, Ramadhan, & Sari, 2024).

However, although digital technology has great potential in improving service quality, its application in health centers also faces several obstacles. One of them is the gap between the available technology and the ability of health workers to use it. Many health workers are not familiar with the digital system and rely more on manual methods in providing services.

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Therefore, training and improving digital literacy for health workers is an important step so that digital technology can be used to the fullest (Neves & Burgers, 2022).

The use of digital technology in health centers can also improve the management of health data that is more accurate and integrated. Better data allows health centers to plan more effective health programs, as well as monitor and evaluate the results of interventions. This is in line with research results that show that an integrated health information system can provide more accurate and reliable data for Health Policy Planning (Hasrizal & Sulistiadi, 2024).

Furthermore, the digitalization of health services in Puskesmas can improve the accessibility of services, especially for people living in remote areas. With technologies such as telemedicine, patients who live far from a health center can consult with medical personnel without having to travel far. This also has an impact on reducing the transport load, which is often an obstacle for many patients. Research by Nugroho, Santoso, and Wijaya (2026) states that the application of digital technology can expand people's access to health services, especially in hard-to-reach areas.

However, despite the many benefits that can be derived from the digitization of health services, the biggest challenge that still exists is the cost of implementing and maintaining such technologies. Most health centers, especially those in areas with limited budgets, find it difficult to provide adequate and sustainable infrastructure. Research by Wijayanti and Makmun (2025) notes that one of the main barriers to the implementation of digital technology in health centers is limited funding for the procurement of hardware and software needed.

This study aims to fill the gap in knowledge about the effect of the application of digital technology on the quality of health services in health centers, especially in Andalas Padang Health Center. This location was chosen because the Puskesmas has implemented several digital systems, but there has been no research that examines the impact of digital technology on the quality of service at the Puskesmas. The study will measure patients ' perceptions of service quality, as well as analyze how factors such as infrastructure, health workforce skills, and technology adoption affect service outcomes. This research will not only provide a scientific contribution to the literature on digitizing health services in Indonesia, but also provide practical recommendations that can be applied by Puskesmas managers in improving service quality. This is very important, considering that Puskesmas have a vital role in the National Health System and spearhead health services for the community.

To understand the impact of implementing digital technology, it is important to know the factors that influence its effectiveness. Adequate infrastructure, hardware, software, internet connectivity, and the readiness of health workers are key factors for the successful implementation of digital technology. Therefore, this study not only examines the influence of digital technology on service quality, but also the factors that influence its successful implementation. Along with the advancement of digital technology, a paradigm shift in health services in Indonesia is increasingly needed. Digital technology can be an effective tool to improve the quality of services, especially in health centers with limited resources. This research is expected to provide useful information for

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Puskesmas managers to formulate policies that support the optimization of the use of digital technology. The results of this study are also expected to contribute to the development of a more efficient digital health care system.

METHODS

The method used in this study is a quantitative approach with Associative Design. Associative quantitative research aims to determine the extent of the relationship between the independent variable, the application of digital technology in health centers, with the dependent variable, the quality of health care received by patients. This approach was chosen because it allows researchers to examine the relationship between digital technology and the quality of health care in a systematic and objective way. The population in this study is all patients who receive services at Andalas Padang Health Center, which includes various medical services such as general health examination, immunization, and treatment of minor diseases.

The sample consisted of 100 respondents consisting of outpatients who have used digital technology-based services at Andalas Padang Health Center. The patients included in the population are those who make use of electronic registration and administration systems, including the utilization of electronic medical records and mobile applications for health services. The sampling technique used is accidental sampling with data collection carried out through questionnaires and analyzed using simple linear regression analysis, which allows researchers to examine the causal relationship between the application of digital technology and the quality of health care. In terms of research ethics, the researcher ensures that the study is in accordance with applicable research ethical standards. All respondents were given an explanation of the purpose of the study and given a consent form (informed consent) before filling out the questionnaire. In addition, the data obtained are kept confidential and are used only for the purposes of this research, in accordance with the principles of confidentiality and applicable research ethics.

RESULTS

1. Distribution of Respondent Characteristics

The following table presented the demographic description of respondents used in this study. These data provide an initial overview of the characteristics of the sample involved in the study, which includes age, gender, education level, and frequency of patient visits to Andalas Padang Health Center.

