Jurnal Manajemen dan Pelayanan Farmasi (JMPF)
(Journal of Management and Pharmacy Practice)
ISSN-p : 2088-8139 | ISSN-e : 2443-2946
JMPF Vol 14(1) 2024: 51-63

Development and Evaluation of Drug Management Information System in Mijen Community Health Center Demak

Faza Putri Farihatus Sholehah[1], Iswandi[1*], Jason Merari Peranginangin[1]
[1] Faculty of Pharmacy, Universitas Setia Budi, Surakarta, Central Java, Indonesia

ARTICLE INFO
Submitted : 05-03-2023
Revised : 19-02-2024
Accepted : 22-02-2024

Published : 31-03-2024

Corresponding Author:
Iswandi

Corresponding Author Email:
iswandi2504@gmail.com

ABSTRACT

Background: Drug management information systems can serve as tools for decision-making. The effectiveness of such a system can be assessed through evaluation. One of the evaluation methods used is the PIECES method.

Objectives: This research aims to evaluate and develop a drug management information system using the PIECES method.

Methods: The research conducted was a qualitative descriptive study with inductive analysis. Sampling for this research was conducted purposive sampling. System development in this study utilized the prototype method, with interviews conducted for Management Information System (MIS) evaluation using the PIECES Framework. The design of the MIS system was created using Data Flow Diagrams and Entity Relationship Diagrams. The designed MIS system development was evaluated using the same method. Data processing in qualitative research consists of valid, clear, and accountable word descriptions, sentences, or narratives provided by the researchers, followed by data validation using triangulation techniques and Nvivo 12 Plus software.

Results: Evaluation results using the PIECES Framework indicate that the implemented MIS system benefits and aids staff performance in daily drug dispensing. However, there are still manual tasks and lacking features such as distribution, drug expiration warnings, and minimum stock on the dashboard. The proposed design for MIS system development includes several features such as stock in, stock out, and distribution, complemented with drug expiration warnings, minimum stock alerts on the dashboard, and reports for each feature.

Conclusion: Implementing the proposed MIS system design can assist and streamline work processes by providing comprehensive information, thus serving as a decision-making tool.

Keywords: Drug Management; Management Information System; PIECES

INTRODUCTION

The current technological advancements have made computers an indispensable tool for organizations to expedite data management and administration performance, thereby generating relevant, timely, and accurate information.[1] Meanwhile, a Management Information System (MIS) is a process of data processing, analysis, and presentation that facilitates decision-making and aids management in enhancing the quality of decisions made.[2]

The effectiveness of a system can be assessed through evaluation. Information system evaluation serves to identify the strengths and weaknesses of an application and to ascertain whether the information presented within the application is accurate, reliable, and timely.[3] One method that can be used in evaluating MIS is the PIECES Framework. The PIECES method is employed to identify system weaknesses, which will subsequently serve as recommendations for improvements in the system under development.[4]

The community health center information system (SIMPUS) is a system that provides information to assist in the decision-making process in implementing community health center management to achieve all of its

activities' objectives.[5] All community health centers in Mijen Subdistrict, Demak District, have implemented the community health center information system (SIMPUS). In contrast, community health centers in other districts have not fully utilized the MIS. From the researcher's observation, it is evident that the implementation of MIS in the Mijen Subdistrict Community Health Center has not undergone evaluation. The Mijen Subdistrict Community Health Center comprises two community health centers: Mijen I and Mijen II. Medication management at Mijen I Health Center, which is an inpatient health center, involves two medication management processes: outpatient services, which already utilize the community health center information system application in the pharmacy for medication management, but the application can only operate features such as incoming medication and medication dispensed to patients. However, MIS usage has not been implemented in the inpatient department due to system malfunctions. Meanwhile, the utilization of MIS in the outpatient department of Mijen II Community Health Center is limited to incoming and outgoing medications, and manual recording is still conducted using stock cards due to frequent MIS issues and inadequate human resources to update stocks actively. The features within the system have not yet assisted pharmacy personnel in managing pharmaceutical supplies up to monthly reporting; thus, this is deemed ineffective in medication management and may lead to errors in monthly reporting. It is hoped that pharmacy personnel's effective and efficient performance can be enhanced with improvements in the development of management information systems in community health centers. Based on previous research conducted by Fauziyah et al.,[6] the optimal utilization of MIS Puskesmas (SIMPUS) in medication management at Batang District Community Health Centers has not been achieved. Hence, improvements are necessary to enhance service quality, system performance, and effectiveness, thereby increasing the benefits for community health centers.[6]

Based on the above description, the researcher is interested in researching the evaluation and development of the Management Information System (MIS) for medication management at Mijen Subdistrict Community Health Centers, with the hope that the MIS implementation will be more optimal to support the existing services at community health centers and can be utilized as a tool for decision-making in medication management.

METHODS

Study design

The research conducted was a qualitative descriptive study with inductive analysis. The object under investigation was the drug management information system (MIS) in the Community Health Center (Puskesmas) of Mijen Subdistrict, Demak. The MIS possessed by the Mijen Subdistrict Community Health Center had the same type and was from the same developer. The evaluation was conducted before and after development. Design development was carried out after obtaining initial evaluation results. The MIS design was created using Data Flow Diagrams (DFD) and Entity Relationship Diagrams (ERD). The developed MIS design was then re-evaluated using the same method.

