E-MANAGEMENT SYSTEM UTILIZATION ANALYSIS IN AN EFFORT TO IMPROVE PATIENT SERVICE QUALITY AT KASIH BUNDA CIMAHI CLINIC

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ABSTRACT

As health service technology advances, clinics must continuously adapt to comply with regulations and stay competitive, particularly in the implementation of information systems, which are crucial for enhancing service delivery and administrative efficiency. This thesis explores the impact of an e-management information system on improving service quality at Klinik Kasih Bunda Cimahi, using a descriptive qualitative exploratory approach. Data was gathered through interviews, direct observations, and document analysis, and organized systematically by classifying it according to topics, questions, categories, parameters, and dimensions set by the researcher. The study finds that the implementation of the system aligns with the 4 Pillar framework of information systems—Techno ware, Human ware, Info ware, and Organ ware. While the current system is generally effective, interviews with clinic personnel highlighted areas where operations remain suboptimal, necessitating improvements in service efficiency across administration, medical services, and pharmacy, ultimately leading to better patient care.

Keyword: *Information System, Quality of Care, E-Management.*

1. INTRODUCTION

The development of health services mirrors the general pattern of business competition, characterized by entities striving to offer competitive advantages over one another. This competitive dynamic underscores the evolution of health services into a strategic industry, capable of being managed effectively at both small institutional levels and within broader national networks. As such, health services have emerged as a promising commodity with significant potential for growth and impact across various scales of operation. This highlights the necessity for a management system that integrates new technology with contemporary knowledge to foster effective and innovative improvements in health services. Such a combination enables management to implement cutting-edge innovations that enhance the quality and efficiency of health services. Information systems, as a key technological advancement, play a crucial role in this integration. A robust clinical information system provides powerful analytical capabilities, empowering management to develop and execute effective innovation strategies for hospitals or clinics [1]. An information system consists of interconnected components designed to collect, process, store, and distribute information, thereby supporting decision-making and control within an organization. It encompasses data about specific individuals, locations, and entities within the organization or its external environment, facilitating informed and strategic management practices.

The advancement of management information systems has led to substantial changes in decision-making processes at all levels of management, from operational staff to senior leaders. This development has significantly altered the

role of managers, who are now expected to access and utilize the most accurate and current information to inform their decisions. The proliferation of information technology, particularly the internet, has enhanced the ability to perform activities with greater precision, quality, and timeliness. Organizations are increasingly leveraging the internet and information technology networks to conduct various activities electronically, allowing for more efficient and effective operations. Additionally, managers can now continuously and consistently analyze organizational performance by harnessing available information technology, facilitating ongoing improvements and strategic decision-making [2].

An information system enhances administrative efficiency by minimizing manual errors and ensuring that patient data is accessible quickly and accurately by medical personnel. Beyond streamlining individual tasks, this system supports the integration of various departments within the clinic, facilitating a cohesive and comprehensive approach to patient care. Additionally, data security is a critical component of the system, with appropriate information technology measures in place to safeguard sensitive patient information against unauthorized access and breaches.

The implementation of information systems is anticipated to enhance the safety and efficiency of health service activities within clinics, ultimately leading to improved patient satisfaction and overall service quality. As technology evolves, clinics must adapt and leverage information systems to elevate health service standards and address future challenges. These systems enable clinics to manage patient data with greater effectiveness and accuracy, reducing administrative errors and enhancing interdepartmental coordination. By ensuring that detailed patient information is swiftly and precisely accessible to medical personnel, information technology facilitates a more efficient and accurate treatment process.

The implementation of an information system also enhances the clinic's capability to comprehensively track patient health histories, monitor treatment progress, and make informed medical decisions based on accurate data. In addition to improving operational efficiency, the system plays a crucial role in safeguarding patient data. Equipped with advanced security features, the system protects sensitive information from unauthorized access, thereby ensuring the confidentiality and integrity of patient data. This robust data protection is essential for building and sustaining patient trust in the clinic's health services.

