Journal of Health Innovation and Environmental Education
Vol. 2, No. 1, June 2025, pp. 31~42
ISSN: 3062-9632, DOI: 10.37251/jhiee.v2i1.1726

Bridging Healthcare and Technology: Management Systems in Radiology Services

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Article Info

Article history:

Received Apr 9, 2025
Revised May 26, 2025
Accepted Jun 27, 2025
Online First Jun 28, 2025

Keywords:

Hospital
Management Information System
Radiology Installation

ABSTRACT

Purpose of the study: The purpose of this study was to determine the description of the implementation of the Hospital Management Information System at the Radiology Installation of Dr. M. Yunus Bengkulu Regional General Hospital.

Methodology: This research was conducted using a qualitative descriptive approach because it will describe the activities that occur in the implementation of the Hospital Management Information System in the Radiology Installation in the field in more depth.

Main Findings: In its implementation, the Hospital Management Information System at the dr. M. Yunus Regional General Hospital including the Radiology installation has been running in accordance with the Minister of Health Regulation No. 1171/MENKES/PER/2011, however, in its implementation there are still several things that have not been implemented such as the absence of policies related to the implementation of the Management Information System at the Radiology installation, the absence of written policies related to routine meetings, inadequate networks, reporting applications that are not yet available, and maintenance of facilities and infrastructure. In addition, in its implementation there is also no reporting of indicators and written procedures related to data management. Meanwhile, in its implementation, data consistency is not a problem because the data obtained is based on patient examinations every day.

Novelty/Originality of this study: This study reveals the dynamics and challenges of implementing the Hospital Management Information System in the Radiology Installation of Dr. M. Yunus Regional General Hospital, Bengkulu, which can be the basis for developing a more effective and local-appropriate information system.

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1. INTRODUCTION

Hospitals are vital institutions in the health service system that have a major responsibility in improving the health of the community [1], [2]. This responsibility is increasingly important along with changes in disease patterns, socio-economic dynamics, and advances in science and technology. In this context, hospitals are required to provide quality, efficient, and responsive services to patient needs. The quality of patient care is the

main indicator in assessing the performance of a hospital [3], [4]. Therefore, improving the quality of service must be the main focus in the management of modern hospitals [5], [6].

The quality of hospital services can be improved through appropriate decision making based on accurate information [7], [8]. Good decisions can only be achieved if the information used in the process is managed properly. The effectiveness of decision making is highly dependent on the quality of the information available [9], [10]. Therefore, the existence of a good information management system is crucial in supporting hospital operations [11], [12]. This system must be able to provide fast, precise, and accurate information for all service units.

One of the systems used to support information management in hospitals is the Hospital Management Information System. Hospital Management Information System is a system that integrates input, processing, and output processes of information to support the effectiveness of health service decision-making [13], [14]. This system is designed to improve the speed, accuracy, and precision of information in the service process [15], [16]. In the digital era, Hospital Management Information System has developed into a computer-based system connected to a network [17], [18]. This allows medical personnel to share data in real-time through different devices.

With the support of information technology, Hospital Management Information System is able to accelerate workflow, minimize errors, and increase service efficiency in various hospital installations [19], [20]. The use of network-based information systems makes data management more effective and transparent [21], [22]. One installation that is highly dependent on the accuracy and speed of information is the Radiology Installation. This installation provides medical support services through radiology examinations which play an important role in establishing a diagnosis. Therefore, the optimal implementation of Hospital Management Information System in this installation is very important to ensure the quality of service [18], [23], [24].

Low quality radiology services can waste resources and increase the risk of misdiagnosis. Therefore, the Radiology Installation is required to carry out services according to standard operating procedures and support the overall quality of medical services [25], [26]. The effectiveness of services in the Radiology Installation is greatly influenced by the information management system used. The implementation of Hospital Management Information System in the Radiology Installation is a strategic effort to overcome these challenges [27], [28]. This system is expected to improve the accuracy, speed, and integration of radiology examination data.