Population and samples

The subjects of this study were personnel in the Pharmacy Unit of the Mijen Subdistrict Community Health Center, including 1 Pharmacist from Mijen I, 1 Pharmacy Technical Personnel (PTP) from Mijen I, 1 Pharmacy Technical Personnel (PTP) from Mijen II, and other health personnel, namely 1 midwife and 1 nurse from Mijen II. Sampling in this study was done through purposive sampling. The population in this study consisted of personnel in the pharmacy unit of the Mijen Subdistrict Community Health Center. The sample in this study consisted of personnel operating the Pharmacy Unit MIS in the Mijen Subdistrict Community Health Center. Inclusion criteria were personnel qualified in drug management, both pharmacists and health personnel, who had worked in the community health center for at least three months. Exclusion criteria were personnel with a maximum high school diploma education level and personnel unwilling to become informants.

Study instruments

The tools used in this study were writing utensils, voice recorders, observation guidelines, documentation guidelines, and interview guidelines prepared based on the PIECES Framework method covering six variables: Performance, Information, Economy, Control, Efficiency, and Service, as seen in Table I. The material used in this study was the drug inventory list in all Community Health Centers in Mijen Subdistrict, Demak.

Table I. Research Instrument

No	Variable	Indicator	Descriptor
1	Performance	Number of tasks or outputs	1. Do you use the MIS to manage drug supplies? 2. Does the MIS used greatly assist the performance of pharmaceutical personnel at the puskesmas? 3. Are there any obstacles in operating the MIS? 4. Can all tasks be performed using the MIS?
		Response Time	1. Does the MIS at the puskesmas respond quickly when used? 2. Does the process of searching for data in the MIS occur quickly?
2	Information and Data	Output or Results	1. Can the MIS provide accurate information? 2. Can the MIS provide complete information? 3. Can the MIS provide accurate information? 4. Is the information generated when using the MIS suitable for the needs of pharmaceutical personnel?
		Input	1. Is the data input process in the MIS relatively easy? 2. Is the MIS easy to learn? 3. Are the available menus in the MIS suitable for the needs? 4. Do the available menus facilitate the use of the MIS? 5. Is a cancellation menu available in the MIS during its usage?
		Stored Data	1. Is data stored in a database or storage media? 2. Is there too much data stored in the database? 3. Is the stored data accurate? 4. Is the data easily accessible? 5. Can the data be stored in a structured manner? 6. Is the data stored in the MIS complete?
3	Economics	Cost	1. Does the implementation of MIS result in cost escalation? 2. Does implementing MIS save or reduce costs compared to conventional methods?
		Benefits	1. Is the implementation of MIS carried out smoothly without any obstacles? 2. Is the MIS beneficial to the puskesmas? 3. Does the implementation of MIS help tasks to be done more easily and quickly?
4	Control and Security	Low security or control	1. Is security implemented using a single user's username and password? 2. Can all personnel access the MIS using the same username and password? 3. Are processing errors common when using the MIS? 4. Are there any ethical violations regarding the data or information within the MIS?

Data collection

Data was collected prospectively through direct field observations, interviews, and documentation. The interview guidelines were developed using the PIECES Framework method. The research was conducted in September 2022 at the Community Health Centers in the Mijen Subdistrict, which comprised Mijen I and Mijen II Community Health Centers.

Table I. (Continued)

No	Variable	Indicator	Descriptor
4	Control and Security	High security or control	1. Is security implemented using individual usernames and passwords for each user? 2. Do all pharmacy personnel have access to log in with their own username and password? 3. Does security within the MIS effectively safeguard stored data and information? 4. Is the storage media safe from damage and accidents? 5. Is the security system functioning well?
5	Efficiency	Time efficiency	1. Do tasks become more accessible and promptly completed with implementing the MIS? 2. Does user performance improve with the implementation of the MIS? 3. Is information generated quickly? 4. Does the generated information aid decision-making, and is it easily retrievable? 5. Does searching for information in the MIS take a long time?
		Resource efficiency	1. Does the MIS provide benefits to its users? 6. Can the MIS be effectively used to support work?
		Required efforts	1. Is MIS development necessary to support better performance? 7. Are additional features needed to make it more comprehensive?
		Required resources	1. Are additional computers with better specifications needed? 3. Is network improvement necessary to enhance user performance?
6	Service	The system produces inaccurate results	1. Does the MIS provide accurate results? 2. Does the MIS provide information as per the needs?
		The system produces inconsistent results	1. Is the information generated by the MIS consistent? 2. Does the obtained information always differ even when accessed with a slight time difference?
		The system produces unreliable results	1. Is the generated information reliable? 2. Does the generated information aid the decision-making process?
		The system is not easy to learn	1. Is the existing MIS easy to understand? 2. Is the existing MIS easy to learn?
		The system is not easy to use	1. Is the MIS user-friendly, requiring training? 2. Are MIS errors common during use?
		The system is rigid or inflexible to use	1. Is the MIS equipped with data updating features? 2. Are there features for data correction when data entry errors occur? 3. Can data updating and correction be easily done?
		The system is inflexible to new situations	1. Is the MIS easily adaptable when faced with new situations? 2. Can the MIS be developed with flexible features?
		The system is inflexible to change	1. Can the MIS be developed further? 2. Is it possible to make improvements to the existing MIS? 3. Can new features be added to the existing MIS?

Table I. (Continued)

No	Variable	Indicator	Descriptor
6	Service	The system is not compatible with other systems	1. Is the MIS integrated with MISs in other units? 2. Is the MIS integrated with the District Health Office?

Data Analysis

Data analysis in qualitative research consisted of word descriptions, sentences, or narratives from the researcher that were valid, clear, and accountable. Data validity in this study was ensured through triangulation validity techniques using NVivo 12 plus software.