The application of information technology enables clinics to adapt effectively to the evolving and increasingly complex health sector. By adopting information systems, clinics can become more responsive to regulatory changes, industry trends, and patient needs. Information technology facilitates continuous updates and enhancements to services, ensuring alignment with evolving healthcare standards. Consequently, the implementation of information systems not only streamlines daily operations but also significantly enhances the overall quality of health services, supporting better patient outcomes and more efficient healthcare delivery [3].

Clinics that embrace information technology are better positioned to deliver superior services, respond swiftly to patient needs, and meet increasingly stringent health service standards. This proactive approach enhances patient satisfaction and bolsters the clinic's reputation for providing high-quality healthcare. Implementing a Clinical Management Information System (SIM) is crucial for integrating all information generated throughout the service process. SIM promotes greater efficiency and effectiveness in clinic operations by ensuring a smooth flow of information from various operational activities. Research in Yogyakarta indicates that 82.21% of clinics have adopted SIM, though many still concentrate on administrative functions such as registration, billing, and claims processing [4]. The implementation of SIM is also mandated by Law Number 17 of 2023 concerning Health, which stipulates that health facilities must establish comprehensive health information systems, including necessary infrastructure, technology, and human resources, to support effective and efficient health services.

Information systems in clinics range from basic to highly sophisticated setups. Initially, a clinical information system was defined as a computer-based system for processing information within clinics. However, paradigm shifts in the health services sector, driven by advancements in technology, have significantly impacted the development of clinical information systems. These changes necessitate a focus on patient safety, cost control, consumer-centric services, evidence-based medicine, and privacy protection. To keep pace with these evolving priorities, clinical information systems must adapt by realigning their functionalities to address these critical aspects effectively.

Clinical information systems, once primarily focused on administrative data management, must now shift their emphasis to prioritize information security, develop features that minimize medical errors, leverage the increasingly accessible internet, digitize manual records, and utilize wireless technology to enhance information access. To optimize the performance of these systems, it is essential to conduct evaluations of existing systems to assess their effectiveness in improving service quality, as the ultimate goal of a clinical information system is to enhance service delivery. Effective evaluation will determine whether the implementation of e-management (MIS) positively impacts the quality of care in clinics. This research aims to explore whether SIM can address existing shortcomings and improve patient care quality, or if there are aspects that may inadvertently compromise it [5].

A well-structured and comprehensive medical record management system is crucial not only for orderly administration but also for significantly enhancing the overall quality of health services. Effective implementation of a Management Information System (MIS) ensures that all clinical and administrative data is accurately recorded, readily accessible when needed, and can be analyzed to drive continuous improvement. This facilitates better patient outcomes and boosts the clinic's operational efficiency. At Kasih Bunda Clinic, despite having a substantial patient base and a wide range of services, there are challenges in processing medical record data, highlighting the need for an optimized and efficient MIS to address these issues.

The Kasih Bunda Clinic faces challenges in both the input and output stages of its medical record management. Currently, patient medical record numbers are generated manually, and patient registration data for the inpatient section is still entered manually using Microsoft Excel, despite the presence of an existing SIM-RS system. Additionally, although the MIS is capable of generating patient visit reports and reports on the top 10 diseases, these reports are still manually compiled using Excel. To address these issues, this research proposes the development of a medical record information system designed to enhance the processing of patient medical record data, improving both input and output functions. Integrating a refined SIM into the Kasih Bunda Clinic is expected to streamline patient administration, reduce waiting times, and minimize errors or loss of patient data. The system will align with ICD-10 standards and meet the specific needs of the clinic, ensuring accurate and efficient management of medical records.

