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Original Research Article

THE PRACTICALITY, EFFICIENCY, POSITIVE IMPACT AND EFFECTIVENESS OF THE "MIDWIFERY MANAGER" MANAGEMENT INFORMATION SYSTEM IN IMPROVING THE QUALITY OF MIDWIFERY SERVICES AT THE MIDWIFERY'S INDEPENDENT PRACTICE PLACE BANDUNG

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ABSTRACT

Introduction. Health transformation in the digital era has brought fundamental changes in health services, including midwifery. About 80% of Midwife Independent Practices in Bandung City still use manual records. The management information system for Midwife Independent Practices, named "Midwifery Manager", is one of the innovations in the health sector. This study aims to analyze the increase in practicality, efficiency, positive impact, and effectiveness of the "Midwifery Manager" Management Information System in improving the quality of midwifery services at the place of practice of independent midwives. **Method.** The research was quantitative, with a pre-experimental design in the form of a pre-test and post-test design. The target population in this study were all midwives who had independent practice places in the Bandung City Region, which were 300 TPMB. The sampling technique in this study used proportionate random sampling, which amounted to 40 respondents. The data analysis techniques used are normality test, Wilcoxon test, and chi-square test. **Result & Analysis.** The results showed an increase in practicality, efficiency, positive impact, and effectiveness of the quality of midwifery services after the use of "Midwifery Manager", respectively with a value of p 0.000; p 0.000; p 0.00; and p 0.001 (<0.05) in the independent practice of midwives. **Discussion.** Using the Management Information System "Midwifery Manager" increases the practicality, efficiency, positive impact, and effectiveness of midwifery service quality, and effectiveness of midwifery service quality in the independent practice of midwives in the Bandung City area.

Keywords: Efficiency, Effectiveness, "Midwifery Manager", Midwife Independent Practice Place, Positive Impact, Practicality, Quality of Midwifery Services**.**

INTRODUCTION

Health transformation in the digital era has brought fundamental changes in health services, including midwifery. The six pillars of health transformation are a program from the Indonesian Ministry of Health, an initiative to carry out change activities. This program includes six transformation types: Primary Service Transformation, Referral Services, Health Resilience System, Health Financing System, Health Human Resources, and Health Technology. The sixth and last pillar of health technology transformation in Indonesia is responsible for implementing information technology and biotechnology related to health. It is stated in the policy document of the Ministry of Health of the Republic of Indonesia in 2021 (Kepala Pusat Sistem dan Strategi Kesehatan Kemenkes RI, 2022).

The recording and reporting that health facilities must carry out is closely related to advances in health technology, primarily through electronic medical records and health information systems. Thus, transforming health technology, primarily through health information systems and electronic medical records, provides a more efficient, accurate, and structured way to record and report health data. Along with technological developments, the government and health institutions have issued regulations on using electronic medical records. It positively impacts the quality of patient care, data management, and compliance with health regulations (Kementerian Kesehatan RI, 2022). One of the health service facilities targeted by this regulation is to require midwives to make more structured records and reports. This regulation also requires midwives to make more structured records and reports to improve data management, transparency, and the quality of midwifery services.

The negative impact of poor record keeping and reporting in midwifery practice can be very detrimental. Inaccurate and incomplete data can hinder midwives' proper decision-making, reduce transparency in patient care, and potentially threaten patient safety. In addition, violations of regulations on electronic medical records can also face serious legal consequences for midwives' independent practice. Kusuma et al.'s research on Si-Bidan: The test results show that the Maternal and Child Health Information system can meet the needs of midwives and mothers. The system has integrated web applications for midwives and mobile applications for parents (Kusuma *et al.*, 2019).

System development can be continued by adding consultation features such as direct Q&A and chat forums, schedule reminder notifications, and queue registration via smartphone (Kusuma *et al.*, 2019). Another study in Sri Lanka by Rodrigo et al. developed an electronic Health Information Management System (HIMS) to assist midwives in the public health sector (Rodrigo *et al.*, 2013). The HIMS system was designed to receive data from Public Health Midwives (PHMs) and generate reports that could be used by the PHMs themselves and their supervisors. A group of 16 PHMs piloted the Health Information Management system (HIMS) in a remote area, all given laptops and the necessary training. They began to enter historical data from the register into the system independently. Nearly 10,000 public health records were generated in the first three months. In a subsequent survey, all health centres gave positive responses indicating they were happy with the pilot project and wanted to continue using it to improve their services. This system is a practical solution for PHM fieldwork in Sri Lanka. The knowledge gained from this study will be helpful in future e-health implementation in the public health sector in Sri Lank (Rodrigo *et al.*, 2013).