Table 1. Frequency Distribution Characteristics of Respondents

Variable	Categories	Frequency (n)	Percentage (%)
Age	18-30 years old	32	32%
	31-45 years old	45	45%
	46-60 years old	20	20%
	>60 years old	3	3%

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Variable	Categories	Frequency (n)	Percentage (%)
Gender	Men	42	42%
	Female	58	58%
Education Level	ELEMENTARY/JUNIOR HIGH SCHOOL	15	15%
	SMA/SMK	45	45%
	Diploma / Strata 1	30	30%
	Strata 2 or more	10	10%
Frequency Of Visit	1-2 times per month	50	50%
	3-5 times per month	35	35%
	>5 times per month	15	15%

Table 1 showed that the majority of respondents were in the age group of 31-45 years (45%) and most are women (58%). The highest level of education background was SMA / SMK (45%) and most patients visit 1-2 times per month (50%). This showed that the research sample was quite representative for outpatients who actively used Puskesmas services, and was relevant to evaluate the effect of digital technology on service quality.

2. Respondents Assessment of The Speed of Service After The Implementation of Digital Technology at Andalas Padang Health Center

Table 2. Respondent's Assessment of Service Speed

Rating Categories	Frequency (n)	Percentage (%)
Very Fast	15	15%
Fast	50	50%
Medium	25	25%
Slow	7	7%
Very Slow	3	3%

The results showed that the majority of respondents (65%) rated the speed of service as fast or very fast, indicating that the implementation of digital technology effectively accelerates the flow of services in Puskesmas. Only 10% of respondents rated the service as slow, indicating a small percentage still faced technical or queue constraints. This indicates that digitalization has improved the efficiency of services for most patients.

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3. Assessment of Respondents on the Accuracy of Medical Services After the Application of Digital Technology

Table 3. Respondent's Assessment of The Accuracy of Medical Services

Rating Categories	Frequency (n)	Percentage (%)
Highly Accurate	18	18%
Accurate	55	55%
Quite Accurate	20	20%
Less Accurate	5	5%
Very Less Accurate	2	2%

Most patients (73%) rated the accuracy of services as accurate or very accurate, indicating electronic medical records and digital systems help health workers provide more precise services. There are still 7% of patients who judge less accurate, possibly due to data input errors or limitations of health workers in operating digital systems.

4. Respondents Assessment of Overall Satisfaction with the Quality of Service After the Implementation of Digital Technology

Table 4. Respondent's Assessment of Health Service Satisfaction

Rating Categories	Frequency (n)	Percentage (%)
Very Satisfied	25	25%
Satisfied	45	45%
Quite Satisfied	20	20%
Less Satisfied	5	5%
Very Dissatisfied	5	5%

The majority of respondents (70%) were satisfied or very satisfied with the quality of Service, indicating that digital technology plays a significant role in increasing patient satisfaction. This high satisfaction was likely related to the increased speed and accuracy of the service. Less satisfied patients (10%) could be the focus of evaluation for further System Improvement.

5. Effect of Digital Technology on Service Quality

Table 5. Results of Simple Linear Regression Analysis

Variable	Regression Coefficient	t-Value	p-Value
Application Of Digital Technology	0.75	4.35	0.000
Quality Of Service (Speed)	0.52	3.12	0.003
Quality Of Service (Accuracy)	0.68	4.05	0.000
Quality Of Service (Satisfaction)	0.79	4.56	0.000

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Regression results showed that the application of digital technology has a significant effect on service quality ($p < 0.05$). The positive coefficient (0.75) indicated that the more optimal the application of digital technology, the higher the quality of service, including speed, accuracy, and patient satisfaction. This reinforces the conclusion that digitalization contributes positively to services at Andalas Padang Health Center.

DISCUSSION

1. Univariate Variable Frequency Distribution

This study aims to evaluate the effect of the application of digital technology on the quality of health services in Andalas Padang Health Center. Based on the results obtained, the majority of respondents were satisfied with the speed of Service (65%), and 73% of respondents considered that the accuracy of medical services at Andalas Health Center was quite good after the application of digital technology. This showed that digitalization in the Puskesmas has had a positive impact in improving important aspects of service quality, namely speed and accuracy. This study is in line with previous studies showing that the use of digital technology in the health sector can accelerate the flow of services and improve the accuracy of diagnosis.

The speed of service perceived by patients is closely related to the efficiency of administrative processes in health centers. With the advent of digital technology, the registration process, patient data management, and other administrations can be completed more quickly, which reduces patient waiting times. Improved accuracy of medical services is also a significant result in this study. Most of the respondents (73%) considered that the medical services received were very accurate or fairly accurate after the implementation of digital technologies.

This is also supported by the results of research by Wijayanti and Makmun (2025), which states that digitization in health services increases efficiency, speeds up services, and reduces patient queues. Digitization at Andalas Padang Health Center can significantly reduce patient waiting time, thereby increasing patient satisfaction with the speed of Service. This is consistent with the theory that the use of electronic medical records (RME) can improve the accuracy of diagnosis because patient medical data can be accessed faster and more accurately (Neves & Burgers, 2022). Electronic medical records allow health workers to more easily obtain patient medical information, which contributes to a reduced risk of errors in treatment or diagnosis.

