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Evaluation of the Implementation of the Puskesmas Management Information System (SIMPUS) on Primary Health Care Efficiency

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ABSTRACT

The implementation of health information systems is crucial to enhancing efficiency in primary health care centers, yet systems like the Puskesmas Management Information System (SIMPUS) are not fully optimized in many Indonesian health centers. Ideally, SIMPUS should enable faster, more accurate, and integrated services, but inefficiencies persist. This study evaluated SIMPUS implementation and its effect on service efficiency in several Puskesmas in Padang City, Indonesia. A cross-sectional descriptive quantitative study was conducted using a structured questionnaire based on the Human-Organization-Technology Fit (HOT-Fit) framework and the Technology Acceptance Model (TAM). Eighty health workers with varying roles and SIMPUS usage experience participated. Descriptive statistics assessed respondent characteristics and perceptions of service effectiveness. Results showed that among 40 respondents, 37 (92.5%) who rated SIMPUS highly (score >4.0) also reported high satisfaction with service effectiveness. Chi-Square and simple linear regression analyses found a significant relationship between system perception and service efficiency. Higher perceived efficiency was noted among users with over two years of experience, administrative and medical record staff, and female health workers. These findings highlight the gap between SIMPUS's potential and actual outcomes, emphasizing the need for technological readiness, continuous training, system updates, and committed leadership to advance digital transformation in primary health care.

Keywords: *Puskesmas Management Information System, Primary Health Care Efficiency, Digital Health Transformation*

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INTRODUCTION

Primary health care is the main pillar and strategic entry point in the national health system. With its function as a gatekeeper, PHC ensures equitable access to services that are promotive and preventive in nature, and supports the efficiency of health financing. Strengthening primary health care is crucial to achieving a healthy society, a resilient health system, and the achievement of national health development goals (Zahrina et al., 2024).

The transformation of public services through the use of information technology in the health sector has become an urgent need in the current era of digitalisation. This is driven by the need to improve the efficiency, quality, and access to health services for the community in a faster and more integrated manner (Palapessy & Susanti, 2025). Information technology is believed to be capable of improving efficiency, accuracy, and transparency in services, while accelerating data-driven decision-making.

One concrete example of digital transformation in primary healthcare services in Indonesia is the implementation of the Community Health Centre Management Information System (SIMPUS). SIMPUS is designed to support administrative processes, record-keeping, reporting, and data management at community health centres. With this system, processes that were previously done manually can be converted to digital, which is expected to improve operational efficiency and the quality of services provided to the community.

When compared quantitatively, field study data shows that the use of SIMPUS reduces the average time for patient administrative services from 12–15 minutes (manually) to just 5–7 minutes per patient with the digital system. Additionally, data recording errors decreased by 45%, and the monthly report compilation process, which typically took 3–5 days manually, can now be completed in 1 working day with SIMPUS. These advantages not only impact time efficiency but also reduce staff workload, improve data accuracy, and accelerate service decision-making (Fadia et al., 2025; Darmawan et al., 2024).

Several studies support that the implementation of SIMPUS provides positive benefits for service efficiency. A study by Fadia et al. (2025) showed a significant correlation between the use of SIMPUS and improvements in information quality and user satisfaction at the Pademangan Sub-District Health Centre. Similarly, Darmawan et al. (2024) noted that SIMPUS significantly facilitates staff operations, particularly in health data processing. Health administrators reported that it is easier to track patient histories, manage medicine stocks, and prepare routine reports compared to manual methods, which tend to be time-consuming and prone to errors.

However, challenges in implementing SIMPUS remain quite complex. Issues such as limited internet connectivity, insufficient training for healthcare staff, and resistance to technological changes often hinder the optimal use of the system (Turistiati & Lenggana, 2021). Similar obstacles were also identified by Noor et al. (2024) at the Setabelan Community Health Centre, where network instability and insufficient socialisation led to low SIMPUS effectiveness.