Dr. M. Yunus Bengkulu Regional Hospital is the main referral hospital in Bengkulu Province that has implemented Hospital Management Information System in several service installations. Installations that have used this system include the Registration Installation, Emergency Room, Medical Records, and Radiology Installation. Specifically in the Radiology Installation, the implementation of Hospital Management Information System began in 2014, making it one of the relatively new units in the implementation of this system. This opens up the possibility of challenges and problems in its implementation, both in terms of technical aspects, human resources, and infrastructure. Therefore, an in-depth assessment of the implementation of Hospital Management Information System in the unit is needed.

The study conducted by Alsalman et al. [29] focused on the status of health information system implementation in hospitals in the Eastern Province of Saudi Arabia, emphasizing the challenges and level of adoption of information technology in public health facilities. On the other hand, the study by Iqbal et al. [30] highlighted the development of a blockchain-based veterinary clinic information management system that integrates predictive analytics to improve the reliability and integrity of healthcare services. Both studies have different approaches to health information systems: one examines the general application of technology in hospitals, while the other develops a specific blockchain-based solution. The current study fills the gap by focusing on the management of information systems in radiology services, a specific domain in healthcare that requires integration between technological efficiency and high diagnostic needs, something that has not been thoroughly studied in the two previous studies.

This study presents a novelty by specifically examining the application of information management systems in radiology services, which are often crucial elements in the diagnostic process and clinical decision-making. Unlike previous studies that focused on the implementation of information systems in general or blockchain-based development, this study explores the unique needs of radiology services, including the management of large and complex medical image data and the integration of technology to improve efficiency and accuracy. The urgency of this study lies in the increasing need for reliable radiology services in the era of health digitalization, where suboptimal information management can have a direct impact on the quality of service and patient safety. With the increasing dependence on technology in healthcare, this study offers concrete solutions to bridge the gap between technology and the operational needs of radiology services.

Improving the quality of Hospital Management Information System must begin with an assessment phase of the ongoing system [31], [32]. This assessment is the basis for setting priorities and planning improvements, as well as implementing further implementation. With this approach, the hospital can ensure that the information system developed is truly in accordance with the needs and operational challenges that exist.

This study aims to provide an overview of the implementation of Hospital Management Information System in the Radiology Installation at Dr. M. Yunus Bengkulu Regional Hospital. The results of this study are expected to be a basis for the improvement and development of a more effective Hospital Management Information System in the future.

2. RESEARCH METHOD

2.1. Research Types

This study adopts a qualitative descriptive design with a case study approach [33], [34]. It seeks to provide an in-depth exploration of the implementation and management of information systems in radiology services. The approach allows for a detailed understanding of specific contexts and practices within the studied setting.

2.2. Instruments and Data Collection Techniques

The research instrument in this study used an in-depth interview guideline to interview informants related to the implementation of Hospital Management Information System in the Radiology Installation. In this study, data collection used an in-depth interview technique. In this technique, researchers used an interview guideline as a data collection tool [33], [35]. The interview guideline is a reference for exploring information related to input, process and output in the implementation of Hospital Management Information System in the Radiology Installation [36], [37]. Interviews in this study were directly conducted with the head of the Charge of the Information and Communication Technology Planning Service Center section, Head of the Data and Information Sub-Section, Information Technology and Hospital Management Information System Coordinator, Head of the Radiology Installation Room and Staff of the Radiology Installation Room at Dr. M. Yunus Bengkulu Regional Hospital. Furthermore, in-depth interviews with research informants can produce primary data regarding the activities and stages of Hospital Management Information System implementation in the Radiology Installation.

2.3. Data Analysis Techniques

Meanwhile, the data analysis technique used is an approach to the qualitative data analysis method model of Miles & Huberman. In this study, the data sampling technique is purposive sampling. This method is a technique for taking samples of data sources with certain considerations, for example, the person who knows best about what we expect, or maybe he is the ruler so that it will make it easier for researchers to explore the object/situation being studied. One of the techniques or methods that can be used in qualitative data analysis is to use the Miles and Huberman model [38], [39]. Data analysis in the Miles and Huberman model is inductive and continuous, consisting of 3 (three) main activities, namely data reduction, data display, and conclusion drawing and verification (conclusion drawing / verification) [40], [41].

