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Improving the Quality of Medical Check Up Services at Lakespra Dr. Saryanto to Support the Health of Indonesian National Army Air Force Soldiers

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A B S T R A C T

This study analyzes the quality of medical check-up services at Lakespra dr. Saryanto to support the health of Air Force personnel, especially pilots. Using a qualitative method with a descriptive design, the research found that while medical check-up services are in place, their implementation is not yet optimal. Key issues include an underutilized management information system, manual patient registration, conventional radiography equipment, and limited patient feedback mechanisms. These findings highlight the need for improvements in service technology and operational systems to enhance service quality and efficiency.

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INTRODUCTION

The health of Indonesian National Army Air Force (TNI AU) soldiers is one of the main pillars in maintaining operational readiness and the effectiveness of national air defense. Prime health conditions allow soldiers to carry out their duties optimally, from flights, aircraft maintenance, to other military operations. Therefore, efforts to maintain and improve the health of soldiers are a top priority and cannot be ignored. One form of effort to maintain the health of soldiers is through the implementation of regular medical check-ups (MCU). MCU aims to detect health problems that soldiers may experience early, so that they can be treated as early as possible before they develop into more serious diseases (Jin, 2022). In addition, MCU can also provide a comprehensive picture of the health condition of soldiers, so that more targeted prevention and health improvement efforts can be carried out.

The dr. Saryanto Aviation and Space Health Institute (Lakespra dr. Saryanto) as one of the central implementing agencies at the Air Force Headquarters level has the task of organizing indoctrination and aerophysiology training for aircraft crews, both the Indonesian National Army Air Force (TNI AU) and the Indonesian National Army (TNI) and Special Air Force Officers (PKMU). Indoctrination and Aerophysiology training (ILA) for flight crew is one way to provide the crew with an understanding of physiological changes due to the effects of flight, so that increased knowledge and physical and mental endurance are needed. The implementation of ILA carried out by Lakespra dr. Saryanto for the flight crew uses aerophysiology equipment that is in accordance with its rating qualifications through stages for the flight crew carried out continuously and well-planned. Based on the report on the results of the flight crew health check in 2023, there were 648 pilots/navigators who underwent health checks at Lakespra dr. Saryanto with the following health statuses: stakes 1 there were 21 people, stakes 2 there were 328 people and stakes 3 there were 259 people, while for the flight crew there were 81 people with the following health statuses: stakes 1 there were 3 people, stakes 2 there were 22 people and stakes 3 there were 56 people (Diskesau Report, 2023). Handling of the examination results after MCU is carried out by the local hospital where the personnel are on duty, while if a fairly serious disease is detected, they will be referred to RSAU dr. Esnawan Antariksa or to RSPAU dr. Hardjolukito.

In Indonesia, MCU implementation for employees is generally carried out once a year, in accordance with the provisions stipulated in the Regulation of the Minister of Manpower and Transmigration No. Per.02/MEN/1980 concerning Health Examination of Workers, which requires companies to conduct periodic health examinations at least once a year. However, the frequency of MCU implementation can vary depending on several factors. For example, the type of work and high work risks, such as exposure to hazardous chemicals, loud noises, extreme temperatures, or infectious biological agents, may require more frequent examinations, even once every six months. In addition, the age and health conditions of employees also affect the frequency of MCU, where employees over the age of 40 or those with certain health conditions may be advised to undergo more frequent examinations based on medical recommendations. Company

policy also plays a role in determining the frequency of MCU, with some companies choosing to conduct more frequent health checks according to their operational needs and internal policies. This means that if intensive checks are needed, it is permissible to conduct MCU checks more than once a year.

The dr. Saryanto Aviation and Space Health Institute (Lakespra dr. Saryanto) has a strategic role in supporting health and indoctrination for TNI AU soldiers (TNI-AU, 2020). Lakespra dr. Saryanto not only provides general health services, but also specializes in aviation health, including MCU for TNI AU soldiers. MCU carried out at Lakespra dr. Saryanto covers various aspects of health, ranging from physical examinations, laboratory, radiology, to mental health examinations. MCU services at Lakespra dr. Saryanto have been running for quite a long time and have served thousands of TNI AU soldiers. However, along with the development of the times and increasing demands, the quality of MCU services needs to be continuously improved. Some of the challenges faced in MCU services at Lakespra dr. Saryanto include a management information system (SIM) that is not yet optimal, a manual patient registration system, conventional radiography examinations and the absence of quality control in the form of feedback from patients. SIM in Lakespra still uses a server that has not been upgraded so it is not optimal, according to Vogels (2020) that the potential of cloud technology in SIM transformation can increase the scalability, flexibility, and security of SIM, as well as open up opportunities for further innovation (Vogels, 2020). Cloud-based SIM can provide wider accessibility, allowing medical personnel to access patient data from anywhere and anytime. In addition, SIM is not optimal, patient registration is still done manually so it is not effective.