The application used by the Independent Midwife Practice Place (TPMB) is an application for Delima midwives called the ODELIA application. The Indonesian Midwives Association (IBI) initiated the development of the Delima Midwife Online (ODELIA) application, which provides an immunization recording menu. Based on the material presented by representatives from IBI during the online focus group discussion (FGD) with developers on October 13, 2022, the ODELIA application consists of 3 modules: Tele-Delima, Tele-Bidan, and Tele-Konsul. Tele-Delima is used by Delima Midwives and supervisors/facilitators at the Independent Midwife Practice Place (TPMB) and staff at the Delima Midwife Implementation Unit (UPBD), both branches and centres, for the issuance of Online KTA, Delima Midwife Certification, e-Certificate of Learning Courses, and Delima Midwife Operational Reports. Tele-Bidan is used by Non-Delima Midwives at TPMB to carry out online referrals and record medical records. Tele-Consul is a module provided for patients and students to obtain journals, general information, and service and advocacy data. Immunization recording and reporting follow the draft of the reporting recording from the health centre, and ODELIA will prepare the Application Programming Interface (API) to be integrated with ASIK later. Currently, the ODELIA application is only available in the website version, which can be accessed

via the following link: http://www.bidan-delima.org.

There are different features from the Management Information System section developed by researchers with existing systems, namely the notification/notification feature for patient re-visit, the notification feature for high-risk patients, and financial management. We all know that the budget is one of the essential documents in health services and is a central document in the planning and control cycle. The budget not only functions as a planning document that identifies the income and resources needed to achieve its goals and objectives but also as a control document that allows for monitoring the actual income generated and its use against what is planned. Budgeting is a planning and control framework with several steps and processes. How and when budgeting will depend on the organization's external and internal evaluations and strategic perspectives. For example, the same hospital may spend its budget on staff and personnel training and development, which means budgeting for human resources, while another hospital may spend its budget on technology, services, management, emergencies, electricity, or hospital cleanliness (Mohamed, 2017).

A preliminary study has been conducted on 10 TPMBs. One TPMB has used a management information system when providing services, but the features used are not as complete as those in "Midwifery Manager." Nine TPMBs still provide services manually, which impacts recording and reporting at the TPMB.

In response to this, the researcher designed an innovation in the form of a website-based management information system application that can be applied in the management of the Independent Midwife Practice Place (TPMB) called the "Midwifery Manager" to help and facilitate every recording and reporting carried out, midwives need the right information system. Through this study, the researcher intends to dig deeper to understand the practicality, efficiency, positive impact, and effectiveness of the "Midwifery Manager" management information system in improving the quality of midwifery services at the independent midwife practice places in the Bandung City Area.

1.2. Research Objectives

1. valuate the practicality of the "Midwifery Manager" management information system at the Independent Midwife Practice Center (TPMB) in Bandung City.
2. Evaluate the efficiency of implementing the "Midwifery Manager" management

information system at the Independent Midwife Practice Center (TPMB) in Bandung City.

3. Evaluate the positive impact of implementing the "Midwifery Manager" management information system at the Independent Midwife Practice Center (TPMB) in Bandung City.
4. Determine the effectiveness of using the "Midwifery Manager" management information system to improve the quality of midwifery services at the Independent Midwife Practice Center in Bandung City.

METHOD AND ANALYSIS

The research method used is quantitative research with a pre-experimental design in the form of a pretest and posttest design. This research was conducted from February to April 2024. This study's target population was all midwives with independent practices in the Bandung City area, 300 TPMB. The sampling technique in this study used proportionate random sampling, a total of 40 respondents. Data analysis was carried out after conducting a data normality test. The data analysis techniques used were the normality test, the Wilcoxon test, and the Chi-square test.