2. RESEARCH METHOD

The research employs a qualitative approach to achieve its objectives, using a descriptive survey method to gather information directly from the site of the study. This approach aims to understand the empirical conditions of the subject being studied by collecting data through observations, in-depth interviews, and document reviews. The descriptive analysis approach is utilized to interpret the data in relation to observable facts during the research period, providing a clear depiction of the research object without examining causal relationships between variables. The development method applied is the waterfall model, a sequential software development process characterized by distinct phases: planning, modeling, implementation, and testing. This model aligns with the descriptive-qualitative research approach, where progress is viewed as a continuous flow downward through these phases. Data collection for this research includes observational studies of the e-management system at Kasih Bunda Clinic, in-depth interviews lasting no more than 90 minutes each, and document reviews of relevant policies, Standard Operating Procedures (SOPs), and internal memos. Interviews are recorded and transcribed for analysis, while observations focus on the operational aspects of the e-management system. The research is conducted using a qualitative descriptive method and a cross-sectional approach to analyze the application and effectiveness of the e-management system at Pratama Kasih Bunda Clinic. The goal is to evaluate how the system impacts patient service quality. Collected data is analyzed descriptively and qualitatively, and the findings are presented in narrative form to address the research problem comprehensively.

3. LITERATURE REVIEW

Management Information Systems (MIS) are integral to the internal control of an organization, encompassing the use of personnel, documents, technology, and procedures to address business challenges such as product costing, service management, and strategic planning. Unlike general information systems, which manage and process data across various organizational functions, MIS specifically focuses on analyzing and optimizing information systems to support business operations and decision-making processes [6]. Typically, MIS is associated with automation and decision support, facilitating the calculation of service and product costs, aiding in planning and control, evaluating performance, and driving continuous improvement [7]. The primary goal of implementing MIS is to deliver accurate, timely information that supports effective management decisions and strategic goals.

McLeod (2004) differentiates between data and information within an information system framework. Data, as the input base, consists of raw facts and figures that, in their unprocessed state, are often voluminous and not immediately useful. Information, on the other hand, is derived from processing this data and provides meaning and context that inform decision-making. It plays a crucial role in guiding management functions such as planning, implementation, control, and performance evaluation. According to Rustiyanto (2010), a Hospital Management Information System (HMIS) encompasses a comprehensive set of activities that manage all health services within a hospital at various administrative levels. It facilitates the collection, processing, presentation, and analysis of data to

support hospital management. The implementation of an HMIS enhances the effectiveness of hospital management activities, thereby positively impacting the overall service process within the hospital [8].

According to [9], Hospital Management Information Systems (MIS) can yield three key categories of benefits: reducing operating costs, increasing revenue, and decreasing capital expenditure. Additionally, there are numerous benefits that are challenging to quantify. For instance, MIS significantly enhances the quality of health services across various dimensions of medical care, including the responsiveness of medical personnel and diagnostic accuracy. These improvements not only elevate the overall patient experience but also have a profound impact on patient safety. By facilitating timely and accurate diagnoses, MIS helps to minimize the risk of medical errors, thereby ensuring that patients receive treatment that is both effective and tailored to their specific medical needs [10].

In addition, improving the quality of health services involves specific measures aimed at safeguarding patients from unnecessary risks and harms. Patient safety is paramount and includes implementing stringent hygiene protocols, utilizing advanced medical technology, and providing ongoing training for medical personnel. These practices are designed to prevent infections, reduce medication errors, and enhance coordination among medical teams. Patient safety also encompasses rigorous oversight of medical procedures, continuous monitoring of patient conditions, and effective communication between patients and healthcare providers . These comprehensive measures ensure that every patient receives care that is not only safe and effective but also free from unnecessary risks. Ultimately, such efforts contribute to enhancing patients' quality of life and fostering greater public trust in the healthcare system.

Thus, enhancing the quality of health services through these various measures not only improves the effectiveness and efficiency of medical care but also plays a crucial role in maintaining and elevating overall patient safety. Key efforts include stringent infection prevention procedures, such as proper hand hygiene, appropriate use of personal protective equipment, and thorough sterilization of medical equipment, all aimed at minimizing the risk of infections in healthcare settings [11]. Additionally, effective medication management is essential for patient safety. This involves meticulous monitoring of drug administration, ensuring accurate dosages, and preventing harmful drug interactions. A robust medication management system also encompasses precise recording and tracking of medication use, alongside continuous training for medical staff on safe medication practices.