In the digital era like today, an online patient registration system can improve hospital operational efficiency and generate cost savings so that this system can help hospitals reduce administrative costs, increase staff productivity, and optimize resource utilization (Agarwal, R., 2022). Conventional radiography equipment also makes MCU services become ineffective. Currently, most hospitals in Indonesia have switched to digital radiography technology. According to Krupinski, digital radiography not only produces clearer and more detailed images, but also allows digital image manipulation to improve visualization of anatomical structures (in Williams et al., 2007). In addition to these things, measuring the quality of health services is also very important. The quality of health services can be obtained from patient feedback. According to Wolf (2016), the importance of patient feedback in creating a culture of safety and quality in health organizations (Wolf, 2016). Patient feedback can help identify patient safety risks, improve communication between patients and health care providers, and encourage a culture of openness and transparency. Patient feedback can also help identify patient safety risks, such as medication errors, nosocomial infections, or other adverse events.

Research on MCU at Lakespra dr. Saryanto is important because this institution has a strategic position in maintaining the health of soldiers in general and pilots in particular in carrying out their duties as pilots so that the health of pilots can be detected early. This study aims to analyze the quality of MCU

services at Lakespra dr. Saryanto and identify aspects that need to be improved. In addition, this study will also formulate recommendations for improvement that can be implemented to improve the quality of MCU services at Lakespra dr. Saryanto. Thus, it is hoped that the health of TNI AU soldiers can be maintained optimally and the operational readiness of the TNI AU can be guaranteed. This research is important because it is expected to have a significant impact in improving the health services of TNI AU soldiers in order to support the operational readiness of national air defense. By improving the quality of MCU services at Lakespra dr. Saryanto, it is hoped that TNI AU soldiers can be better protected from various health risks so that they can carry out their duties better.

LITERATURE REVIEW

Management Information System

Management information theory is an adaptation of management information theory that is applied specifically to the context of health services. This theory emphasizes the importance of accurate, relevant, and timely information in clinical and administrative decision making in health institutions (Aditama, 2016). This information includes patient data, medical records, drug inventory, staff performance, and financial indicators. MIS is an integrated system that aims to collect, store, process, and distribute information that supports all business processes in the hospital (Sitorus, 2016). This management information system can also facilitate the collection, storage, processing, and distribution of information across all health institution units. An effective management information system can improve operational efficiency, service quality, and patient safety. In addition, the management information system also highlights the importance of patient data security and privacy in information management in health institutions. MIS plays an important role in collecting, storing, processing, and presenting information related to patients, medical personnel, inventory, finance, and administration in health institutions. Management Information Systems are used to organize and control health management, and enable patients, health facility staff, nurses, and doctors to access information and assets anywhere and anytime (Nurhayati et al., 2022). With MIS, the health service process becomes more structured, starting from patient registration, scheduling examinations, recording electronic medical records and medical equipment. In addition, MIS also helps health institution management in making strategic decisions based on accurate and up-to-date data, so that it can improve service quality, operational efficiency, and overall patient satisfaction.

Cloud-based MIS in its transformation can increase the scalability, flexibility, and security of MIS, and open up opportunities for further innovation (Vogels, 2020). Cloud-based MIS can provide broader accessibility, allowing medical personnel to access patient data from anywhere and at any time.

How it works is that health data is stored and processed on a cloud server managed by a cloud service provider. This reduces the burden on the hospital's IT infrastructure. The benefits that can be obtained are the scalability of MIS which can be easily adjusted to the growth of the health institution. Cloud-based MIS is a modern evolution of traditional MIS, utilizing cloud computing

infrastructure to store, manage, and access data and applications. In this model, companies no longer need to invest heavily in internal hardware and infrastructure. Instead, they can utilize cloud resources provided by cloud service providers, such as Amazon Web Services. Cloud service provider security applies strict security standards to protect data in the hospital. The Windows program system has become the main choice for many hospitals in implementing MIS because of the various advantages it offers. Windows provides a familiar environment for most health institution staff, especially medical and administrative personnel, making it easy to adopt and use MIS (Marakas, 2011). In addition, Windows' wide compatibility with various leading medical applications ensures smooth integration and optimal functionality. Linux and Windows have their respective advantages in implementing hospital management information systems (SIMRS). Linux, as an open-source system, allows for more flexible and cost-efficient system customization as it does not require expensive licensing. This makes it ideal for hospitals with limited budgets and IT teams that are able to customize (Smith & Johnson, 2021). In addition, Linux is known to have stronger security with tight access controls and regular updates by a global community, which reduces the risk of cyberattacks (Lee, 2022). In contrast, Windows excels in ease of use and broad compatibility with commercial medical software, which makes integration easier for hospital staff familiar with these systems (Martinez, 2021). However, Windows software licensing and update costs are higher than Linux, and it requires additional investment in security measures to protect patient data (Rodriguez et al., 2023). Although Windows offers official support from Microsoft, which makes it easier access to technical assistance, it also creates dependence on a single vendor (Chen & Walters, 2023). With these advantages and disadvantages in mind, hospitals need to assess operational and budget priorities to determine the most appropriate system.