RESULTS AND DISCUSSION

The researchers evaluated the Management Information System (MIS) based on interviews, observations, and documentation with 1 pharmacist, 1 midwife, 1 nurse, and 2 pharmacy technical personnel. The MIS evaluation was carried out using the PIECES Framework method with six variables, starting from the performance variable, the first variable in the PIECES analysis method. This variable plays a crucial role in assessing whether the existing processes or procedures can still improve their performance and assessing to what extent and how reliable an information system is in processing data to achieve the desired objectives.[7] The results of the evaluation of Mijen Community Health Center's MIS align with Tarigan and Maksum[7] that e-community health centers, in terms of performance with the available menu options and navigation, facilitate health workers in operating the community health center management information system, thus, from a performance aspect, it falls into the good category.[7] The implemented MIS also assists personnel in faster information retrieval, consistent with research indicating that the application of MIS can expedite information retrieval.[8] The MIS evaluation results at Mijen Community Health Centers I and II can be seen in Table II.

The "Information and Data" variable is utilized to determine the quantity and clarity of information generated for a single search.[9] As explained in Table II, the presence of the MIS has not yet facilitated monthly reporting, but the information produced by the MIS is already entirely accurate. Information is vital in communication. Thus, accuracy and relevance are crucial in any information dissemination.[10]

The "Economics" variable is an analysis conducted to ascertain whether a system is appropriately implemented within an institution, considering financial aspects and the expenses incurred. This is highly important as a system is also influenced by the magnitude of expenses.[9] The results in Table II align with Pratitis's study, indicating cost savings perceived by users, such as reduced paper consumption and office supplies expenditure.[10]

A system's "Control and Security" variable must be implemented effectively to function well.[9] The security and confidentiality of patient data are essential considerations to maintain patient trust in healthcare providers.[11] As stated in Table II, the security system is not functioning well. Limiting access rights aims to safeguard patient data confidentiality in accordance with (PERMENKES RI No 269/MENKES/PER/III/2008) Article 14, which states that "Health service facility leaders are responsible for the loss, damage, forgery, and unauthorized use of medical records." Therefore, security at community health centers needs to be enhanced through access rights restrictions for users.

The "Efficiency" variable is an analysis conducted to determine whether a system is efficient or not, where minimal data input should result in satisfactory output.[9] The results in Table II indicate that the Mijen Community Health Center MIS cannot yet be used as a decision-making tool.

The "Service" variable is an analysis conducted to understand existing issues related to service provision.[9] From the results in Table II, implementing the MIS provides ease for users in daily drug dispensing data entry. Still, it cannot be fully utilized due to limitations of infrastructure, facilities, and human resources.

The interview transcripts in this study underwent data analysis using the NVivo 12 Plus software. This software allows qualitative researchers to conduct analytical data coding efficiently and effectively. Researchers create codes to interpret the meaning of each data for analytical purposes.[13] To assist the coding process in NVivo, nodes, and cases are utilized.[14] Nodes serve as variables to facilitate the coding process of research findings, while cases are broader, encompassing participants, demographics, and research locations.[10] The NVivo 12 Plus software also aids in data exploration through the use of Matrix Coding Query. Matrix Coding Query is a process in the analysis query stage. Researchers process data with a flexible approach to understand what is happening in the data from a more focused perspective and discover specific data patterns by identifying

Table II. Evaluation of Drug Management Information System at Mijen Community Health Center, Demak

Analysis	Before MIS Development
Performance	The MIS provides benefits and assists staff in daily drug dispensing; however, some tasks are performed manually, so the MIS implementation is not yet fully optimal. Staff feel faster and more effective with the implementation of MIS.
Information And Data	Information and data storage in the existing MIS is complete and accurate. The information and data the system provides are only used as supporting data in daily drug dispensing to patients; monthly reporting is still done manually.
Economics	The MIS does not cause cost escalation. Costs are only incurred during the initial purchase of the application and during maintenance if there is damage.
Control And Security	The MIS is still poorly implemented to maintain data confidentiality because usernames and passwords can be accessed by all staff in the community health center.
Efficiency	With the MIS, work becomes faster and easier in daily tasks, but the existing MIS cannot yet be used as a decision-making tool.
Service	The MIS at the community health center is capable of providing consistent and reliable information. Implementing MIS provides users convenience in drug data entry and can be operated easily without training. The MIS at Mijen Community Health Centers I and II is already integrated with other units but not yet integrated with the District Health Office (DKK).

combinations of nodes and attributes, displaying the results in a table.[15] This is aimed at understanding the relationship between nodes and cases. The interview guidelines in this study employ deductive techniques, whereby codes or nodes have been predetermined, and variables have been identified in advance. The Percentage Coverage values can be seen in Table III.

Based on Table III, it is evident that all variables have percentage coverage values, and all informants discussed all variables. The indicator "number of tasks" shows the highest percentage coverage result at 25.70%, while the lowest variable is the service variable at 0.75%. This indicates that the "number of tasks" indicator in the performance variable is frequently mentioned in the interview process. According to Aulia and Jasilah,[16] the higher the percentage coverage value of a variable, the more frequently it is mentioned in the interview process, and it is the most influential variable in system development.[16] Further analysis using Matrix Coding Query was conducted on nodes and cases. This analysis aims to determine how many statements from informants are used as references in nodes or as coding references. The results of the Matrix Coding Query analysis (Nodes and Cases) can be seen in Table IV.