RESULT

1) Respondent Characteristic

Table 1. Characteristics of TPMB in Bandung City Area in 2023

Age and Education of Midwives (Years)	**N=40**	**Percentage (%)**
Midwife age		
18–40	23	58
>40	17	42
Midwife education		
D3	29	73
D4/S1	11	27
S2	0	0

*Frequency Distribution

Table 2. Frequency Distribution of Use of "Midwifery Manager"

"Midwifery Manager"	**N=40**	**Percentage (%)**
Never	0	0
Sometimes	6	15
Often	9	22
Always	25	63

Based on Table 1 most respondents midwife age at 18-40 years (58%) with D3 education basic (29%). Based on Table 2, most respondents always use "Midwifery Manager" as many as 25 respondents (63%).

Based on Table 3, it was found that most respondents stated that practicality before using "Midwifery Manager" was in the moderate category which was 17

respondents. Efficiency Before using "Midwifery Manager" in the reasonably efficient category, which was 21 respondents.

Table 3 Distribution of Practicality, Efficiency, Positive Impact, and Effectiveness Before and After Using "Midwifery Manager"

Variable	Before	P Value	After	P Value
Practicality				
Not practical	0	0.189*	0	0.000*
Less practical	9		0	
Medium	17		4	
Practical	7		9	
Very practical	7		27	
Efficiency				
Not efficient	1	0.000*	0	0.002*
Less efficient	6		0	
Quite efficient	21		4	
Efficient	5		8	
Very efficient	7		28	
Positive impact				
Not satisfied	3	0.043*	0	0.000*
Quite satisfied	3		0	
Satisfied	18		18	
Very satisfied	16		22	
Effectiveness				
Effective	18	0.585*	32	0.000*
Ineffective	22		8	

*Normality Test (Shapiro Wilk)

Positive impact before using "Midwifery Manager" in the satisfied category, which was 18 respondents; Effectiveness before using "Midwifery Manager" in the ineffective category, which was 22 respondents.

Most respondents stated that practicality after using "Midwifery Manager" was in the efficient category of 27 respondents. Efficiency after using "Midwifery Manager" was in the very efficient category, while 28 respondents had a positive impact after using "Midwifery Manager" in the very satisfied category, which was 22 respondents. Effectiveness after using "Midwifery Manager" was in the practical category of 32 respondents.

The table shows the distribution of data in the study is usually distributed for the variables of practicality effectiveness before the use of "Midwifery Manager" with a p-value > 0.05 (0.189; 0.585), while for the variable of efficiency, positive impact before the use of "Midwifery manager" has an abnormal data distribution with a p-value < 0.05 (0.043; 0.002). The variables of practicality, efficiency, positive impact, and effectiveness after the use of "Midwifery Manager" have an abnormal data distribution with a p-value < 0.05 (0.000; 0.000; 0.002; 0.000). Based on the results of the data normality test, some

data are not normally distributed, so the test used is the Wilcoxon test.

2) Bivariate Analysis

Table 4. Practicality of the Management Information System for Independent Midwife Practices (TPMB) "Midwifery Manager" in the City of Bandung

Variables	n	Mean±SD	P* Value
Practicality of management information system before using "Midwifery manager"	40	61.85±21	0,000
Practicality of management information system after using "Midwifery manager"		90±12.8	

*Wilcoxon Test

Based on Table 4. there is an increase in the average practicality after using the "Midwifery Manager," which is 61.85 to 90 with a p-value of 0.000 (p <0.05), so it can be concluded that "there is a difference in practicality before and after using the "Midwifery Manager". Based on Table 5, there is an increase in the average efficiency after the use of "Midwifery Manager," which is 63.5 to 89.8 with a p-value of 0.000 (p <0.05), so it can be concluded that "there is a difference in efficiency before and after the use of "Midwifery Manager".