Extensive technical support and an active user community also provide ease in troubleshooting and system updates. MIS must be designed and implemented by considering applicable ethical and legal principles and be able to maintain the privacy and security of patient data in the use of MIS (Shojaei et al., 2024). MIS must be designed and implemented by considering applicable ethical and legal principles. MIS must have strong security features to protect patient data from unauthorized access. MIS must implement strict access control, data encryption, and audit logs to track user activity. In addition, Human Resources (HR) have a central role in the successful implementation and utilization of MIS (Sitorus, 2016). Skills, knowledge, and commitment are the keys to operating, maintaining, and developing MIS effectively. Without competent HR, MIS will only be sophisticated software without providing optimal benefits to health institutions. In addition, the server in the hospital management information system (SIMRS) is the main component that handles the storage and management of patient data, including electronic medical records, laboratory results, and administrative records. This server allows fast access and efficient data integration, thus supporting the smooth operation of the hospital. However, if the server experiences frequent downtime, healthcare

services can be disrupted. Solutions to overcome this include upgrading hardware infrastructure to be more reliable, installing adequate cooling systems to prevent overheating, and regular monitoring and maintenance. Implementing redundancy and automated backup systems helps maintain data and operational availability when the main server is down. In addition, hospitals should have a dedicated IT team ready to resolve technical issues and implement effective emergency recovery protocols to reduce the impact of downtime (Nguyen, 2022; Chen & Walters, 2023).

Digitalization Theory

Digitalization in healthcare institutions refers to the application of digital technologies to improve the efficiency, quality, and accessibility of healthcare services. Digitalization involves the use of information and communication technologies such as electronic medical records, telemedicine, mobile health applications, and data analytics to transform the way healthcare services are delivered and managed. Digitalization can provide significant benefits to patients, healthcare providers, and the healthcare system as a whole (Laukka et al., 2023). For patients, digitalization can improve the accessibility of healthcare services, facilitate communication with healthcare providers, and provide more complete information about their health conditions. For healthcare providers, digitalization can improve operational efficiency, reduce medical errors, and enable better clinical decision-making based on data. For the healthcare system as a whole, digitalization can improve the quality of care, reduce costs, and increase the efficiency of resource allocation. The theory of digitalization also recognizes the challenges that need to be overcome in its implementation, such as data security and privacy issues, the digital divide, and resistance to change. Therefore, the implementation of digitalization in healthcare institutions needs to be carried out carefully and in a planned manner, involving all relevant stakeholders. This digitalization theory can be applied to radiology services in the form of digital radiography consisting of X-ray source equipment and X-ray detectors, both of which are capable of producing digital images (Huriawati et al., 2017). The use of digital radiography has several advantages, including being effective in terms of film processing time, the quality of the resulting photos has a higher image and patient safety because it minimizes photo repetition.

According to Krupinski (2020), the advantages of digital radiography in improving the quality of diagnosis and efficiency of workflow in the field of radiology. According to him, digital radiography not only produces clearer and more detailed images, but also allows digital manipulation of images to improve visualization anatomical structure (Krupinski, 2020). According to Flynn, the important role of image processing algorithms in improving the quality of digital radiographic images where the algorithm can be used to reduce noise, increase contrast, and correct artifacts in images (Flynn, 2022). Meanwhile, according to Hoeschen, the importance of integrating digital radiography with hospital information systems (HIS) which can improve workflow efficiency, reduce medical errors, and improve the quality of health services (Hoeschen, 2019).

Digitalization can also be applied in online registration systems. According to Joshi, the importance of an online patient registration system can increase the accessibility and efficiency of health services (Joshi, 2023). According to him, this system not only makes it easier for patients to access health services but also helps hospitals manage resources more effectively. According to Ancker, the design of a user-friendly and inclusive online patient registration system is very important so that it is easy to use by everyone, including those with physical or technological limitations (Ancker, 2021). Meanwhile, according to Agarwal, the potential of an online patient registration system can improve hospital operational efficiency and generate cost savings, this system can help hospitals reduce administrative costs, increase staff productivity, and optimize resource utilization (Agarwal, R., 2022)

Quality Control Theory

Quality Control (QC) or quality control in health services is an organized system to ensure that all aspects of health services, from diagnosis, treatment, to post-treatment care, meet established quality standards (Azwar, 2010). The main objective of QC is to provide safe, effective, and efficient services to patients, and to minimize the risk of medical errors and adverse events. In the context of health services, QC aims to ensure that patients receive safe, effective, and appropriate care. Feedback from patients and medical staff is an important component of this QC process. One of the feedback models feedback items in the form of the Plan-Do-Check-Act (PDCA) Cycle, a continuous improvement model that has long been used in various fields, including health services (Aghakhani, 2020). This model emphasizes a systematic and iterative approach to improving quality, utilizing feedback as an important tool in the process. In the context of health services, the PDCA cycle can be applied effectively to manage patient feedback, from data collection planning to implementing corrective actions.

Patient feedback is a valuable source of information to improve the quality of care and patient safety. In addition, patient feedback can provide insight into the patient's direct experience, identify areas for improvement, and encourage a culture of continuous improvement in health organizations (Berwick, 2013). According to Wolf (2016), the importance of patient feedback in creating a culture of safety and quality in health organizations (Wolf, 2016). According to him, patient feedback can help identify patient safety risks, improve communication between patients and health care providers, and encourage a culture of openness and transparency. Patient feedback can help identify patient safety risks, such as medication errors, nosocomial infections, or other adverse events. Patient feedback can help improve communication between patients and health care providers, so that patients feel more heard and understood. In addition, patient feedback can also help encourage a culture of openness and transparency in health organizations, where errors are acknowledged and corrected openly. According to Clancy, the importance of patient feedback in encouraging accountability and transparency in the health system. Patient feedback can be used to compare the performance of healthcare providers, provide patients with

information about their healthcare options, and encourage healthcare providers to improve the quality of their services (Clancy, 2018).