Based on Table IV, the variable "Performance" has the highest number of references obtained from informant D. The variable "Information and Data" has the highest number of references generated from informant E. The variable "Economics" has the same number of references across informants A to E. The variable "Control and Security" has the highest number of references from informants A and B. The variable "Efficiency" has the highest number of references indicated by informant C. The variable "Service" has the highest number of references, indicated by informant C. These analysis results are also presented in chart form, as shown in Figure 1.

Understanding the Drug Management Information System (MIS) at Mijen Subdistrict Community Health Center in Demak appears to be good, particularly with informant D regarding the performance variable. Based on Figure 1, informants B and E have a more positive view of the Information and Data variable than others. They both mentioned that the current MIS does not fully provide complete and accurate information, suggesting additional features are needed. All informants share the same understanding regarding the Economics variable, acknowledging that the MIS helps minimize costs and provides benefits in daily use. Regarding Control and Security, informants A, B, and E express concerns about the lack of security since all community health center staff can access the MIS. Informant C demonstrates a better understanding of the Efficiency variable, noting that the MIS cannot yet be used as a decision-making tool and is only utilized for daily drug dispensing, with stock and expiration date information not included in the system. Informant C also exhibits a good understanding of the Service variable compared to others. In this study, informant C emerges as a critical informant due to their comprehensive understanding of the existing MIS. Evaluation results from data reduction and NVivo analysis

Table III. Percentage Coverage Values of Mijen Community Health Center MIS, Demak

Variable	Indicator	Files	References	Percentage Coverage (%)
Performance	Number of tasks or outputs	5	29	25.70
	Response Time	5	10	3.50
Information and Data	Output or Results	5	21	16.56
	Input	5	20	9.60
	Stored Data	5	19	9.02
Economics	Cost	5	9	6.05
	Benefits	5	16	8.06
Control and Security	Low security or control	5	21	10.15
	High security or control	5	18	7.38
Efficiency	Time efficiency	5	26	9.37
	Resource efficiency	5	9	1.44
	Required efforts	5	9	2.14
	Required resources	5	9	1.60
Service	The system produces inaccurate results	5	10	4.33
	The system produces inefficiency	5	11	2.53
	The system produces inconsistent results	5	11	2.97
	The system produces unreliable results	5	5	0.75
	The system is not easy to learn	5	11	3.56
	The system is not easy to use	5	14	1.99
	The system is rigid or inflexible to use	5	10	3.48
	The system is inflexible to new situations	5	16	4.91
	The system is inflexible to change	5	12	2.44

Table IV. Matrix Coding Query (Nodes and Cases)

	Informant				
	A	B	C	D	E
Performance	8	7	8	9	7
Information and data	14	15	9	8	18
Economics	5	5	5	5	5
Control and Security	9	9	6	8	7
Efficiency	11	10	12	11	9
Service	19	18	23	19	20

indicate that the implemented MIS at Mijen Community Health Center benefits daily drug dispensing tasks; however, some manual work is still required, and the system lacks certain features such as distribution, expiration date alerts, and minimal stock features.

Based on the results obtained after the evaluation, it is evident that there is a need for the development of the MIS. Through the development of the MIS, it is hoped that it can assist and simplify the work of pharmacy personnel in managing drugs and make their work more effective and efficient. The design of the MIS development is presented in several diagrams, including Data Flow Diagrams (DFD) and Entity Relationship Diagrams (ERD). The development begins with DFD and continues with ERD.

Based on the proposed Data Flow Diagram (DFD) for the development of the drug management information system, the system begins with the receipt of drugs by the Health Department according to the report on drug usage and drug requisition forms (LPLPO) from the previous month. The items are received and input into the system with the warehouse location. Drugs are distributed to subunits according to the requests of each unit. Pharmacy personnel input the list of drug requests into the MIS according to the subunit locations so that everything is well-documented. Drugs that the subunits have received are given to patients, which are then input into the system, ensuring that all transaction activities are recorded in the system.

An Entity Relationship Diagram (ERD) is a model that describes data in the form of entities, attributes, and relationships between entities.[17] The proposed design for the development of the drug management MIS

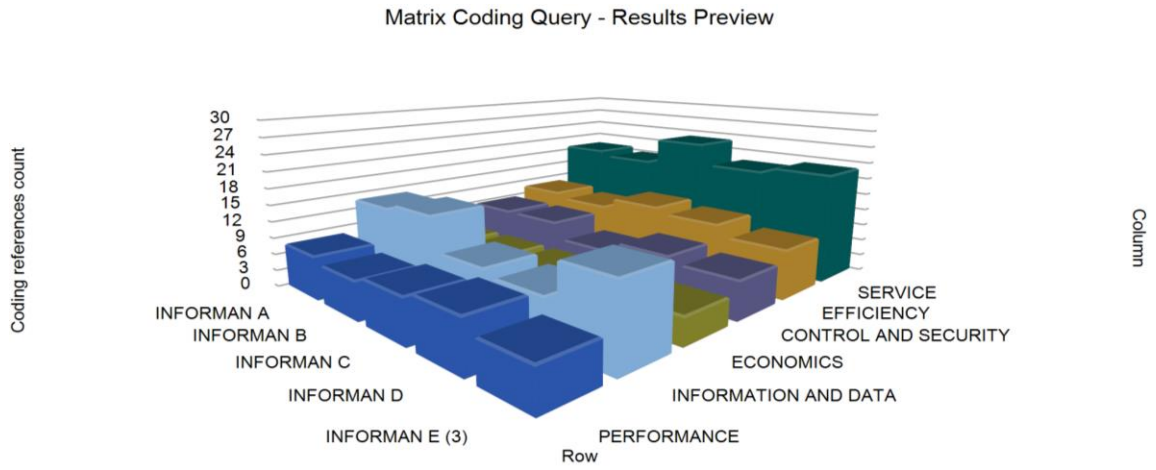

Figure 1. Matrix Coding Query (Nodes and Cases)