Table 5. Efficiency of Implementation of the Management Information System for Independent Midwife Practices (TPMB) "Midwifery Manager" in the City of Bandung (N=40)

Variables	Mean±SD	P-Value
Efficiency of management information system before using "Midwifery manager"	63.5±18.95	0.000*
Efficiency of management information system after using "Midwifery manager"	89.8±13.05	

*Wilcoxon Test

Table 6. Positive Impacts in Improving the Quality of Midwifery Services at Independent Midwife Practices (TPMB) "Midwifery Manager" in the City of Bandung

Variable	n	Mean±SD	P-Value
Positive Impact in improving the quality of midwifery services before the use of "Midwifery Manager"	40	77.7±16.6	0.000
Positive Impact in improving the quality of midwifery services after the use of "Midwifery Manager"		85.4±12.0	

*Wilcoxon Test

Based on Table 6, there is an increase in the average positive impact of midwifery services on patients after the use

of the Midwifery Manager, namely 77.7 to 85.4 with a p-value of 0.000 (p <0.05), so it can be concluded that it has a positive impact on improving midwifery services before and after the use of "Midwifery Manager".

Table 7. Effectiveness of Using the "Midwifery Manager" Management Information System in Improving the Quality of Midwifery Services at Independent Midwife Practices in the City of Bandung in 2023

The Use of "Midwifery Manager"	Positive Impact in Improving the Quality of Midwifery Services					P-Value
	Very Dissatisfied	Dissatisfied	Quite Satisfied	Satisfied	Very Satisfied	
Never	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0,001
Sometimes	0 (0%)	0 (0%)	4 (80%)	1 (20%)	0 (0%)	
Often	0 (0%)	0 (0%)	1 (11,1%)	5 (55,6%)	3 (33,3%)	
Always	0 (0%)	0 (0%)	1 (4%)	10 (40%)	14 56%)	

* Chi-square test

Based on Table 7. it was found that TPMB always uses a "Midwifery manager", and most of the patients, 14 respondents (56%), said they were delighted with the services provided. The p-value obtained was 0.001 (p <0.05). Statistically, there is a relationship between the use of "Midwifery manager" and the positive impact felt by patients. So, it can be concluded that using a "Midwifery manager" effectively improves the quality of midwifery services.

DISCUSSION

1) Respondent Characteristics

The characteristics of the research subjects consist of age and education. The characteristics of the subjects' age are dominated mainly by midwives aged 18 to 40 years (Putrawan, Putri and Ariyanto, 2017), categorizing a person's age into three groups: early adulthood (18 to 40 years), late adulthood (41 to 65 years), and elderly (over 65 years). People in the early adulthood group have higher intellectual capacity and maturity than those in the late adulthood group. Thus, better proficiency, skills, and professionalism are obtained during early adulthood, which allows a person to apply and develop art, science, and technology. The prediction of conclusion-making is based on age because an individual's memory and working memory will be affected by age. A person's memory is related to their age. Adults are more likely to avoid risky conclusion choices but will also have difficulty making conclusions when information is not clearly stated.

Age is related to a person's memory of things they have remembered. Age also affects a person's ability to adapt because a person will gain more experience as they get older (Rumana, 2021). At this age, midwives are still looking for information and easily accept it. One of the external components that affects a person's knowledge is the acceptance of information (Pusida, Pati and Lambey, 2018). According to the researcher's assumption of the age of midwives in this study, the researcher used appropriate and accessible electronic media to improve the understanding of midwives, such as "Midwifery manager", which is easier to understand for the independence of midwives' memory.

Guidance given to others to understand something is called education. The higher a person's level of education, the easier it is to get information and the broader their knowledge (Ekawaty *et al.*, 2021). The results of the study show that the level of education of most midwives is D3 Midwifery. In Notoatmodjo's opinion, knowledge is influenced by a person's internal factors, one of which is formal education (Ekawaty *et al.*, 2021).

People with higher education have broader understanding, and people with lower education have lower knowledge. The low level of midwife education influences the acceptance of information. People with higher education usually act more rationally. Therefore, they are more receptive to new ideas. A person's knowledge will change by seeking and receiving much information. The researcher assumes midwives have good enough thinking skills, so following the receipt of information with the application of a "Midwifery Manager" will make it easier to accept and differentiate information according to needs.