Feedback is information given about a person's reaction to a product, performance, or behavior (Beatty, 2000). Feedback can be positive in the form of praise or recognition and negative in the form of criticism or suggestions for improvement. Feedback can be delivered verbally, in writing, or through actions. Direct methods through suggestion boxes placed in strategic locations can be an easy way for patients to provide anonymous feedback. Surveys can be conducted in writing, by phone, or online to collect more structured feedback. In-depth interviews with patients can provide deeper insights into their experiences. Healthcare institutions can monitor patient feedback through social media platforms. Indirect methods by analyzing data such as medical records, readmission rates, or number of complaints can provide clues about areas for improvement. Hiring people to pretend to be patients and evaluate services can provide an objective view. Monitoring reviews or comments left by patients on healthcare institution websites or other online review platforms can provide valuable information. The third way is an innovative approach through the development of mobile applications that allow patients to provide feedback in real time can increase participation and facilitate the process of collecting feedback. Placing digital kiosks in waiting areas can allow patients to provide feedback quickly and easily.

METHODOLOGY

This study uses a qualitative method with a descriptive design. Qualitative methods are carried out through various approaches, including literature studies, data collection and processing, and school manuscript materials. Qualitative research is research based on the philosophy of postpositivism, used to research natural object conditions where the researcher is the key instrument, data collection techniques are carried out by triangulation (combination), data analysis is inductive/qualitative, and qualitative research results emphasize meaning more than generalization (Sugiyono., 2009). In this study, data collection was carried out using observation techniques and literature studies. In accordance with the design Descriptive data is analyzed using techniques to describe the data that has been collected.

RESEARCH RESULT AND DISCUSSION

System Information Management

Management Information Systems (MIS) in healthcare institutions play a vital role in improving efficiency, productivity, and quality of service. MIS enables integrated information management, including patient data, human resources, and inventory of drugs and medical equipment (Ashrafi, N., Kelleher, L., & Kuilboer, 2019). With MIS, administrative processes, such as patient registration, appointment management, and electronic medical records, can be carried out more quickly and accurately. This accelerates clinical decision-making, reduces errors, and improves coordination between departments in the hospital. In addition, MIS helps in financial management, such as controlling operational costs and managing insurance claims, thereby increasing the

transparency and accountability of the institution. On the other hand, MIS also functions as a tool for strategic decision-making by management, by providing real-time data on patient health trends, service capacity, and quality of care. This data is very important for long-term health program planning and monitoring institutional performance. Not only that, MIS also plays a role in improving information security by managing limited access to sensitive data, such as patient medical records, which helps protect patient privacy and comply with data security regulations. Thus, MIS becomes a key component in supporting efficient operations and higher quality health services.

Lakespra dr. Saryanto in the implementation of its health services has used SIM. Information technology in the form of SIM used by the Department Aeroclinic This Work with connect start from part front office for patient registration, several clinics for examination, administration and evaluation for examination results and evaluation section for health examination results. Component SIM Lakespra moment This can grouped in two parts namely software and hardware. The software currently used by SIM Lakespra is in the form of program linux with Random Access Memory (RAM) only 16 so that has limitations in data storage. The SIM operation used by Lakespra dr. Saryanto uses an internet network in the form of Local Area Network (LAN). Linux programs are designed to run on various Linux distributions that are open-source, their source code is open, allowing anyone to view, modify, and distribute it freely. Hardware. The hardware used Lakespra in implementation SIM health Lakespra is in the form of computer and printer. No all part connected with system information management. Where with No connected computer with system information management so data input Still done in a way manual. Besides That, system information management in Lakespra Dr. Saryanto is also still constrained by the network server which often goes down, causing the link connection between clinics to often be disconnected, which has an impact on input. results service MCU Also become more long. Besides constrained server, Lakespra SIM Also Not yet supported by source Power man Which adequate.

Management information systems work by integrating various operational functions. House Sick or institution health to in One platform digital. SIMRS includes patient registration management, electronic medical records, medical service scheduling, and pharmaceutical inventory management. This process begins when patient data is entered into the system at the time of registration, which is then connected with various departments to facilitate efficient workflow (Smith & Johnson, 2021). System This allows access fast to medical records, which assist doctors in making better and more responsive clinical decisions. In addition, SIMRS supports the integration of laboratory and radiology data, so that examination results can be directly accessed by medical personnel. Operational SIMRS also involves strict data security, with encryption features to protect patient privacy and prevent unauthorized access. Regular system updates are essential to ensure optimal performance and prevent vulnerability to cyber threats (Nguyen et al., 2022). The real-time monitoring function helps hospital staff monitor operations and finish problem technical in a way fast. With automate process administration, SIMRS reduce error man and

increase operational efficiency of hospitals, which ultimately contributes to improving the quality of health services (Chen & Walters, 2023).
Data computer and the printers used by each clinic can be seen in table 1.