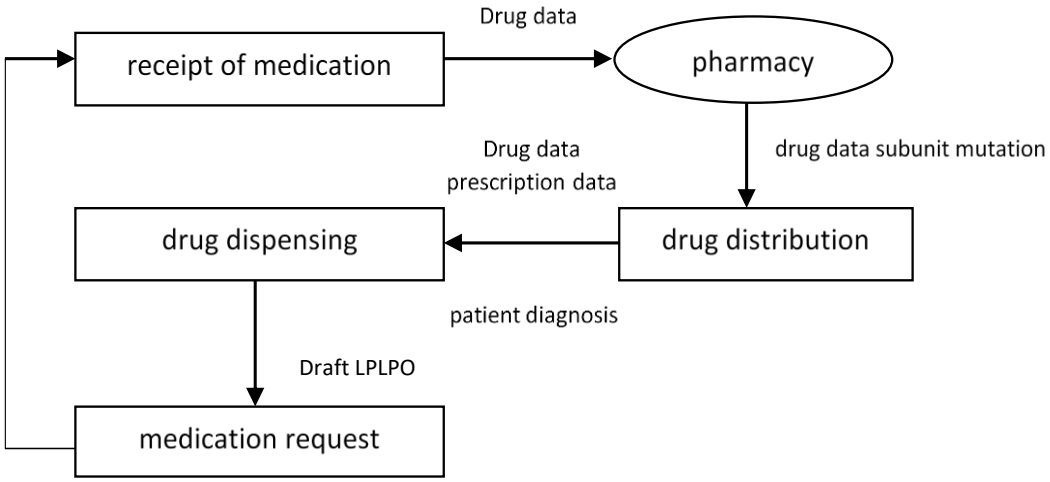

Figure 2. Data Flow Diagram

involves the receipt of drugs from the District Health Office (Dinas Kesehatan Kabupaten, DKK) to the drug warehouse at the community health center by inputting data such as the origin of drug receipt, drug code, drug name, quantity of drugs received, expiration date, unit of drug, batch number, location, unit, date of entry, and drug price. Drugs received by the community health center pharmacy warehouse are then subject to mutation or distribution to subunits such as outpatient care, inpatient care, Village Health Posts (Posyandu), and sub-health centers (Pustu). The mutation or distribution process is carried out to meet the drug needs in subunits according to the requests of their respective unit supervisors.

The data to be inputted in the drug mutation or distribution menu consists of drug code, drug name, quantity of drug, expiration date, drug unit, batch number, and location. Drugs that have been distributed to subunits can be dispensed. The drug dispensing menu includes the patient's name, doctor's name, quantity of drug, drug name, dispensing date, expiration date, batch number, and drug location. Each menu has a report providing information regarding drug reception, mutation or distribution of drugs, and drug dispensing.

The development design of the MIS that has been planned and further developed is then re-evaluated with five informants. The results of the evaluation can be seen in Table V.

Based on the table above, the performance variable indicates that the developed MIS design can be used to assist drug management at the Mijen Subdistrict Community Health Center. The new design is tailored to produce a system that meets user needs. The operation of the developed MIS provides quick response and fast data retrieval processes. Table V shows results that are consistent with Sholehah's study,[18] which states that the performance of the outpatient registration information system for BPJS patients at the Regional General Hospital