The effectiveness of SIMPUS implementation can be evaluated using theoretical approaches such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). These models help measure the extent to which users' perceptions of the ease

and benefits of using the system influence their long-term intentions and behaviour (Nurfaizal & Wahyudi, 2022).

Unfortunately, despite the benefits of SIMPUS being felt, there are still few systematic studies evaluating SIMPUS's contribution to the overall efficiency of primary healthcare services. An integrative evaluation, which measures both technical and non-technical aspects such as user perceptions and organisational impacts, is essential to obtain an objective picture of the system's effectiveness.

A study by Alfiansyah et al. (2024) at the Ajung Community Health Centre highlighted that SIMPUS has not been fully optimised because it has never been thoroughly evaluated, resulting in many important features not being utilised to their full potential and high data security risks.

Based on these issues, there is an urgent need to evaluate the implementation of SIMPUS, focusing on service efficiency. This evaluation is important to identify the extent to which SIMPUS plays a role in speeding up services, reducing waiting times, improving data accuracy, and promoting user and patient satisfaction.

Thus, this study aims to evaluate the implementation of the Community Health Centre Management Information System (SIMPUS) on the efficiency of primary health care services. The results of this evaluation are expected to provide constructive input for policy makers and community health centre managers in optimising the role of information technology for better, faster, and more efficient health services.

METHODS

This study uses a descriptive quantitative approach with a cross-sectional design, which aims to evaluate the implementation of the Community Health Centre Management Information System (SIMPUS) and analyse its impact on the efficiency of primary health care services. This approach was chosen because it provides a comprehensive picture of the actual implementation of SIMPUS and the level of service efficiency within a specific period of time, making it relevant for assessing the relationship between the two simultaneously. The study was conducted at several Puskesmas in the city of Padang that have implemented SIMPUS for at least one year. These locations were chosen because they reflect the diversity of information system implementation conditions at the primary care facility level. The study is planned to take place from January to March 2025.

The population in this study consists of all health workers at Puskesmas who actively use SIMPUS in their daily service activities, such as doctors, nurses, midwives, administrative staff, and medical record staff. The sample was selected using purposive sampling, with 80 respondents meeting the inclusion criteria, namely healthcare workers who have actively used SIMPUS in the past six months and are willing to participate in the study. The data used in this study includes primary and secondary data. Primary data was obtained through the distribution of questionnaires to respondents, while secondary data was obtained through a review of internal Puskesmas documents, such as reports on service waiting times, patient data input speed, and the number of patient visits before and after the implementation of SIMPUS. The combination of these two types

of data was intended to objectively measure the dimensions of SIMPUS implementation and service efficiency.

The main instrument in this study was a questionnaire developed based on the *Technology Acceptance Model* (TAM) theoretical framework and the *Human-Organisation-Technology Fit* (HOT-Fit) model. The instrument includes a number of indicators, namely perceived usefulness, perceived ease of use, system quality, information quality, service quality, user satisfaction, and perceived service efficiency. Service efficiency is measured based on respondents' perceptions of data access speed, reduction in administrative work time, and increased work productivity. Before being widely used, the questionnaire was tested for validity and reliability through a pilot study involving 20 healthcare workers from two community health centres with similar characteristics but not included in the main research location. The validity test results showed that all statement items had correlation values (calculated r) greater than the table r (0.444), thus deemed valid. The reliability test yielded a *Cronbach's Alpha* value of 0.873, indicating that the instrument has high internal consistency and is reliable.

Data collection was conducted through two main methods: distributing questionnaires directly and online to respondents who met the inclusion criteria, and conducting limited interviews with several key informants, such as health centre heads and IT officers. These interviews aimed to enrich contextual understanding regarding the implementation of SIMPUS. Additionally, document review was conducted to strengthen quantitative results with objective data available at the health centre management unit. All collected data were analysed using descriptive statistics to describe respondent characteristics and the mean values of each variable. Furthermore, inferential statistical analyses such as the Chi-Square test and simple linear regression were conducted to test the relationship between SIMPUS implementation variables and service efficiency. Data analysis was performed using the latest version of SPSS software.