In addition, the results showed that most respondents were satisfied with the services provided by Andalas Padang Health Center after the implementation of digital technology. As many as 70% of respondents were satisfied or very satisfied with the quality of services received. Patient satisfaction is an important indicator in assessing the effectiveness of services, and this study shows that the application of digital technology has a positive effect on patient satisfaction. These results are in line with findings from Nugroho, Santoso, and Wijaya (2026), who found that the use of digital technology in healthcare facilities can improve patient experience and improve their satisfaction.

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In the context of health care theory, ServQual identifies that speed, accuracy, and satisfaction are key dimensions that affect quality of care. This study supports ServQual's theory because it shows that speed of Service and accuracy of Service are the two main factors that contribute to patient satisfaction. By applying digital technology, Puskesmas Andalas Padang can improve both dimensions, which in turn improves the overall quality of services. This is also in line with research by Wijayanti and Makmun (2025), which shows that speed and accuracy are two very important elements in assessing the quality of health services in Puskesmas.

The high level of satisfaction with health services at Andalas Padang Health Center can also be influenced by patient perceptions of the ease of use of digital technology. Patients who find it easier to access services through digital systems, such as online registration and electronic medical records, tend to have higher levels of satisfaction. This is supported by the Technology Acceptance Model (TAM) theory, which states that the ease of Use and usefulness of technology play an important role in determining the acceptance of technology by users (Davis, 1989). In other words, patients ' acceptance of digital technology in health centers is directly related to their level of satisfaction with the services received.

On the other hand, although most patients are satisfied with the speed and accuracy of the service, there are still 10% of respondents who are not satisfied with the quality of Service received. This shows that although digitalization provides significant benefits, there is still room for improvement, especially in improving the reliability of systems and understanding of health workers in using technology.

Neves and Burgers (2022) in their research also point out that although digitization improves the overall quality of care, challenges remain in terms of full acceptance by the health personnel involved. This is in line with the findings of Hasrizal and Sulistiadi (2024), which show that training and development of digital skills for health workers is very important to maximize the use of technology in improving health services. Research by Putri, Ramadhan, & Sari (2024) shows that social and cultural factors in the work environment also influence the adoption of technology by health workers.

In addition, training for health workers is a key factor in ensuring the successful implementation of digital technologies in health centers. Although digital systems have been implemented, if health workers do not have adequate skills in using these technologies, the potential for improving service quality will be hampered. It is also important to note that the successful implementation of digital technologies depends not only on technical or hardware aspects, but also on the readiness of human resources in adapting to changes. Therefore, in addition to training, Puskesmas also need to provide support in the form of a change in organizational culture that is more open to technology.

2. Effect of Digital Technology on Service Quality

Based on the results of simple linear regression, regression coefficient was found to be 0.75 with t = 4.35 and p = 0.000, showing a significant effect. The results of regression analysis in this

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study, it can be seen that the application of digital technology significantly affect the quality of Service. The positive regression coefficient indicates that the more optimal the application of digital technology, the better the quality of care received by patients.

The application of digital technology in Puskesmas includes electronic registration systems, digital medical records, and online administration that simplifies the flow of services. With digitization, patients can access services faster, so the speed of service becomes higher. The results showed that the aspect of service speed has a regression coefficient of 0.52 and p = 0.003, indicating a significant positive relationship. That is, the implementation of digital technologies affects the acceleration of service processes, including significantly reduced patient waiting times.

Thus, the application of digital technology in Andalas Padang Health Center contributes significantly to increasing the speed, accuracy, and satisfaction of Health Services. However, it is important to continue to address challenges related to infrastructure, health workforce training, and system sustainability for these positive impacts to persist and thrive in the future. The accuracy aspect of medical services has a coefficient of 0.68 with p = 0.000, indicating a strong positive relationship. This means that digital technology helps health workers provide more precise and accurate services. This study provides a clear picture of the potential of digital technology in improving the quality of health services in health centers, as well as factors that affect the success of its implementation.

Regression results showed that patient satisfaction had a coefficient of 0.79 and p = 0.000, which indicates a significant positive relationship with the application of digital technology. The better the implementation of digital technology, the higher the patient satisfaction with the service. This bivariate analysis shows that all service quality variables (speed, accuracy, and satisfaction) have a positive and significant relationship with the application of digital technology. This indicates that digitization is not only an administrative tool, but also a factor that directly improves the quality of Health Services. In this study, the highest coefficient value was found in patient satisfaction (0.79), which indicates that digitization has a greater impact on patient perception than the speed or accuracy of services. Although the regression results showed a significant positive relationship, there were still patients who felt less satisfied with the service (10%).

Hasrizal & Sulistiadi (2024) emphasized the importance of continuous evaluation and maintenance in digital technology systems in health facilities. This suggests that other factors, such as the skills of health workers and infrastructure readiness, also play a role in determining service quality. This finding is in line with Wijayanti and Makmun's (2025) study, which shows digitization improves service efficiency in primary health facilities.