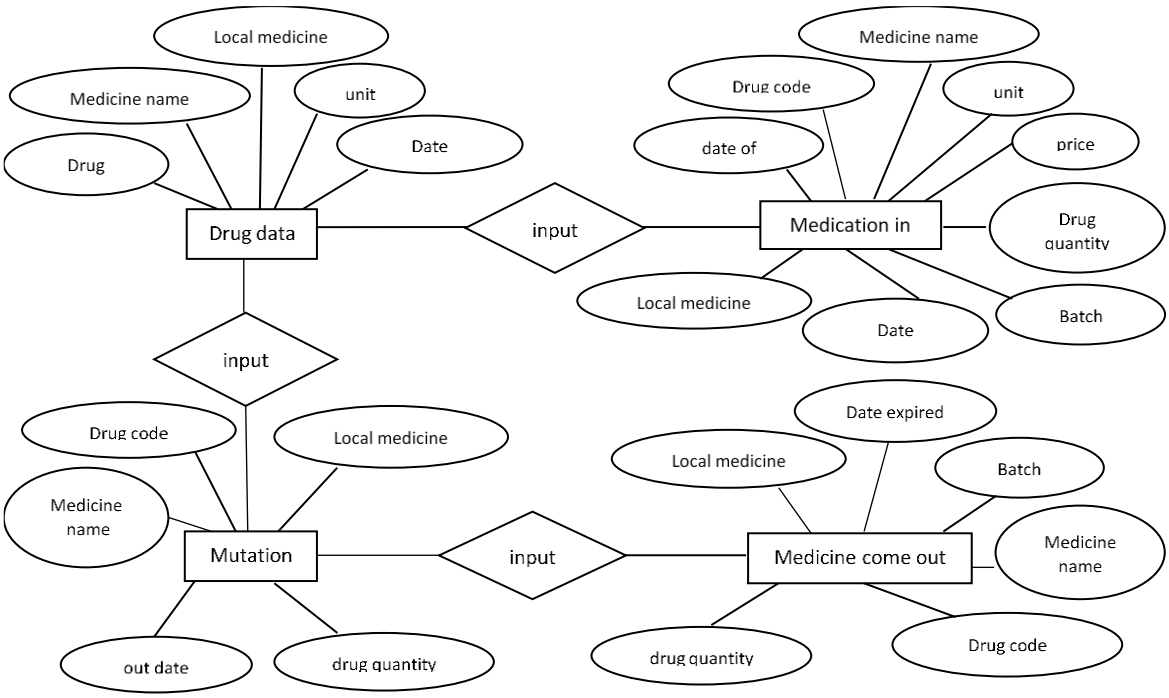

Figure 3. Entity Relationship Diagram

Table V. Evaluation of Drug Management MIS Development Design

Analysis	After MIS Development
Performance	The MIS provides benefits and assists staff in daily to monthly drug dispensing. The new MIS is equipped with alerts for drugs approaching ED and alerts for drugs with dwindling stock. The operation of the developed MIS provides quick response and fast data retrieval processes.
Information And Data	The design of the MIS development can provide fast, complete, and relevant information. The MIS development design can provide accurate information. The information generated can be used to aid decision-making.
Economics	The MIS does not cause cost escalation; costs are incurred only during maintenance.
Control And Security	The developed MIS uses the same username and password specifically for pharmacy unit staff and staff assigned to input drugs.
Efficiency	The design of the MIS development can help improve staff performance to be more effective and efficient. The information generated by the MIS can be used as a tool for decision-making.
Service	The information generated by the system is accurate and meets the needs of staff. The MIS development design provides consistent, reliable information and can be used as a decision-making tool. The MIS is not yet integrated with other units and the DKK.

of Sidoarjo District, based on the performance aspect can already generate information according to what is needed with a reasonably stable response time.[18]

The information and data variable shows results in Table V. The term "improved information quality" refers to information that becomes more relevant, accurate, and complete, presented in a timely manner.[7] In this study, the quality of the generated information has improved. The development design of the MIS can provide accurate information if users input data correctly. The generated information can be used to aid decision-making processes, from drug requests to the District Health Office (DKK) to the disposal of expired drugs and to facilitate LPLPO reporting. Users also find that data input can be quickly done, which aligns with the findings of Tarigan and Maksum, indicating that in terms of information aspect, the implementation of e-health centers at the West City Health Center falls into the good category, being easy to use, easy to learn, and producing easily readable outputs.[7]

The economic variable in implementing the MIS does not cause cost escalation; costs are incurred only during maintenance. This is consistent with the research by Yuli Prasetyo, which states that economic considerations are made by assessing the extent of the benefits provided by a system.[19] The development design of the MIS is tailored to user needs, with the expectation of being able to complete tasks more effectively and efficiently.

Table V shows that the Control and Security variable already utilizes a security system. The purpose of restricting user access rights is to ensure data security, prevent data leakage, and avoid misunderstandings in case of data input errors. Salam's study states that the data storage process using a database will guarantee data confidentiality and security. Each user accessing it is provided with a username and password, and data can be stored in large quantities.[20]

The Efficiency variable shown in Table V indicates that the development design of the MIS can help improve staff performance to be more effective and efficient. The information generated by the MIS can be used as a tool for decision-making. This is consistent with Sudjiman's study, which states that the information generated by the MIS benefits organizational needs and decision-making.[21].

The Service variable in Table V indicates that the information generated by the system is accurate and meets the needs of the staff. The development design of the MIS is considered to provide consistent, reliable information and can be used as a decision-making tool. This aligns with Setyawan's study[22], which states that Hospital Management Information Systems (HMIS) greatly assist in identifying issues that occur. Work is done using computerization and manual methods, making it easier to identify problems or errors, such as in reports, thus facilitating decision-making.[22]

The interview transcript from the evaluation of the MIS development design was coded using NVivo software. Table VI presents the percentage coverage values based on the coding results.

Table VI shows that all variables have a percentage coverage value, and all informants discussed all variables. Based on the results, the highest percentage coverage is shown in the performance variable by the indicator of the number of tasks at 40.35%. In comparison, the lowest variable is the service variable with the indicator "MIS is not easy to learn" at 1.33%. The indicator of tasks is frequently discussed, whereas the indicator "MIS is not easy to learn" is rarely discussed because MIS is easy to learn, and there are no difficulties in learning it.

Table VII shows that in the performance variable, the most references are obtained from informant D. The most references for the information and data variable are generated from informants C and E. The economics variable has the highest number of references from informants C and E. The control and security variable has the highest number of references from informant D.

The most references for the Efficiency variable are indicated by informant D. The most references for the Service variable are indicated by informant E. These analysis results are also presented in the form of a chart, which can be viewed in Figure 4.