2.4. Research Subject

The informants in this study numbered five people who were selected based on their roles and direct involvement in the implementation of the Hospital Management Information System in the Radiology Installation of Dr. M. Yunus Bengkulu Hospital. The first informant is the Head of the Program Utilization and Evaluation Section who also serves as the Person in Charge of the Information and Communication Technology Planning Service Center. The second informant is the Head of the Data and Information Sub-Section who also serves as the Head of the Person in Charge of the Information and Communication Technology Planning Service Center. The third informant is the Coordinator of Information Technology and Hospital Management Information System who is responsible for the technical management of the information system in the hospital. Meanwhile, the fourth and fifth informants came from the Radiology Installation, namely the Head of the Radiology Installation Room and a staff representing the technical implementer in the unit.

3. RESULTS AND DISCUSSION

3.1. Overview of Input Implementation of Radiology Installation Management Information System of Dr. M. Yunus Regional Hospital, Bengkulu

The description of the input to the hospital management information system at the Radiology Installation in its implementation leads to the implementation related to policies and coordination, funds, implementing personnel and facilities.

3.1.1. Policy and Coordination

Policy and coordination will be assessed in three aspects, namely policy, routine monitoring and routine meetings. Based on interviews with informants, there is no policy on the Hospital Management Information System at Dr. M. Yunus Regional Hospital including in the Radiology Installation. Based on interviews

regarding the policies that regulate the implementation of the Hospital Management Information System at the Radiology Installation, namely as follows:

> "…The policy already exists, the Hospital Management Information System policy…" (Informant C)

> "...Regarding Hospital Management Information System, basically there is no specific policy from the hospital regarding Management Information System Radiology, the policy that we use is only the policy given by the hospital based on the Governor's Regulation..." (Informant D)

> "....As far as I know there is a policy from the hospital but regarding SI, there is also nothing specific regarding Management Information System Radiology..." (Informant E)

Based on the document review, basically there are regulations regarding the management information system for each hospital. As per the provisions of Article 52 paragraph (1) of Law Number 44 of 2009 concerning Hospitals, each hospital is required to record and report all hospital management activities in the form of a hospital management information system. Until now, the regulations or guidelines used in the implementation of Hospital Management Information System reporting at the Radiology Installation are based on instructions from Charge of the Information and Communication Technology Planning Service Center. The Radiology Installation does not have guidelines regarding policies in the implementation of Hospital Management Information System at the Radiology Installation.

Another aspect of resources is the policy regarding routine monitoring. This routine monitoring activity is carried out by Charge of the Information and Communication Technology Planning Service Center to see how the Hospital Management Information System is developing at the Radiology Installation. This activity aims to conduct an evaluation regarding the development of the Hospital Management Information System at the hospital. Based on the following interview, the informant's answer regarding the monitoring of the Hospital Management Information System at the Radiology Installation carried out by Charge of the Information and Communication Technology Planning Service Center:

> "…Monitoring activities are carried out by the Charge of the Information and Communication Technology Planning Service Center team only…" (Informant C)

> "...From the beginning of its establishment or the beginning we were ordered to base it on the Management Information System, there has been no evaluation conducted by the Person in Charge of the Information and Communication Technology Planning Service Center. We only provide reports related to the development or facilities and infrastructure that we want to add. It's just like that, in the form of a monthly report to Charge of the Information and Communication Technology Planning Service Center..." (Informant D)

> "...There is no special monitoring, we just provide monthly reports to the Charge of the Information and Communication Technology Planning Service Center..." (Informant E)

In routine meeting activities, these activities are not stated in written policies. Meetings are only held routinely at the beginning of the year to discuss the planning of the Hospital Management Information System development program at Dr. M. Yunus Hospital. Meetings are also held to conduct program evaluations, however, for the Hospital Management Information System in the Radiology Installation, an evaluation has never been conducted since it was first implemented. The following are the results of interviews regarding routine meetings:

> "…There are meetings but they are not written down…" (Informant C)

> "…Meetings are held at the beginning of each year, for each month we only report on activities or report on program developments…" (Informant C)

> "…There have been no written meetings discussing the evaluation related to the Management Information System in Radiology…" (Informant D)

For the routine meeting, there is no specific written policy but it has become the hospital's agenda to hold meetings every year. From the description, it can be concluded that, in the Radiology Installation there is no policy element regarding the implementation of the Hospital Management Information System. While routine

monitoring activities regarding the implementation of the Hospital Management Information System of the Radiology Installation have been running. And in routine meetings, there is no written policy regarding routine meeting activities.