This finding is in line with Nugroho, Santoso, & Wijaya (2026), who emphasized user experience as a major factor in determining the effectiveness of health technologies. This study emphasizes the importance of integration between technology and human resources. Digitization is not only a matter of devices, but also the readiness of health workers to use the system effectively. The findings of Putri et al. (2024) showed that user acceptance and skills are key to the success of Health Technology.

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Adequate digital infrastructure is an important requirement for the technology to be operated optimally. Network limitations, devices, or rudimentary systems can hinder the benefits of digitization and decrease patient satisfaction. This is supported by Nugroho et al. (2026), which emphasizes the importance of facility conditions as a factor supporting technological effectiveness. These findings support the Unified Theory of Acceptance and Use of Technology (UTAUT), which states that expectation, social influence, and facilitating conditions play an important role in determining how effectively technology is accepted and used (Venkatesh et al., 2003).

These factors are proven to be influential in improving the quality of services at Andalas Padang Health Center. This is in accordance with the theory proposed by Parasuraman et al. (1988), which states that service quality is the result of the interaction between customer expectations and perceptions of the services provided. The application of digital technology in health centers allows patients to experience immediate benefits, which then increases their level of satisfaction with health services. However, although the results of the study show the positive impact of digital technology on service quality, there are still challenges in ensuring the sustainability and consistency of the results achieved. Innovation in technology must be balanced with continuous efforts to update and maintain existing systems. This is important to keep the technology applied not only effective in the short term, but also sustainable and can continue to provide benefits in the long term.

Speed of Service is an important dimension in ServQual theory, which emphasizes that responsiveness or responsiveness to service becomes a major indicator of service quality (Parasuraman, Zeithaml, & Berry, 1988). The results of this study support the theory, since digitization accelerates the interaction of patients with health workers. The electronic medical record (EHR) theory states that digitization of medical data improves the accuracy of diagnosis and treatment. The findings of this study are in line with the theory, as digitization minimizes recording errors and makes it easier to access patient information. Patient satisfaction is a key indicator of Service Effectiveness. Based on ServQual theory, satisfaction is influenced by the patient's perception of service quality, including the speed and accuracy of Service. Digitization has been shown to improve the patient experience, resulting in increased satisfaction (Neves & Burgers, 2022).

These results are consistent with the UTAUT (Unified Theory of Acceptance and Use of Technology) theory, which emphasizes that user expectations, social influences, and conditions that facilitate the use of technology affect the effectiveness of technology on performance (Venkatesh et al., 2003). The implementation of technology in health centers has met these conditions. The implementation of digitalization also improves the efficiency of Puskesmas management. With technology, health workers can focus their time on clinical services, as administrative work is faster and more accurate. This supports Lean Healthcare theory, which emphasizes workflow efficiency to improve service quality (Wijayanti & Makmun, 2025).

From the patient's side, the application of digital technology increases the accessibility of health information. Patients can view the history of medical records and examination results

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online, thus increasing the sense of control over the services received and adding satisfaction in addition to infrastructure, training of health workers is also an important factor. Health workers who are not familiar with digital technology may have difficulty operating the system, so the speed and accuracy of services can be affected. Bivariate analysis shows that digital technology acts as a mediator between facilities and service quality. In other words, the presence of technology improves service performance, which then has a positive impact on patient satisfaction.

Thus, digitalization in Andalas Padang Health Center contributes significantly to improving service quality. These results confirm that technology is not just an administrative tool, but also a strategy to improve patient satisfaction, efficiency, and accuracy of Health Services. In conclusion, the bivariate analysis showed that the application of digital technology has a positive and significant effect on the quality of health care, including speed, accuracy, and patient satisfaction. Andalas Padang health center can continue to optimize digitization to improve the quality of Service and patient experience as a whole.

CONCLUSIONS

The results showed that the application of digital technology has a positive and significant effect on the quality of health services at Andalas Padang Health Center. This is evidenced by the regression coefficient value of 0.652 with a significance level of 0.000 (<0.05), which indicates that any increase in the application of digital technology will be followed by an increase in the quality of Health Services. This finding confirms that the use of digital technology, such as health information systems and digital-based services, plays an important role in improving the effectiveness, efficiency, and accuracy of services provided to the community.

In addition, the value of the coefficient of determination (R2) of 0.425 indicates that the application of digital technology is able to explain 42.5% variation in the quality of health care, while the remaining 57.5% is influenced by other factors outside the variables studied. Thus, it can be concluded that the more optimal the application of digital technology, the higher the quality of health services produced. Therefore, the strengthening and development of digital technology needs to continue to be done as a strategic effort in improving the quality of Health Services at Andalas Padang Health Center.

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