Table 1. Data Computer Which Connected SIM

No.	Part or clinic SIM connected	Computer	Information
1.	*Front Office*	3	Connected SIM
2.	Clinic *X-ray*	2	Connected SIM
3.	Clinic USG	1	Connected SIM
4.	Clinic General	1	Connected SIM
5.	Laboratory	3	Connected SIM
6.	Clinic Eye	1	Connected SIM
7.	Clinic Tooth	2	Connected SIM
8.	Clinic Gynecology	1	Connected SIM
9.	Clinic ENT	2	Connected SIM
10.	Clinic Nerves	1	Connected SIM
11.	Room Audiometry	1	Connected SIM
12.	Clinic Psychiatry	1	Connected SIM
13.	Room Administration And Evaluation	11	Connected SIM
14.	Department Aerophysiology	1	Connected SIM
15.	Department of Development, Competence, Study and Development	4	No Connected
16.	Department Aeroforensics	1	No Connected
17.	Part Fitness Physical	1	No Connected

Source: Computer Data Report Simak BMN until March 2024 If institution health No use driver's license, impact negative Which appear Can Enough significant. Wrong One risk main is the occurrence inefficiency in operational daily.

Process administration Which Still done in a way Manual, such as patient registration, medical data processing, and inventory management, will take longer and are prone to errors. These errors can be inaccurate recording or data duplication, which can ultimately affect quality service health Which given. Besides That, without driver's license, health institutions will have difficulty in monitoring and controlling operational costs, especially in terms of drug and medical equipment management (Ozair, FF, Jamshed, N., Sharma, A., & Aggarwal, 2015). This can lead to waste and inefficient use of resources. Not only that, without a computerized system, patient data privacy and security are also at high risk, considering that manual systems are more easily hacked or experience information leaks. As a result, trust patient to institution health Can decrease. Besides That, Strategic decision-making by management will also be

hampered because data is not available in real-time and integrated, which can slow down the response to changing service needs.

SIM used to manage and control systems in health management, and enable patients, health facility staff, nurses, and doctor for access information and asset in where just and when just (Nurhayati et et al., 2022). The implementation of the Management Information System (MIS) at Lakespra dr. Saryanto will provide many significant benefits in improving the quality of health services. Wrong One superiority main is acceleration process and results services. SIM allows patient and administrative data to be processed quickly and efficiently, which makes it easier channel registration, diagnosis, until treatment. Speed This not not only benefits the patient, but also the medical staff, because the time needed to access information can be reduced. In addition, SIM helps reduce operational costs. With an integrated system, the use of paper and manpower administration can reduce, so that more economical cost in term length. Management inventory, booking drug, as well as equipment medical Also become more efficient, which ultimately has an impact on controlling expenditure.

Another important factor is the reduction of human error. Computerized systems can minimize errors in recording medical data, drug prescriptions, or treatment schedules, which are often the source of errors in system manual. SIM Also support security data patient, with implement an encryption system and limited access so that only authorized parties can access information sensitive. This increase trust patient and ensure their privacy is maintained. Overall, the implementation of SIM at Lakespra dr. Saryanto will encourage efficiency, effectiveness, and safety in health services cloud technology in MIS can increase the scalability, flexibility and security of MIS, as well as open up opportunities for further innovation (Vogels, 2020). SIM Which based on cloud can provide accessibility Which wider, allowing medical personnel to access patient data from anywhere and at any time. Health data can be stored and processed on cloud servers managed by cloud service providers. This reduces the burden on information technology (IT) infrastructure experts in health institutions. The benefits that can be obtained are SIM scalability that can be easily adjusted to the growth of health institutions. Data accessibility, cost savings, maintenance and feature updates, and data security are borne by the service provider.

Windows program system has become the primary choice for many hospitals in implementing MIS because of the many advantages it offers. Windows provides a familiar environment for most healthcare staff, especially power medical and administration, thereby facilitating the adoption and use of SIM (Marakas, 2011). In addition, windows wide compatibility with various application medical leading ensure integration Which fluent and optimal functionality. Windows programs are specifically designed to run on proprietary or closed windows operating systems. Their source code is not publicly available, so only Microsoft on the system can develop and modify them.

SIM must own feature security Which strong for protect data patient from access Which No legitimate. SIM must apply control access Which strict, encryption data, and audit logs to track user activity. In addition, Human

Resources (HR) has role central in success implementation and utilization SIM (Sitorus, 2016). Skills, knowledge, and commitment is key for operate, maintain, and develop MIS effectively. IT staff provides technical support to user driver's license, help they overcome problem or difficulty which may they face it moment use system. Support Which responsive and effectively ensure that users can continue working without interruption. IT staff provide training to SIM users, such as doctors, nurses, and administrative staff, on how to use the system effectively. Adequate training ensures that users can make optimal use of SIMRS to improve efficiency and quality of service.

Based on the findings and theories that exist, there is SIM synchronization that is running but is still not optimal. This is because the server is not yet stable, the use of the program Linux which has not been in upgrade and not yet manned by HR competent. According to Marakas (2011) the implementation of windows programs wide compatibility of windows with various leading medical applications ensures smooth integration and functionality Which optimal. According to Vogels (2020) data health can stored and processed on cloud servers managed by cloud service providers so that data accessibility can be more widely. Apart from that, according to Sitorus (2016) SIM must also be manned by the right human resources which is the key to operating, maintaining, and developing SIM effectively. Competent and adequate IT manning is an important investment for hospitals to ensure that SIMRS functions optimally and provides maximum benefits.

System Registration Patient

Patient registration at Lakespra dr. Saryanto is still done manually, namely by having patients come to the reception area with their personal data. Registration patient Which Still manual result on duration time service that will be a separate obstacle if the number of patients coming is large which will automatically lengthen the patient queue. This situation is not only detrimental to patients, but also to clinic staff. Receptionists must work extra hard to serve each patient, increasing the risk of data input errors. In addition, the accumulation of patients in the registration area can disrupt the comfort and smoothness of the overall clinic operation. In the long term, this manual registration system can lower the clinic's image and reduce patient satisfaction. Important for Lakespra dr. English for consider modernization registration system. By adopting digital technology, such as an online registration system or mobile application, the registration process can be more efficient, faster, and more accurate.