3.1.2. Funds and Implementing Personnel

In this case, other resources assessed are funds and implementing personnel. The assessment was conducted to determine the functional installation, training activities and budget allocated for the implementation of the Radiology Installation hospital management information system. Dr. M. Yunus Regional Hospital has a functional unit that is specifically responsible for managing the hospital management information system. The functional unit in question is the Information and Communication Technology Service Center. The Information and Communication Technology Service Center here is a supporting installation for the smooth implementation of information with a computerized system at Dr. M. Yunus Regional Hospital, Bengkulu. Thus, it can be concluded that Dr. M. Yunus Regional Hospital already has a functional installation that specifically handles the Hospital Management Information System. The following are the results of interviews regarding the functional unit:

> "…If the functional unit in question is to assist in the implementation of the Hospital Management Information System, Dr. M. Yunus Regional Hospital has an Information and Communication Technology Service Center unit as an assistant unit…" (Informant A)

> "…Here is the role of the Information and Communication Technology Service Center as a unit that assists the implementation of the Hospital Management Information System in each installation and hospital…" (Informant C)

> "…Hospital Management Information System activities are assisted by the Information and Communication Technology Service Center as a complaint unit…" (Informant D)

Training on the management of the Hospital Management Information System has been carried out by Dr. M. Yunus Regional Hospital. Training is given to new officers who will run the Radiology Hospital Management Information System. However, the training is only given once when the officer first starts working in Radiology, the rest of the officers learn by themselves. The following are the results of interviews regarding the training on the management of the Radiology Installation Hospital Management Information System:

> "…For training, yes…" (Informant C)

> "…The training we get is for new staff who will run the Radiology Hospital Management Information System, the training is obtained together with all staff who run the Hospital Management Information System…" (Informant D)

> "…For training, there is no special training, at that time I learned how to use the Radiology Hospital Management Information System program…" (Informant E)

Training on the Radiology Installation Hospital Management Information System has been conducted, but the training was not specifically for Radiology Installation holders. The training was conducted simultaneously with Hospital Management Information System holders for other Installations. The budget and funds for managing the Radiology Hospital Management Information System come from the Regional Revenue and Expenditure Budget and hospital operational funds. The following are the results of interviews regarding the management of funds for the Radiology Hospital Management Information System:

> "…The funds for the implementation of the Hospital Management Information System are obtained from the Regional Revenue and Expenditure Budget, yes, there is a budget from the hospital itself but I don't think there is a special budget for training…" (Informant A)

> "…The funds for the implementation of the Radiology Hospital Management Information System come from the Regional Revenue and Expenditure Budget.." (Informant C)

> "…We don't know about the funds, it seems like it's from the Regional Revenue and Expenditure Budget and the hospital. Because if it's related to funds, we just report to the Information and Communication Technology Service Center, then the Information and Communication Technology Service Center will provide it. And usually we ask for it according to the needs for papers or other operations…" (Informant D)

> "…The funds for the implementation of the Radiology Management Information System come from the hospital's operational funds provided by the Information and Communication Technology Service Center…" (Informant E)

The budget used for the management and implementation of the Radiology Hospital Management Information System is used only to fulfill the facilities for implementing the Radiology Installation Hospital Management Information System, however there is no training budget.

3.1.3. Facilities

Facilities are supporting the implementation of the Radiology Hospital Management Information System. Facilities that include Information Technology equipment such as computers, internet networks and other supporting facilities along with maintenance of these facilities. The existence of paper and other Office Task Tools that can support the running of the Radiology Hospital Management Information System. Based on observations and interviews, the availability of these facilities in the Radiology Installation is available, but the available network still often experiences disruptions. In addition, the existence of these facilities has not been supported by a special maintenance budget. In addition, the Radiology Installation does not yet have a program related to reporting routine and annual reports so that it is still done manually. The following are the results of interviews regarding the availability of facilities:

> "...The facilities provided are computers, printers, internet networks and other series such as paper are already available in the Radiology Installation, there is also one computer specifically for the Radiology Hospital Management Information System..." (Informant A)