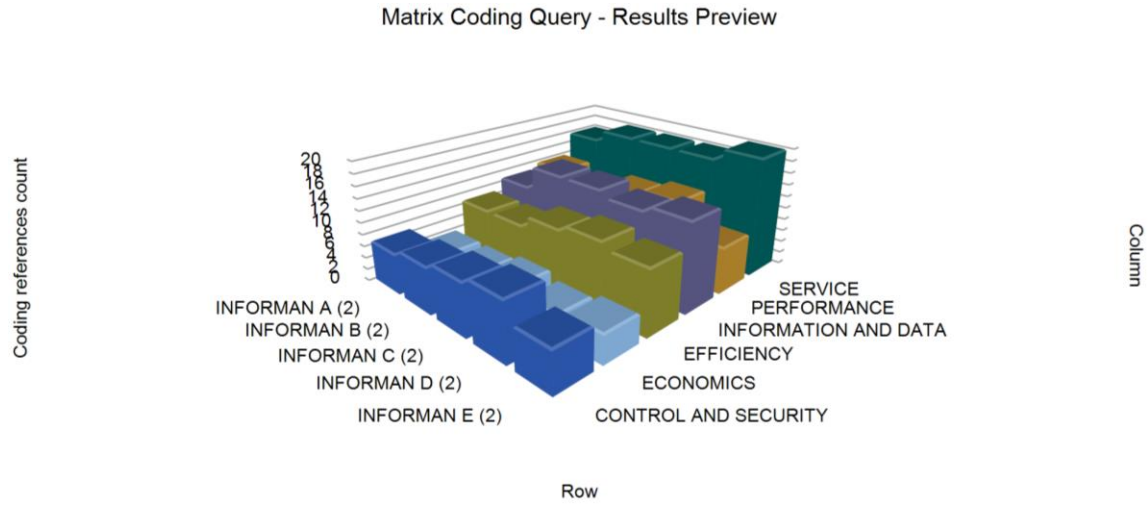

Figure 4. Matrix Coding Query (Nodes and cases)

Understanding related to the Drug Management Information System (MIS) at the Mijen Subdistrict Community Health Center appears to be better in informant D compared to other informants, who understand

Table VI. Percentage Coverage Values of Drug Management MIS Development Design

Variable	Indicator	Files	References	Percentage coverage (%)
Performance	Number of tasks or outputs	5	33	40.35
	Response Time	5	24	14.36
Information and Data	Output or Results	5	21	17.33
	Input	5	23	13.37
	Stored Data	5	27	15.16
Economics	Cost	5	10	6.83
	Benefits	5	13	8.99
Control and Security	Low security or control	5	20	7.21
	High security or control	5	21	7.08
Efficiency	Time efficiency	5	22	22.04
	Resource efficiency	5	11	4.19
	Required efforts	5	10	5.93
	Required resources	5	10	6.44
Service	The system produces inaccurate results	5	8	1.92
	The system produces inefficiency	5	10	3.92
	The system produces inconsistent results	5	9	4.88
	The system produces unreliable results	5	5	1.33
	The system is not easy to learn	5	10	4.43
	The system is not easy to use	5	14	2.74
	The system is rigid or inflexible to use	5	9	2.46
	The system is inflexible to new situations	5	15	3.03
	The system is inflexible to change	5	10	1.50

Table VII. Matrix Coding Query (Nodes and cases)

	Informant				
	A	B	C	D	E
Performance	12	7	12	13	8
Information and data	11	15	15	14	15
Economics	4	4	5	4	5
Control and Security	7	8	9	10	7
Efficiency	9	9	11	12	11
Service	16	18	18	18	20

the performance variable sufficiently. Informant D stated that the performance of the MIS Puskesmas (SIMPUS) has been helpful for the staff's tasks. Figure 4 shows that informants C and E have a more positive view of the information and data variable. They stated that the existing MIS can provide comprehensive and accurate information. Informants C and E have a better view of the economic variables. The new MIS does not cause cost escalation, but there are maintenance costs. Regarding the control and security variable, informant D has a better view of the MIS's usernames and passwords for a specific pharmacy section that can be accessed. In terms of efficiency, informant D has a better understanding. Informant D believes that the MIS can be used as a decision-making tool. For the service variable, informant E has a good understanding. In this study, informant D has a good understanding of the MIS development design and understands it better because informant D is a staff member who inputs data daily.

CONCLUSION

Implementing the MIS Puskesmas (SIMPUS) in the Mijen Subdistrict can assist and facilitate pharmacists in carrying out their duties; however, it has not yet been fully utilized as a decision-making tool. The design of the MIS development was created using Data Flow Diagrams (DFD) and Entity Relationship Diagrams (ERD), comprising several features including stock in (Medicine Receipt), stock out (Medicine Dispensation), and mutations or distributions supplemented with drug expiration date warnings, minimum stock alerts on the

dashboard, and accompanied by reports for each feature. Implementing the new MIS development design can assist and facilitate users by providing comprehensive information, thus enabling it to be utilized as a decision-making tool.

ACKNOWLEDGEMENT

We acknowledge the informants, pharmacists, and all who had participated in this study. Thank you for Mijen District Health Office, and all staff of the Puskesmas.

STATEMENT OF ETHICS

This research met the ethical requirements of research No.446/XI/2022/Ethical Commission issued by the Medical/Health Research Bioethics Commission, Faculty of Medicine, Islamic University of Sultan Agung Semarang on November 30, 2022.