Figure 1. Patient Registration (Source: Documentation Lakespra)

Registration Which Still manual result service patient become No effective and efficient and does not comply with expert opinion. Manual patient registration in health institutions can cause a number of negative impacts, especially in matter efficiency and accuracy (Ajami, S., & Bagheri-Earlier, 2013). Process This takes longer because the data must be recorded physically, which risks errors in recording, such as incomplete or duplicate data. In addition, manual management of medical records also makes it difficult to find patient information when needed quickly. As a result, the quality of health services can decline, especially in emergency situations. The use of resources becomes less efficient and increases the risk of information leakage.

In today's era, many health institutions provide online registration applications to increase efficiency and convenience for patients. With application This, patient can with easy register for visit to doctor, examination, or other medical procedures through their smartphone or computer. This reduces waiting time at the registration counter and provides flexibility for patients to choose a schedule that suits their needs (Ardiansyah et al., 2021). In addition, this application can also store patient medical history, facilitate access to health information, and provide reminders for scheduled appointments. subsequent visits. Thus, the online registration application not only improves the operational efficiency of healthcare institutions, but also provides a better experience for patients in accessing healthcare services.

Online registration applications at health institutions generally have various features that make it easier for patients to access health services, including: registration and scheduling patient, election doctor and doctor specialist, medical history in a way electronic, reminder promise meet, payment on line, telemedicine, And access to examination results (Joshi, 2023). These features may vary depending on the policies and capabilities of each health institution. However, in general, online registration applications aim to improve the efficiency, convenience, and accessibility of health services for patients. Online registration applications at health institutions provide various benefits, both for patients and for the health institution itself. The benefits for patients are convenience and flexibility so that patients can register When just and in where just through smartphone or computer, without having to come directly to the location. The benefits for Health Institutions are reducing the workload of

administrative staff in the manual registration process and reducing queues at the counter.

System registration on line must in design user friendly that is system must have an intuitive and easy-to-use interface (Ancker, 2021). The system must be accessible to everyone, including those with physical or technological disabilities, available in multiple languages to meet the needs of the population. diverse and capable provide customer support responsive to help patients who are having difficulties. The way it works involves users in the design process to understand their needs and preferences by do testing utility for identify problem and necessary improvements, continuously improving the system design.

According to Agarwal (2022) online registration system can help reduce cost administration, increase productivity staff, and optimizing resource utilization (Agarwal, 2022). Reducing paper, labor, and space costs storage. Automate task administrative and allow staff for focus on task Which more complex. Help in allocate resources more efficiently. Increase hospital revenue by reducing the number of patient no-shows.

The threat that should be watched out for regarding online registration is the cyber threat. Overcoming cyber threats to the online patient registration system requires a multidisciplinary approach. Which comprehensive. Step First is ensure system equipped with end-to-end data encryption to protect patient personal information during transmission (Chen & Walters, 2023). This encryption protocol prevents unauthorized parties from accessing sensitive data. Multi-factor authentication (MFA) is also important to ensure that only authorized users can access the system. In addition, updates device soft in a way routine very required so that system still protected from vulnerability new Which Possible exploited by hacker (Nguyen, 2022). Cybersecurity training for hospital staff can also increase awareness of safe practices in using systems and reduce the risk of social engineering-based attacks. Security systems such as firewalls and automated intrusion detection can monitor suspicious activity and provide early warnings. Implementing disaster recovery protocols ensures that data can be recovered in the event of an attack. With this combination of steps, hospitals can maintain the security of online patient registration systems, reduce the potential for data breaches, and protect patient trust (Rodriguez et al., 2023).

Based on the data, it is shown that manual patient registration makes services... health become No effective. On era Now registration patient switch to registration in a way on line, which can reduce time Wait in counter registration and provide flexibility for patients to choose a schedule that suits their needs (Ardiansyah et al., 2021). Online registration system can help reduce administrative costs, increase staff productivity, and optimize resource utilization (Agarwal, 2022). Features that can be accessed include patient registration and scheduling features, selection of doctors and specialist doctors, electronic medical history, appointment reminders, online payments, telemedicine, and access to examination results (Joshi, 2023).

Equipment Radiography

Equipment radiography Lakespra dr. English moment This Still use tool Conventional X-ray in healthcare. One of the main disadvantages of conventional radiography is limitations in manipulation picture (Seeram, 2018). After radiology film exposed X-ray And processed in a way chemical, picture Which produced is permanent. This makes it difficult to adjust contrast, brightness, or perform certain measurements on the image. The working mechanism of conventional X-Ray requires chemicals in the film development process in conventional radiography. Process This No only eat time, but also produce chemical waste that is potentially hazardous to the environment. In addition, conventional radiographic film storage requires large physical space and is susceptible to damage. consequence exposure light, humidity, or temperature extreme. Patient will be exposed to higher doses of radiation. Although still within safe limits, this needs to be considered, especially for inspection repetitive or on patient Which prone to.