> "...From the beginning the hospital changed to be based on information technology, what was provided and prepared in advance was the computer device and its system..." (Informant C)"

> "...Yes, it's like this, there is only 1 computer specifically to support Hospital Management Information System, so there is only one officer. But related to the service from registration in front of the computer, there are 4. In my opinion, the system is still very ordinary, the Hospital Management Information System is still inadequate..." (Informant D)

> "...Yes, there are computers. But I think there is one less to help me with my work. If there is an error, I like to fiddle with it myself, or ask for help from friends who understand, because we don't have special Information Technology if there is damage. And if we need to call someone, we usually pay first, because if we wait from the hospital, it will take a long time, while the work must continue..." (Informant E).

The assessment of computer devices is adequate. Another aspect that is assessed is the internet network. The internet network in the Radiology Installation is available but errors often occur. In addition, the program regarding the Hospital Management Information System is also considered incomplete because there is no program to create monthly reports and annual reports. However, in terms of maintenance, the Radiology Installation has not carried out equipment maintenance, because there is no special budget and special personnel in maintaining the equipment used in reporting through the hospital management information system.

3.2. Overview of the Process of Implementing the Radiology Installation Management Information System at Dr. M. Yunus Bengkulu Regional Hospital

3.2.1. Indicators

Indicators are one of the components assessed from the hospital management information system. Based on the interview results, in the implementation of the Hospital Management Information System in the Radiology Installation, it has its own indicators to measure the success of the implementation of the Hospital Management Information System itself. In its implementation, the Hospital Management Information System in the Radiology Installation is considered successful if there are Human Resources available who can run the program and the availability of complete applications. In addition, the indicator of success is the achievement of the number of patient visits to the Radiology installation.

In terms of reporting, the activity has not been carried out regularly. This is due to the lack of available personnel, especially for the Radiology Installation Hospital Management Information System itself. The following are the results of interviews related to the indicators of the success of the Radiology Hospital Management Information System:

> "…The indicators created only refer to Permenkes No. 1171/MENKES/PER/2011…" (Informant C)

> "….There are no specific indicators, the Radiology Installation Hospital Management Information System is said to be successful if it has achieved the target of hospital visits and Human Resources have met and the application is complete…" (Informant D)

> "…The Hospital Management Information System is said to be successful if Human Resources can run the application correctly, there is no indicator reporting…" (Informant E)

It can be concluded that the Radiology Installation has indicators to measure the success of the Hospital Management Information System in the Radiology Installation, but based on observations this is not supported by indicator reporting. Because there is no evidence of indicator reports used by the Hospital Management Information System of the Radiology Installation.

3.2.2. Source of Funds

The assessment of data sources is generated from document review and interviews regarding available data. According to informants at the Radiology Installation, the data used is only patient data. The data collection is based on patient data. The data is in the form of data on the number of patient examinations, the number of incomes and the number of patient data. The data will later be used to create a report addressed to the health and medical support divisions. The results of the data will later become a summary of each examination made manually. The following are the results of interviews regarding the data sources used in the implementation of the Radiology Installation Hospital Management Information System:

> "...The source of the data that we will report later only comes from patient data, there is also data on the implementation of our activities that we will also report later..." (Informant D)

> "...The data that I manage is patient data, in the form of data on the number of examinations and income, then data on the number of patients..." (Informant E)

3.2.3. Data Management

In data management, an assessment is carried out on data management procedures, data warehouses, dictionaries and special codes in the hospital management information system. The procedures available in the implementation of the Radiology Hospital Management Information System refer to Permenkes No. 1171/MENKES/PER/2011. However, the hospital itself makes guidelines that will be used in data management. The following are the results of interviews regarding the Radiology Management Information System management procedures:

> "…Each installation should have a procedure in accordance with its respective implementation…" (Informant C)

> "…There is no procedure, we only refer to the steps provided by the Information and Communication Technology Service Center…" (Informant D)

> "…There is none, we are self-taught…" (Informant E)

Based on interviews and observations in its implementation, the Radiology Installation does not have a written procedure related to its implementation steps. The Radiology Installation only performs data management based on self-study.