In conducting this research, all stages followed the principles of research ethics. This study has undergone an ethical review process conducted by the Health Research Ethics Committee of the Faculty of Public Health, Andalas University, and was deemed ethically acceptable to conduct, as stated in the ethical approval letter with the number to be included at the time of final publication. Additionally, the researcher obtained written permission from the Community Health Centre and the Padang City Health Office. Each participant was provided with an explanation of the purpose and benefits of the research and was asked to provide written consent before participating. The confidentiality of the respondents' identities and institutions was fully maintained during and after the research process.

RESULTS

This study aimed to evaluate the implementation of the Puskesmas Management Information System (SIMPUS) and the extent to which it contributes to the efficiency of primary health care in several Puskesmas in Padang City. Data were collected from 80 health workers with various professional backgrounds and length of SIMPUS use, through a questionnaire based on the *Technology Acceptance Model* (TAM) framework and the HOT-Fit *model*.

Analyses were conducted using a descriptive statistical approach to describe respondents' characteristics and their perceptions of service efficiency as influenced by SIMPUS. Furthermore, inferential testing was conducted to see the relationship between perceptions of SIMPUS implementation and service efficiency using the Chi-Square test and simple linear regression.

The following table shows the distribution of perceived service efficiency based on respondents' characteristics and analyses of the relationship between the main variables studied.

Table 1. Distribution of Perceived Service Efficiency Based on Respondent Characteristics

Respondent Characteristics	Category	n	Percentage (%)	Average Efficiency Score
Gender	Male	30	37,5	4,10
	Female	50	62,5	4,22
Profession	Doctor	10	12,5	4,15
	Nurse	30	37,5	4,25
	Midwife	20	25,0	4,30
	Administrative Personnel	15	18,75	4,35
	Medical Records Officer	5	6,25	4,40
Length of SIMPUS use	< 1 year	20	25,0	3,95
	1-2 years	40	50,0	4,25
	> 2 years	20	25,0	4,30

This table shows how perceived service efficiency varies by gender, profession, and length of SIMPUS use. Of the 80 respondents, the majority were women (62.5%), and this group recorded a mean service efficiency score of 4.22, slightly higher than men (4.10). This indicates that women tend to adapt more quickly and positively to the use of technology in health services.

By profession, medical record officers had the highest efficiency score (4.40), followed by administrative staff (4.35), midwives (4.30), and nurses (4.25). This suggests that occupations that are closely related to recording and managing data experience the greatest efficiency impact from SIMPUS implementation.

Furthermore, the length of SIMPUS use also influenced perceptions of efficiency. Respondents who had been using the system for more than 2 years had an average efficiency score of 4.30, higher than those who had been using it for less than 1 year (3.95). This finding supports the notion that adaptation to information technology systems takes time, and that long-term utilisation has a more tangible impact on efficiency.

Overall, this table confirms that SIMPUS implementation was positively perceived to improve service efficiency, especially in user groups with intensive exposure to technology and longer periods of use.

Table 2. Chi-Square Test: Relationship Between Perceived Benefits of SIMPUS and Service Efficiency

Perceived benefits of SIMPUS	Low Efficiency (≤3.5)	High Efficiency (>3.5)	Total	*p-value*
Low (Score ≤3.5)	12	8	20	0,000086
Medium (Score 3.6-4.0)	6	14	20	
High (Score >4.0)	3	37	40	
Total	21	59	80	

Table 2 presents the results of the Chi-Square test that examined the relationship between the level of perceived usefulness of SIMPUS and the efficiency of health services. The data shows that of the 40 respondents with high perceived benefits (score >4.0), 37 (92.5%) also had high perceived service efficiency. In contrast, of the 20 respondents with low perceived benefits (score ≤3.5), only 8 (40%) reported high efficiency.

Statistical analysis yielded a Chi-Square value of 18.65 with degrees of freedom (df) = 2 and a p-value of 0.000086. Since the p-value is much smaller than the significance level of 0.05, it can be concluded that there is a statistically significant relationship between perceived benefits of SIMPUS and perceived efficiency of service.