The implementation of technology significantly enhances patient safety by streamlining access to accurate patient information and facilitating real-time monitoring. An electronic medical record (EMR) system, for instance, provides quicker and more precise access to a patient's health history, reducing the risk of errors associated with incomplete or inaccurate information. This technology also supports real-time patient monitoring, allowing for the prompt detection and treatment of medical complications. Moreover, fostering a robust patient safety culture within healthcare organizations is essential for reducing medical errors. This culture encourages medical staff to report errors or incidents without fear of retribution, enabling systematic analysis and continuous improvement to prevent recurrence. Together, these preventive and reactive measures contribute to creating a safer care environment, making patient safety a foundational element of responsible and high-quality medical practice [12].

Continuity of care is a crucial benefit of advanced medical systems, ensuring patients receive consistent and coordinated attention throughout their treatment journey. This is especially vital for managing chronic or complex conditions, where smooth transitions between different stages of care, such as from hospital to home care, can significantly impact health outcomes. A cohesive medical team helps reduce errors, avoid redundant tests, and provide more timely and effective treatment. Additionally, a patient-centered approach, which places patient needs, preferences, and values at the core of decision-making, is increasingly emphasized. This approach ensures that patients are actively involved in discussions about their treatment options, feel heard, and are respected in all aspects of their care.

Involving patients in their care fosters a sense of value and engagement, which not only enhances patient satisfaction but can also lead to improved clinical outcomes. When patients are actively involved, they are more likely to adhere to treatment plans and develop a better understanding of their condition. Although these benefits are challenging to quantify, they contribute significantly to positive changes in patient experiences and health outcomes. Enhanced patient engagement helps create a more efficient and effective healthcare system by reducing long-term costs associated with complications and improving overall quality of life. Thus, while the impact may not always be measurable in numerical terms, its significance for patient well-being and system efficiency is substantial.

According to [13], a framework is essential for identifying the factors that significantly influence the implementation and success of Clinical Management Information Systems (MIS) in developing countries. [14] further emphasize that the success of such projects relies 80% on the development of social and political skills of the developers and only 20% on the deployment of hardware and software technology. This highlights the crucial role that hospital policy and governance play in determining the effectiveness and success of MIS [10].

To ensure the effective and efficient implementation of a Hospital Management Information System (MIS), it is crucial for all stakeholders to have adequate knowledge of technology, particularly in computer systems and hospital management information systems. This includes a fundamental understanding of computer hardware, software, and the core concepts of the information system being implemented. Experienced IT practitioners emphasize that the success of the technology transfer process largely depends on the readiness and skill level of human resources (HR) who will use the system. For a smooth and optimal implementation, HR, especially end users, should possess basic computer skills. This includes familiarity with using a mouse and keyboard, proficiency in operating basic programs such as Windows, and competence in using office applications like Microsoft Excel and Word. Ensuring that end users have these skills helps facilitate a smoother transition to the new system and enhances overall system effectiveness.

The human resource training and development process before the implementation of a MIS is crucial and should not be overlooked. Comprehensive training is essential to ensure that each user is familiar with both the basic and advanced functionalities of the system. This training should cover not only the technical aspects but also the purpose and benefits of the system. By understanding the relevance and importance of MIS, users can better appreciate how it contributes to improving operational efficiency and the quality of hospital services. Investing in HR education and training is a critical step in the successful implementation of MIS. Organizations must ensure that all staff, from administrative personnel to medical professionals, receives the necessary training and ongoing technical support. This approach fosters an environment that supports the adoption of new technologies and ensures that the management information system is used effectively to enhance healthcare services in hospitals.