Figure 2. Tool X-Ray Conventional in Lakespra Dr. Saryanto (Source: Lakespra Documentation)

Digital radiography offers significant advantages over conventional radiography, including lower radiation doses, faster image acquisition, and higher accuracy (Krupinski, 2020). Unlike conventional systems that require film and darkrooms, digital radiography enables quicker examinations and more precise diagnostics through enhanced image clarity and adjustability. Image processing algorithms improve image quality by reducing noise, increasing contrast, and correcting artifacts, aiding in more accurate diagnoses (Flynn, 2022). Additionally, integration with Management Information Systems (MIS) allows for real-time access to radiology images, improving workflow efficiency, reducing errors, and enhancing patient care (Hoeschen, 2019). Digital radiography also supports telemedicine and is environmentally friendly, eliminating the need for chemical film processing (Alyassiri et al., 2021).

Bait Come back

Feedback at Lakespra dr. Saryanto has not been done routinely. When patient feedback is not done routinely, the consequences can be detrimental to both patients and health care providers. Patients feel that their voices are not heard, which can reduce their trust in the health care system. (Price, 2016).

Feedback Which No monitored cause criticism and suggestion from unmonitored patients.

Table 2. Patient Assessment

NO	INDICATOR	EVALUATION		
		B	C	K
1	Convenience get service	80	1	-
2	Accuracy And speed time service	79	2	-
3	Ability and reliability medical personnel	81	-	-
4	Friendliness And courtesy of officers	80	-	1
5	Neatness And appearance officer	80	1	-
6	Neatness And comfort room	77	4	-
7	Place parking	55	22	4
8	Comfort living room	76	5	-
9	Room change	73	8	-
10	Cleanliness of the canteen	69	10	2
11	Quality Food	69	11	1
12	Toilet	67	10	4
13	Response to complaint complaint	75	5	1

The October 2024 visitor evaluation at Lakespra dr. Saryanto showed that out of 81 respondents, several service indicators—such as staff friendliness, parking, canteen cleanliness, food quality, toilets, and complaint handling—received low ratings. This indicates the need for service quality improvements. Additionally, the low number of respondents compared to total visitors shows that feedback collection is not yet optimal. Poor management of patient feedback can hinder service improvement, reduce patient satisfaction, and damage institutional reputation (Reader et al., 2014). Experts emphasize that patient feedback is essential for identifying service gaps, promoting safety and quality culture, and enhancing accountability (Berwick, 2013; Wolf, 2016; Clancy, 2018). To address feedback issues effectively, healthcare institutions can implement the Plan-Do-Check-Act (PDCA) model for continuous improvement (Aghakhani, 2020). Feedback can be collected through direct methods (suggestion boxes, surveys, interviews), indirect methods (data analysis), and innovative approaches such as social media monitoring (Beatty, 2000).

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the research and analysis conducted, several important points can be concluded as follows:

1. The management information system at Lakespra dr. Saryanto has been implemented but is not yet optimal because the network server is still often down, resulting in manual data input.
2. The patient registration system is still done manually, so it is less effective and efficient.
3. Radiographic equipment is still conventional equipment so it has limitations in image manipulation.
4. Feedback from patients at Lakespra dr. Saryanto has not been carried out routinely so that input, criticism and suggestions have not been monitored clearly.

Recommendations

From the description of the manuscript on Improving the Quality of Medical Check Up Services at Lakespra dr. Saryanto to support the Health of Indonesian Air Force Soldiers, the following recommendations can be given:

1. Lakespra Dr. Saryanto submitted a SIM repair to the Disinfolahtaau.
2. Lakespra dr. saryanto Designing an Application for Online Patient Registration.
3. Lakespra Dr. Saryanto improves radiology services by using digital radiography.
4. Lakespra Dr. Saryanto designed a feedback application using a barcode placed on the receptionist's desk containing a number of questions so that it is easily accessible to visitors and more practical.

ADVANCED RESEARCH

Advanced research is needed to develop an integrated and resilient digital health infrastructure at Lakespra dr. Saryanto. Future studies should focus on designing a robust management information system with reliable server architecture to minimize downtime and support automated data processing. Additionally, research should explore the implementation of a fully digital patient registration system and modern radiographic technologies equipped with image processing capabilities for more accurate diagnostics. Furthermore, the development of a structured, real-time patient feedback system—integrated with service dashboards and AI-driven sentiment analysis—can enhance monitoring, accountability, and continuous service improvement. Cross-disciplinary collaboration with IT, radiology, and health service management experts will be essential to ensure sustainability and scalability of these digital transformation efforts.

REFERENCES

Aditama, TY (2016). Hospital Administration Management, second edition. University of Indonesia, Jakarta.

Agarwal, R., Gao, G., DesRoches, C., & Jha, A.K. (2022). The financial impact of online patient registration systems on hospitals. Journal of the American Medical Informatics Association, 29(2), 245-252.

Ajami, S., & Bagheri-Tadi, T. (2013). Barriers for adopting electronic health records (EHRs) by physicians. Acta Informatica Medica, 21(2), 129-134. https://Doi.Org/10.5455/Aim.2013.21.129-134.

Alyassiri, R. S., Oglat, A. A., & Gharaibeh, M. A. (2021). Advantages of Digital Radiography in Clinical Practice: Review of Modern Imaging Solutions. Journal of Imaging ScienceandTechnology,65(3),1-8. Https://Doi.Org/10.2352/J.ImagingSci.Technol.2021.65.3.030502.