REFERENCES

1. Febriani OM, Putra AS, Prayogie RP. Rancang Bangun Sistem Monitoring Sirkulasi Obat Pada Pedagang Besar Farmasi (PBF) Di Kota Bandar Lampung Berbasis Web. *J Darmajaya*. 2020;1:122-132.
2. Mohamad Ridwan, Yuni Widiastiwi, Ati Zaidiah RHP, Ika Nurlaili Isnainiyah, Yunita Ardilla, Kraugusteeliana EK, Rika Yuliana, I Putu Sugih Arta, Supiah Ningsih IPS, Guntoro, Angga Ranggana Putra TR. *Sistem Informasi Manajemen*. Penerbit Widina; 2021.
3. Cahyani APP, Hakam F, Nurbaya F. Evaluasi Penerapan Sistem Informasi Manajemen Puskesmas (Simpus) Dengan Metode Hot-Fit Di Puskesmas Gatak. *J Manaj Inf dan Adm Kesehat*. 2020;3(2):20-27. doi:10.32585/jmiak.v3i2.1003
4. Astriyani E, Putri FN, Widianingsih NE. Desain Sistem Informasi Monitoring Aset Pada PT.Arbunco Wira Pandega. *J Sensi*. 2020;6(1):87-99. doi:10.33050/sensi.v6i1.946
5. Kemenkes RI. Permenkes RI. *Nomor 31 Tahun 2019 Tentang Sistem Informasi Puskesmas. Menteri Kesehatan Republik Indonesia Peraturan Menteri Kesehatan Republik Indonesia*. 2019.
6. Fauziyah R, Satibi S, Nugroho E. Analisis Kesuksesan Sistem Informasi Manajemen Puskesmas pada Pengelolaan Obat di Puskesmas Kabupaten Batang. *J Manaj dan Pel Farm (J Manag Pharm Pract)*. 2020;10(2):91. doi:10.22146/jmpf.44130
7. Tarigan SFN, Maksum TS. Pemanfaatan Layanan Sistem Informasi E-Puskesmas Dengan Menggunakan Metode Pieces. *Jambura Heal Sport J*. 2022;4(1):29-36. doi:10.37311/jhsj.v4i1.13446
8. Witanti W & Abdillah G. Sistem Informasi Pelayanan Kesehatan sebagai Upaya Peningkatan Kinerja E-Government. *SESINDO* 2018;(November):40526.
9. Supriyatna A & Maria V. Analisa Tingkat Kepuasan Pengguna dan Tingkat Kepentingan Penerapan Sistem Informasi DJP Online dengan Kerangka PIECES. *Khazanah Inform J Ilmu Komput dan Inform*. 2018;3(2):88. doi:10.23917/khif.v3i2.5264
10. Pratitis MP, Peranginangin JM, Purwidyaningrum I. Evaluasi Sistem Informasi Manajemen Pada Laporan Pemakaian dan Lembar Permintaan Obat di Puskesmas X. *J Manaj dan Pel Farm (J Manag Pharm Pract)*. 2022;12(4), 208-222. https://doi.org/10.22146/jmpf.76079
11. Mulyani I, Zamzami EM, Zendrato N. Pengaruh Sistem Teknologi Informasi Pada Manajemen Data Dan Informasi Dalam Layanan Keperawatan: Literature Review. *Inspir J Teknol Inf dan Komun*. 2019;9(2):137-142. doi:10.35585/inspir.v9i2.2526
12. Kemenkes RI. *PERMENKES RI No 269/MENKES/PER/III/2008 tentang Rekam Medis*. Jakarta, 2008.
13. Rahadi DR. *Konsep Penelitian Kualitatif, Plus Tutorial NVivo*. PT Filda Fikrindo; 2020.
14. Aziz A, Muljono P, Las I, Mulyandari RSH. Aplikasi Pendekatan Nvivo Dalam Analisis Determinasi Faktor Adopsi Petani Terhadap Sistem Informasi Kalender Tanam Terpadu. *Inform Pertan*. 2020;29(1):43. doi:10.21082/ip.v29n1.2020.p43-54
15. Juliasyah N. Metodologi Penelitian; Skripsi, Tesis, Disertasi, dan Karya Ilmiah. Penerbit Kencana. 2017;549:40-42.
16. Aulia BU & Jasilah N. Faktor Pengembangan Kawasan Pegaraman (Studi Kasus : Kawasan Pegaraman Kabupaten Pamekasan). *J Penataan Ruang*. 2019;14(1):28. doi:10.12962/j2716179x.v14i1.7151
17. Jaelani AK, Sampurno, Andani TM. Pengembangan Model Sistem Informasi Manajemen Skrining Development Model Management Information System Screening. *J Manaj dan Pel Farm (J Manag Pharm Pract)*. 2015;(November):301-312.

18. Sholehah F, Rachmawati E, Wicaksono AP, Chaerunisa A. Evaluasi Sistem Informasi Pendaftaran Rawat Jalan Bpjs Dengan Metode Pieces Rsud Sidoarjo. *J Rekam Med dan Inf Kesehat*. 2021;2(2):297-303. doi:10.25047/j-remi.v2i2.2018
19. Yuli Prasetyo D. Sistem Informasi Monitoring Covid-19 Berbasis Web. *J Tek Ind Unisi*. 2020;4(2):7-20. doi:10.32520/juti.v4i2.1400
20. Salam A, Zeniarja J, Achsanu I. Sistem Monitoring Penyebaran Covid-19 di Indonesia. *Sem Nas Apl Sains Tek*. 2021;1(1):83-90.
21. Sudjiman PES dan Sudjiman LS. Analisis Sistem Informasi Manajemen berbasis Komputer dalam Proses Pengambilan Keputusan. *J Tek In Kom*. 2018;8:55-67. https://doi.org/10.36342/teika.v8i2.2327
22. Setyawan dedy. Analisis Implementasi Pemanfaatan Sistem Informasi Manajemen Rumah Sakit (SIMRS) Pada RSUD Kardinah Tegal. *Indones J Comput Inf Technol*. 2016;1(2):54-61.