[11] identifies several technical obstacles in the implementation of Hospital Management Information Systems (HMIS). These include issues with hardware, software, and network connections. The hardware used must meet the specifications required for smooth application operation. Inadequate or outdated hardware can lead to slow data processing, frequent malfunctions, and reduced operational effectiveness. Software selection or development errors can result in incompatibility with specific hospital needs, vulnerability to cyber-attacks, and bugs that impair performance. Additionally, insufficient maintenance and updates can lead to system instability and operational disruptions. Network stability and speed are critical. An unstable or slow network can impede data communication between MIS components, causing delays in data access, integration issues across departments, and potential data loss. Ensuring high-quality network services is essential for optimal and continuous system operation.
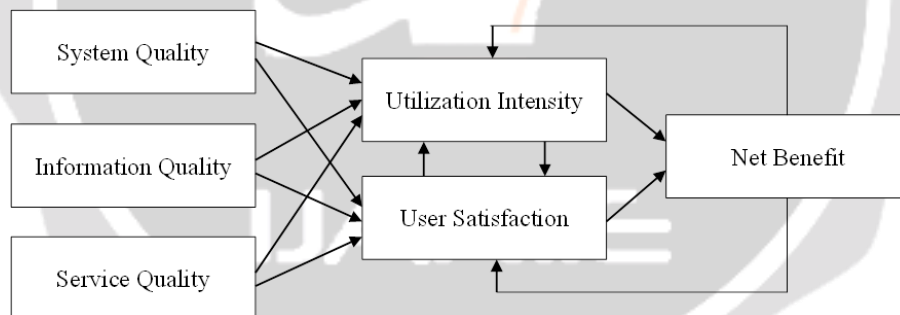

Fig. 1. MIS Success Measurement Model Based on DeLone & McLean Theory[15]

In addition to technical factors, the successful implementation of MIS can be hindered by insufficient technical support. A competent and responsive technical support team is crucial for addressing issues with hardware, software, and networks promptly and effectively. Without adequate support, problems can disrupt hospital operations and impact overall system performance. To address these challenges, hospitals need to engage in careful and comprehensive planning regarding the procurement and maintenance of hardware, software, and network infrastructure. Investing in current and suitable technology, coupled with continuous training and development for human resources, is essential. This approach will help mitigate risks and overcome obstacles, ensuring that MIS operates effectively and delivers significant benefits in enhancing the efficiency and quality of health services.

The De lone and McLean model [15] for measuring information system success is widely used to evaluate the effectiveness and impact of information systems. According to their framework, the success of a system can be assessed through several key dimensions:

1. **System Quality**: This dimension evaluates the technical performance of the system, including factors such as reliability, functionality, and ease of use. It assesses how well the system's technology supports user needs and operational requirements.

2. **Information Quality**: This focuses on the quality of the information produced by the system. Key attributes include accuracy, relevance, timeliness, and completeness of the information. High-quality information is crucial for making informed decisions and achieving desired outcomes.
3. **Service Quality**: This measures the quality of support and assistance provided by the system's service team. It includes aspects such as responsiveness, competence, and the effectiveness of user support services. Good service quality ensures that users receive adequate help and support, which enhances their overall experience with the system.
4. **System Use**: This dimension tracks how frequently and extensively the system is used. It involves measuring user engagement and the extent to which the system is integrated into daily work practices. Regular and effective use of the system indicates its relevance and utility.
5. **User Satisfaction**: This measures how satisfied users are with the system. User satisfaction is a critical indicator of the system's success, as it reflects how well the system meets user expectations and needs.

[16] in their research on the success of user-developed applications and information systems, confirmed the significance of these dimensions in determining system success. Their empirical testing highlighted that user satisfaction plays a crucial role in influencing how the system is used. High levels of user satisfaction are often associated with increased system usage and better overall performance, which underscores the importance of addressing user needs and preferences in the system design and implementation process. This comprehensive approach to evaluating system success helps ensure that various aspects of system performance and impact are considered, leading to more effective and beneficial information systems [17].