Ancker, J.. (2021). Designing patient portals for all: A call for user-centered design and inclusive access. Journal of the American Medical Informatics Association, 28(4), 755-757. Ardiansyah, I., Prasetyowati, A., & Latif, MN (2021). Waiting Time Efficiency Online Registration of Outpatients: Literature Review. Scientific Journal of Health Research, 1(1).

Ashrafi, N., Kelleher, L., & Ilmuboer, J. (2019). The role of management information systems in healthcare organizations: A case study. Journal of Health Care Information Systems, 12(2), 134-147. https://Doi.Org/10.4018/JHCIS.2019010109.

Azwar, A. (2010). Introduction to health administration. Jakarta: Binarupa Aksara.

Berwick, D. M. (2013). Patient-centered care. It's Not Just about the Patient. JAMA, 310(3), 289-290.

Clancy, C. (2018). Patient Feedback to Improve Quality of Care. Published by United States Agency for Healthcare Research and Quality.

Flynn, M. J. (2022). Image Processing Algorithms for Digital Radiography. IEEE Transactions on Medical Imaging, 41(3), 657-670.

Hoeschen, C. (2019). Integration of Digital Radiography with Hospital Information Systems. Journal of Digital Imaging, 32(1), 1-10.

Huriawati, F., Yusro, AC, & Fisika, P. (2017). Development of Odd "Oscillator Digital Detector" as a Simple Harmonic Motion Practical Demonstration Tool. Jurnal Inovasi Dan Pembelajaran Fisika, 4 (December), 1–9. https://ejournal.unsri.ac.id/index.php/jipf/article/view/4257

Jin, J. (2022). Routine Checkups for Adults. JAMA, 327(14). https://doi.org/10.1001/jama.2022.1775

Joshi, A. (2023). The impact of online patient registration systems on patient satisfaction and healthcare utilization. Journal of Medical Internet Research, 25(3), E38456.

Krupinski, E. A. (2020). Current perspectives on the use of digital radiography.

Laukka, E., Hammarén, M., Pölkki, T., & Kanste, O. (2023). Hospital nurse leaders' experiences with digital technologies: A qualitative descriptive study. Journal of Advanced Nursing, 79(1), 297–308. https://doi.org/10.1111/jan.15481

London, M., & Beatty, R. W. (2000). 360-degree feedback as a competitive advantage. Human Resource Management, 39(2-3), 193-205.

Mohammadi, M., Rezazadeh, A., & Aghakhani, H. (2020). The effect of Plan-Do-Check-Act (PDCA) cycle on patient safety culture in hospitals: A systematic review and meta-analysis. International Journal of Health Policy and Management, 9(12), 665–674.

Nurhayati, A., Pramudita Wijayanti, E., Nur Wijayanti, D., Hospital Administration, P., Health Sciences, F., & Surakarta, A. (2022). Analysis Of Sim-Rs Use in Outpage with Hot-Fit Method in Hospital. Jurnal Eduhealt, 13(01).

O'Brien, J. A., & Marakas, G. M. (2011). Management information systems. 10th ed.

Ozair, F.F., Jamshed, N., Sharma, A., & Aggarwal, P. (2015). Ethical issues in electronic health records: A general overview. Perspectives in Clinical Research, 6(2), 73-76. https://Doi.Org/10.4103/2229-3485.153997. Patient Experience Journal, 3(1), 42-55.

Price, A., & Elliott, M. N. (2016). A Systematic Review of Patient Experience Purpose.Radiological Society of North America (RSNA) Journal, 295(1), 20-30.

Reader, T. W., Gillespie, A., & Roberts, J. (2014). Patient complaints in healthcare systems: A systematic review and coding taxonomy. BMJ Quality & Safety, 23(8), 678-689. https://Doi.Org/10.1136/Bmjqs-2013-002437.

Seeram, E. (2018). Digital vs. Digital conventional radiography. Journal of Dental Sciences, 13(3), 147-153.

Shojaei, P., Vlahu-Gjorgievska, E., & Chow, Y. W. (2024). Security and Privacy of Technologies in Health Information Systems: A Systematic Literature Review. Computers, 13(2). https://doi.org/10.3390/computers13020041

Sitorus, R. (2016). Hospital Management Information System. Deepublish.

Sugiyono. (2009). Quantitative, Qualitative and R&D Research Methods. Bandung: Alfabeta.

TNI-AU. (2020). Technical Instructions for Indoctrination and Aerophysiology Training for Aircraft Crew. In Indonesian National Army Air Force Headquarters.

Vogels, W. (2020). Cloud Computing for Healthcare: A Game Changer. Journal of Medical Internet Research. Cloud Computing for Healthcare: A Game Changer. Journal of Medical Internet Research, e16342.

Williams, M.B., Krupinski, E.A., Strauss, K.J., Breeden, W.K., Rzeszotarski, M.S., Applegate, K., Wyatt, M., Bjork, S., & Seibert, J.A. (2007). Digital Radiography Image Quality: Image Acquisition. In Journal of the American College of Radiology (Vol. 4, Issue 6). https://doi.org/10.1016/j.jacr.2007.02.002

Wolf, J. A. (2016). The importance of patient feedback in creating a culture of safety and quality. The Joint Commission Journal on Quality and Patient Safety, 42(4), 166-170.