In other words, the higher health workers' perceptions of SIMPUS' benefits-such as speeding up work, helping with reporting, and making it easier to find data-the more likely they are to perceive increased efficiency in their daily services.

This result is consistent with the *Technology Acceptance Model* (TAM) framework, which states that perceived usefulness is a major factor in influencing the acceptance and use of information systems. The perceived usefulness of SIMPUS directly impacts on a more efficient work experience in primary care.

DISCUSSION

1. Distribution of Perceived Service Efficiency Based on Respondent Characteristics

The results showed that the perception of service efficiency due to the use of SIMPUS was higher among female health workers, administrative and medical record officers, and users with more than two years of experience. This indicates that the factors of experience and job relevance to the system greatly influence perceptions of efficiency.

In theory, this supports that in both TAM and HOT-Fit, perceived usefulness and system quality are key factors in determining technology adoption and its perceived impact on work efficiency. Useful and quality systems not only increase the desire to adopt, but also encourage increased productivity and user job satisfaction (Anastasya & Rohman, 2021).

Previous research that supports, among others, a study by (Gita et al., 2023) states The results of the gap analysis revealed variations in satisfaction levels among the dimensions measured. Health workers show high levels of satisfaction in several dimensions. *The Efficiency dimension* recorded a positive average gap value of 0.01, indicating that users' perceptions of the ease of access to SIMPUS and the relevance of the information provided exceeded their expectations. The Fulfillment

dimension also shows good satisfaction with an average gap value of 0.00, indicating that the services provided by SIMPUS, especially regarding timeliness, are in accordance with user expectations and (Sevtiyani & Fatikasari, 2020), which states Of the five EUCS variables, only format and timeliness have a significant effect on user satisfaction with the DGS system at Puskesmas Banguntapan II. Improvements in the appearance of an attractive interface and the speed of the system in providing user needs are expected to increase user satisfaction and the quality of Puskesmas services.

However, there are also studies that are not in line with the results of this study. Research by (Muhtaddin, 2022) found that the limited number and quality of human resources that did not match the educational background hindered the optimisation of SIMPUS in improving work efficiency. The same thing was revealed by (Sholihah et al., 2022), who stated that low user readiness caused SIMPUS to hamper services.

The researcher's assumption of this result is that differences in efficiency perceptions are caused by variations in the level of interaction between users and the system. Professions such as medical records and administration officers have more intense expectations and interactions with SIMPUS, so they tend to recognise its benefits more quickly. In contrast, medical personnel who are more focused on clinical aspects may not experience a significant increase in efficiency because most of their work still relies on direct services, not information systems. In addition, the duration of SIMPUS use also shapes the pattern of adaptation and deep understanding of system features. Users with a longer usage period are more likely to experience a repetitive and accumulated learning process, which ultimately improves operational skills and work efficiency. Therefore, the role of ongoing training and technical support is also assumed to be very important to ensure that all users-regardless of their professional background-can achieve maximum efficiency benefits from SIMPUS.

2. Relationship between perceived benefits of SIMPUS and service efficiency

Table 2 shows a significant relationship between perceived usefulness of SIMPUS and service efficiency ($p = 0.000086$). Respondents who rated SIMPUS as very useful tended to also rate services as more efficient.

This finding supports that based on TAM, perceived usefulness has a significant influence on behavioural intention to use technology. This means that the higher a person's perception of the benefits of technology, the greater the desire to use it in daily activities (Elisabeth & Hanani, 2025). Users who find the system helpful tend to use it more actively and efficiently.

Some supporting research includes (Nurfaizal & Wahyudi, 2022) stating that this study analyses the acceptance of the BPJS Health P-Care system at Puskesmas Banyumas using the TAM model, finding that complexity and ease of use significantly affect perceived benefits and attitudes of use. Voluntariness and perceived benefits drive behavioural intentions, which together with perceived benefits determine actual use. Interestingly, initial complexity increases voluntariness with adaptation. In conclusion, these factors are crucial in driving sustainable adoption of P-Care by healthcare workers.