Data on the Radiology Hospital Management Information System is user friendly because it can be accessed by all parties. This is also indicated by the ease of use of the management information system by users or users who have a code related to the Radiology Hospital Management Information System. The results of interviews and observations show that only Radiology personnel can use it. This is because only those who are interested in the Radiology Hospital Management Information System can use it.

> "…The programs owned by each Installation vary according to their needs…" (Informant A)

> "…Not all officers can access the data in the Radiology Installation because each officer has their own duties according to their field…" (Informant C)

> "…The data in the Radiology Installation is easy to understand, but not everyone can access it. According to their needs only…" (Informant D)

> "…The data is easy to understand and easy to access by anyone who has a special code. Usually those who are interested want to see something from the Radiology Installation report ask me first to open it…" (Informant E)

The Radiology Installation has a manual administration book and report summary that is useful for data storage. In addition, data storage is also carried out by the Information and Communication Technology Service Center which is carried out in the form of a digital system. That way, to open the Radiology Installation data archive, you can see it from the Information and Communication Technology Service Center. The following are the results of interviews regarding data storage:

> "…The Information and Communication Technology Service Center also serves as a place to store archive data owned by each Installation…" (Informant A)

> "…The Radiology Installation has its own report to store its data…" (Informant D)

> "…We store the data in the manual administration book and report summary. While the digital form is with the Information and Communication Technology Service Center team…" (Informant E)

Based on the data obtained, the Radiology Installation does not yet have a procedure that can assist in its implementation. Then, the data used is user friendly because it can be accessed by users who have a special code. And the Radiology Installation, in addition to backing up its own data, also has an Information and Communication Technology Service Center that backs up data related to the implementation of the Hospital Management Information System in the Radiology Installation.

3.3. Overview of the Output of the Implementation of the Radiology Installation Management Information System at Dr. M. Yunus Regional Hospital, Bengkulu

3.3.1. Information Products

In the information product component, elements such as data consistency, reporting intensity, and measurement intensity will be assessed. Data consistency is described through data collected in the Radiology Hospital Management Information System. The following is an interview regarding data consistency:

> "…Data from patient examinations changes every day…" (Informant C)

> "…It is definitely not consistent, every day the patients are definitely different…"(Informant D)

> "…The data we process every day is not consistent at all, because every day it definitely changes…" (Informant E)

The reporting flow or procedures owned by Radiology have several stages. The first is the registration section, because the registration section has a patient card that records previous medical records and records patient data. The second is the Radiology section, then the Information and Communication Technology Service Center section, after which new data is given to the Director for decision making. Based on the results of interviews and observations in reporting, there are monthly reports and annual reports. Monthly reporting includes reports of activities carried out every day. While the annual report is more about the planning needs report and the results of the evaluation for a year. The following are the results of interviews regarding data reporting:

> "…The field department receives monthly reports made by the Radiology Installation…" (Informant C)

> "…The monthly and annual reports that we make…" (Informant D)

> "…In this Radiology Installation, there are 2 forms of reports. Namely monthly reports and annual reports. The monthly report is more about what is done every day, such as patient data that goes into the monthly report. While the annual report is like planning what we will do next month, needs for next year, like that…" (Informant E)

Based on the interview, the routine reporting conducted by the Radiology Installation is addressed to the health and medical support division, while the annual report is addressed to the Director. It can be concluded that the data used in the Hospital Management Information System activities in the Radiology Installation is never the same or can be said to always change. Then the reporting has been done well because the reporting is done once a month. The report is collected within a period of months and years.

3.3.2. Dissemination and Use of Information

One aspect of information dissemination and users is the aspect of needs and analysis. In the aspect of needs and analysis, elements such as information acquisition and data presentation will be assessed. In the element of obtaining information in a timely, relevant, and accurate manner, it is considered adequate. In terms of timeliness, the availability of information is sufficient because the information is already available at the time of planning and direct action. The following is an interview regarding the timeliness of the report:

> "...The annual report is intended for the director, while the monthly report is reported to us every month..." (Informant A)

> "...Yes, there is an annual report, it is given to me as the person in charge who also does the planning..." (Informant C)

> "...We always make annual and monthly reports, and we always submit reports according to the book closing schedule...
>
> " (Informant D) "...Always make reports and on time, because it must be checked first by the head of the room before being submitted. Sometimes we have to be late when we have a lot of work..." (Informant E)