2) Efficiency of the Implementation of the Management Information System for Independent Midwife Practices (TPMB) “Midwifery Manager” in the City of Bandung

This study found that using the Management Information System "Midwifery Manager" is more efficient in managing Independent Midwife Practices (TPMB) in the City of Bandung. Efficiency is a measure used to compare the use of planned input with the use of actual input. The more input that can be saved, the higher the level of efficiency, and the less input that can be saved, the lower the level of efficiency. This study shows that using a "Midwifery manager" causes costs, time, or energy efficiency because the service system can be provided on time and meet patient needs.

Law No. 36 of 2009 concerning Health stipulates the basis for implementing SIMRS, namely that "health information" that can be organized through an information system is needed to provide efficient and effective health services (Handayani, Tilly and Rampen, 2011). Every health facility organizer must have a health information system infrastructure that includes institutional devices, technology, and human resources. Permenkes No. 82 of 2013 stipulates the

basis for the implementation of SIMRS, which states that every hospital is required to implement and develop SIMRS.

The study's results are in line with the theory. According to Jogiyanto, the quality of information is influenced by three main factors: economical, effective, and reliable. The benefits of the information produced are more significant than the cost of obtaining it. Most information regarding benefits with a unit of value cannot be estimated, but its effectiveness can be assessed. In addition, the information produced can be trusted because it is not made up or inaccurate (Jogiyanto, 2014).

The study results align with the research conducted by Fadilla, showing that hospitals can increase the efficiency of the process and service flow by implementing SIMRS and reducing operational costs, improving performance, improving human resource capabilities, and enabling improvements in hospital organization. Three leading indicators can show increased hospital efficiency as a result of the use of SIMRS in this study, namely 1) the information system used and the complexity of health services in the hospital concerned; 2) automation of the process of realizing hospital efficiency through the use of information systems; and 3) the objectives that have been set for the development of information systems (Fadilla, 2021).

Likewise, Anggraeni and Supriyadi's research on using SIMRS in outpatient internal medicine units showed that SIMRS can increase hospital efficiency. Every year, management improves SIMRS and provides SIMRS-related training to medical personnel (Anggraeni and Supriyadi, 2019).

3) Positive Impact of Implementation of Management Information System of Independent Midwife Practice (TPMB) "Midwifery Manager" in Improving the Quality of Midwifery Services in Bandung City

This study shows that the Management Information System "Midwifery Manager" positively impacts improving the quality of midwifery services in Bandung City. This study's results align with the Theory of Reasoned Action (TRA), which defines usefulness as the level at which a person believes that their work performance can be improved by using a particular subject (Susilo, Jaenudin and Widhyaestoeti, 2022).

Based on this definition, using computers can improve the performance and work performance of individuals who use them. Benefits are measured based on the diversity of applications and frequency of use. The results show that understanding the benefits of technology can save time and energy when providing services to patients. The research survey indicates that patients are satisfied with the services provided (Putra and Kurniawati, 2019).

Information technology has two aspects that affect its benefits: 1) usefulness, which means that work becomes more accessible, more practical, and more productive; and 2) effectiveness, meaning that work is more efficient and more productive (Bhaswara Siwi, Prasetyo and Kartikasari, 2020).

The Theory of Reasoned Action (TRA) describes opinions about technology based on the Technology Acceptance Model (TAM) as the level of impact assessment experienced by a person when using a particular system in their workplace. In the use of technology, perspective is determined by feelings of liking or disliking a system towards the behaviour carried out by the system (Bhaswara Siwi, Prasetyo and Kartikasari, 2020).

According to Davis in the book by Santi and Erdani, Attitude, also known as attitude, is the amount of feeling or affection felt by users about accepting or rejecting an object. User attitudes are affected when someone uses information system technology (Santi and Erdani, 2021). This is in accordance with Putra's research which states that users really like the use of the Hospital Management Information System (SIMRS) because they see it as a good thing, namely that the existence of this SIMRS really helps officers in working and saves officers' time in doing their work (Putra and Kurniawati, 2019).

This study assesses the positive impact felt by patients as recipients of health services. The impact The question is patient satisfaction because this "Midwifery Manager" has a notification feature for patients regarding the time of return visits. It is to the theory in the research of Cao et al. that there is a relationship between health applications and user satisfaction scores. The theory of information system success suggests that the use of information systems and satisfaction will be related, ultimately affecting individuals or organizations and producing benefits (Cao, Zhang and Liu, 2022).