Research by Darmawan et al., 2024 examined the use of SIMPUS in North Jakarta Puskesmas using the UTAUT method, involving 121 respondents. The results show that *Performance Expectancy* has the highest percentage in the good category (95.9%), indicating that SIMPUS is very helpful for operational activities of officers. *Effort Expectancy* was also high (94.2%), indicating ease of use. Although *Social Influence* and *Facilitating Conditions* were also rated as good (84.3% and 85.1%), there was a small proportion of respondents who felt less influenced or constrained by facilities. Overall, Performance Expectancy is a key indicator showing that SIMPUS is highly effective in supporting staff operational activities, although there is still room for improvement in the social and facilitating aspects, emphasising that belief in the benefits of SIMPUS drives work efficiency and motivation (Darmawan et al., 2024).

However, there is also evidence that does not support this relationship. Research by (Putri et al., 2023) showed that although users realised the benefits of SIMPUS, poor training led to inefficiencies and implementation failure. Similarly, a study by (Turistiati & Lenggana, 2021) found that limited internet network and human resources meant that the benefits of SIMPUS could not be maximised.

The researcher's assumption in interpreting these results is that perceived benefits of information systems such as SIMPUS are psychological constructs that can encourage use, but the realisation of these benefits remains dependent on external factors. Factors such as technological infrastructure, technical training, and organisational readiness determine whether perceived benefits can actually be translated into service efficiency. Researchers also believe that high perceived benefits serve as a motivational catalyst, but if they are not matched by ease of access, system stability, and user support, then these benefits become "potential" that is not always realised. Therefore, SIMPUS can only provide optimal efficiency if it is accompanied by organisational readiness and continuous improvement in its technical implementation.

The importance of data quality and system coordination in health information systems is further emphasized by experiences from other health programs in Indonesia. Research by (Putra & Pradnyani., 2022) on tuberculosis information systems in Denpasar City revealed significant data discrepancies between the Tuberculosis Information System (SITB) and National Health Insurance (JKN) systems, with 85% of private clinics showing recording differences averaging 29.1%. Their study found that poor data integration not only affected case detection accuracy but also negatively influenced treatment outcomes, where JKN ownership paradoxically reduced treatment success rates (OR 0.545, p=0.009) due to inadequate coordination between systems and recording mechanisms. This finding parallels our SIMPUS research, suggesting that perceived usefulness of information systems, while crucial for user acceptance as demonstrated by our TAM analysis, must be supported by robust data management infrastructure and inter-system coordination to achieve sustainable efficiency improvements. The call for data consolidation and system interoperability in tuberculosis program management reinforces our recommendation that SIMPUS implementation requires not only technological readiness and user training, but also comprehensive strategies for data quality assurance and coordinated management across different health information platforms.

CONCLUSIONS

Based on the results of the study, it can be concluded that the implementation of the Puskesmas Management Information System (SIMPUS) has a significant contribution to improving the perceived efficiency of primary health care services at Puskesmas. This perceived efficiency was found to be higher among health workers with professional backgrounds in administration and medical records, as well as those who have been using SIMPUS for more than two years. This suggests that experience and familiarity with the information system influence the optimisation of SIMPUS utilisation in daily operations. In addition, there is a highly significant relationship between the perceived usefulness of SIMPUS and service efficiency, which corroborates the Technology Acceptance Model (TAM) theory that perceived usefulness is the main driver of system usage behaviour.

However, not all literature absolutely supports these findings. Some previous studies have shown that constraints such as infrastructure limitations, lack of training, and low user readiness can hinder the achievement of efficiency even though users have high perceived benefits of SIMPUS. Therefore, efficiency is not only dependent on individual perceptions, but also largely determined by organisational, technical, and other supporting environmental factors. This study implies that the success of SIMPUS in improving service efficiency will be optimised when supported by a comprehensive implementation strategy, including continuous training, system updates, and managerial commitment to digital transformation at the primary healthcare level.

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