In terms of data relevance, in the Radiology Installation all existing data is relevant or related between data from the registration section to the Radiology section. Here is an interview regarding data relevance:

> "…Yes, it is relevant, from the field we also receive…" (Informant C)

> "…The data we have so far has always been relevant to the data from the registration section to the Information and Communication Technology Service Center section…" (Informant E)

Furthermore, in terms of data accuracy, the data has been assessed as quite accurate in seeing the actual events, because everything that has been written or entered into the system is the data that actually occurred according to the examination. The hospital director validates the data by looking at the data that the Information and Communication Technology Service Center has with Radiology.

> "...Accurate, the one who usually checks the data is the Director, it also often comes unexpectedly..." (Informant C)

> "…We give the data to the field section to be checked again, later from the field section that reports to the head, the data is definitely accurate..." (Informant D)

> "…The report before being given to the field section is usually checked first by the Radiology Division, the data before being entered into the report is also checked for accuracy. When inputting data, it must be repeated 2 times..." (Informant E)

Data presentation is only done using tables that already exist in the system and usually it is easier to understand. That way the data presentation aspect is considered to already exist and adequate. Other aspects in the dissemination and users of information are advocacy, implementation and action. In this aspect, the information user will be assessed according to the authority at the health service level. In the Radiology Hospital Management Information System, the information user is addressed to the Division to be used as a report. Information users are used at every level to assist in the evaluation of the Radiology Installation management information system. This is done by each party, namely planning, Radiology and the Information and Communication Technology Service Center which will then be submitted to the Director for evaluation. The following are the results of interviews regarding users of information in the Radiology Installation Hospital Management Information System:

"...Always get data reports from the Radiology department and it is done every month..." (Informant A)

"...The data is used for monitoring and evaluation, as well as a guideline for future planning..." (Informant C)

"...There is always reporting that we do..." (Informant D)

"...If it is to the patient, the information that is definitely delivered is about the diagnosis and is related to the examination in Radiology, then the information is also directed to the Division report..." (Informant E)

It can be concluded that the use of periodic monitoring and evaluation has been carried out by the Radiology Installation in the implementation of the Hospital Management Information System. Because every month monitoring is carried out by the Information and Communication Technology Service Center and occasionally holds meetings with the Director as well. While for the advocacy element, the Hospital has collaborated with the Health Service in responding to the Hospital Management Information System, especially in the Radiology Installation.

This study has a positive impact by providing in-depth insights into the implementation and management of management information systems in radiology services, which can be a reference for the development of health technology in the future. The findings of this study are expected to help improve operational efficiency, diagnostic accuracy, and quality of patient care. However, this study has several limitations, such as the limited scope of certain radiology services and the use of a qualitative approach that may not fully represent the variation in implementation across health facilities. In addition, limited data from the end-user perspective may also affect the generalizability of these findings.

4. CONCLUSION

The Radiology Installation Management Information System is a system that can assist in decision making. At Dr. M. Yunus Bengkulu Regional Hospital, the management of the Hospital Management Information System is assisted by the Information and Communication Technology Service Center, including the Management Information System in the Radiology Installation. Input elements in the Radiology Installation Management Information System include resources. In its implementation, there are still several things that have not been implemented, such as the absence of written policies, the absence of written policies related to routine meetings, inadequate networks, reporting applications that are not yet available, and maintenance of infrastructure. The process elements in the Radiology Installation Management Information System include indicators, data management and data sources. In its implementation, there are still several things that have not been implemented, such as the absence of indicator reporting and written procedures related to data management. The output of the Radiology Installation Management Information System is information products and dissemination as well as information users. In its implementation, data consistency is not a problem because the data obtained is based on patient examinations every day. Further research is suggested to expand the scope by examining the implementation of information systems in various types of health services other than radiology to gain a more comprehensive understanding. In addition, a quantitative approach can be used to more systematically measure the impact of information systems on operational efficiency and patient satisfaction.

ACKNOWLEDGEMENTS

We would like to thank all parties who have contributed to this research. Special thanks are given to institutions and individuals who have provided moral, technical, and material support, so that this research can be carried out properly.

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