This study's results align with previous studies, which state that, in total, the study reported user satisfaction. Respondents expressed high satisfaction with smoking cessation, nutrition, and weight control. Participants described the application as applicable and resulted in patient satisfaction (Dalrymple *et al.*, 2013)

The results of this study are also in line with a systematic review by Badawy et al. evaluating SMS and applications for preventive behaviour in adolescents. They concluded that most studies reported positive feasibility with high acceptance and satisfaction in adolescents using SMS and applications (Badawy and Kuhns, 2017).

4) Effectiveness of the Use of the "Midwifery Manager" Management Information System in Improving the Quality of Midwifery Services at Independent Midwife Practices (TPMB) in the Bandung City Area

The results of this study indicate that the "Midwifery Manager" Management Information System effectively improves the quality of midwifery services at independent midwife practices (TPMB) in the Bandung City Area. The factor that measures how far someone can achieve a goal is known as effectiveness. This definition emphasizes more on results.

Effectiveness is defined as utilizing resources, facilities, and infrastructure in a certain amount that has been consciously determined to complete several jobs quickly. Two main measures, efficiency and effectiveness, can be used to evaluate and

analyze system performance. Evaluation is related to the use of information systems to improve the organization's mission based on the level of effectiveness of users or organizational units (Pusida, Pati and Lambey, 2018).

In their publication, DeLone and McLean discuss the dimensions that can be used to determine the effectiveness of an information system used in an organization. The dimensions proposed by DeLone and McLean in their publication consist of 6 (six) dimensions that form a relationship model. These dimensions are Information Quality; System Quality; Service Quality; Intention to Use; User Satisfaction; Net Benefits (Putri, Ilhamsyah and Mutiah, 2021).

This study assesses the effectiveness of 3 dimensions: Service Quality, User Satisfaction, and Net Benefits. Several elements can be used to evaluate the quality of an information system, such as ease of use, availability, reliability, flexibility, and interactivity. These aspects indicate the system quality of the information system itself.

User satisfaction with the information system is the next dimension that indicates the effectiveness of the information system. User satisfaction can be measured by how users use the information system. User experience with the information system will determine whether or not they are satisfied with it and whether their expectations have been met. The net benefits generated by the information system are the last dimension that indicates how effective the information system is.

The Theory of Reasoned Action (TRA) states that actual usage is how the system is used. The concept is to measure the frequency of technology use and how long the technology is used. A person will be satisfied using the system if they believe it is easy to use and will increase their productivity as reflected in the actual conditions of use. "Midwifery manager" provides convenience for users in carrying out health services, increasing efficiency, and positively impacting its use (Susilo, Jaenudin and Widhyaestoeti, 2022).

This study supports the study by Udayanti and Nugroho, showing that every time the TB scoring application's usefulness and ease of use increase, user interest will increase.

The results of this study support the results of research that along with the growing popularity of mobile applications among the general public, so does the potential to improve the quality of services and access to evidence-based health services through technology. Mental health providers and researchers are encouraged to develop and carefully evaluate mobile applications for clinical practice and research. The mental health field continues to adopt new technologies to improve access and quality of services; it is essential to investigate the effectiveness, feasibility, usability and acceptability to reduce the mental burden of illness, increase access to evidence of high-quality care, and ensure that the mental health field remains at the

forefront of developments in the health field (Price *et al.*, 2014).

Mobile devices' increasing popularity and functionality have several implications for the delivery of mental health services. Effective use of mobile applications has the potential to (a) increase access to evidence-based health services, (b) provide consumers with better information about services and more actively engage them in their care, c) increase the use of evidence-based practices, and (d) improve care after formal treatment is completed (Price *et al.*, 2014).

Research Limitations

1. The number of samples taken in the study was limited because the server used to accommodate application data was still limited, so the study's results needed to be further developed and could only be generalized to some of the population.
2. This study did not determine a control group as a comparison group, so it could not assess the specific impact of the intervention (use of "Midwifery manager").

CONCLUSION

The "Midwifery Manager" management information system is five times more practical and efficient in improving the quality of midwifery services at TPMB in the Bandung City area compared to similar information systems, especially in financial management.

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