Even though measuring the success of information systems is becoming more complex with technological advancements, the fundamental principles remain straightforward. According to De lone and McLean (2016), the success of an information system can be assessed through several key indicators. User satisfaction reflects how well the system meets user needs and expectations, often indicating effective system performance and a positive user experience. Information quality evaluates the accuracy, relevance, timeliness, and completeness of the information provided by the system. High information quality supports better decision-making and aligns with organizational objectives. System quality assesses the technical attributes of the system, including its reliability, security, and usability. High system quality ensures that the system functions effectively and integrates well with existing processes. Net impact on organizational performance measures the system's contribution to achieving organizational goals and improving overall performance, including enhancements in efficiency, productivity, and decision-making capabilities [18].

To gain a comprehensive view of information system success, research should consider both technical and non-technical aspects. Technical aspects involve system reliability, security, and integration capabilities, which are essential for the system's smooth operation and its ability to support organizational needs. Non-technical aspects include factors such as user training, management support, and organizational culture. Proper training helps users make full use of the system, while strong management support and a conducive organizational culture foster successful implementation and sustained use. These indicators and considerations provide a holistic evaluation of how well an information system performs and its impact on organizational success, ensuring alignment with strategic goals and delivering value.

The theory used by DeLone and McLean, which incorporates variables such as Information Quality, System Quality, Service Quality, Intention to Use, and User Satisfaction, helps in determining the success of an information system through its impact on Net Benefit. In their research [15], it was found that the intention to use an information system positively influences the Net Benefit. This Net Benefit dimension is crucial for evaluating the effectiveness and efficiency of user performance in the successful implementation of a System Information Management (SIM-RS). The intention to use the system is positively influenced by System Quality, although not significantly. System Quality encompasses attributes such as the system's performance and reliability. One key indicator of System Quality is the response time regarding data input speed in the SIM-RS application. An improved response time can enhance users' intention to use the system, as it contributes to a more efficient and effective user experience. For User Satisfaction, the quality of the information provided by the system plays a significant role. Factors affecting user satisfaction include the accuracy of the information, the content provided by the SIM-RS application, and the validity period of the information. These aspects ensure that users receive reliable and relevant data, which in turn affects their overall satisfaction with the system. In summary, the De lone and McLean framework highlights the importance of system quality and user satisfaction in shaping users' intention to use a system, which ultimately impacts the Net Benefit derived from the system [15].

4. RESULTS AND DISCUSSION

The current implementation of the E-Management Information System (E-MIS) at Kasih Bunda Clinic is anchored in four key pillars that form the foundation of its information system architecture.

Techno ware is the foundational pillar of the E-Management Information System (E-MIS) at Kasih Bunda Clinic, focusing on the essential physical components that enable efficient data processing and management. This pillar encompasses a range of technological tools and infrastructure, each playing a critical role in ensuring the system's overall effectiveness and reliability.

1. **Hardware**: Hardware refers to the tangible, physical devices that form the backbone of the E-MIS. This includes servers, computers, storage devices, and peripherals such as printers and scanners. These devices are responsible for running the software applications that manage patient records, billing, scheduling, and other administrative tasks. High-quality hardware ensures that these processes are executed swiftly and without interruption, providing a stable platform for the entire information system.

2. **Software**: Software includes the programs and applications that process, store, and manage data within the E-MIS. This could involve specialized healthcare management software that handles patient information, electronic health records (EHR), billing systems, appointment scheduling, and more. The software is designed to be user-friendly, allowing clinic staff to input, retrieve, and update information with ease. It also ensures data accuracy, security, and accessibility, critical for delivering high-quality patient care.

3. **Supporting Devices**: Supporting devices such as computer networks and communication systems are integral to the Techno ware pillar. These networks connect the various hardware components, enabling data to be shared across different departments in real-time. For example, when a patient's information is updated in the reception area, it is instantly available to the medical staff in the examination room. Communication systems, including secure messaging platforms and internal communication tools, facilitate coordination among clinic staff, ensuring that everyone is informed and aligned in delivering patient care.

4. **Network Infrastructure**: The network infrastructure underpins the entire Technoware pillar. This includes local area networks (LAN), wide area networks (WAN), and internet connections that allow the E-MIS to operate both locally within the clinic and remotely if needed. A robust network infrastructure ensures that data is transmitted quickly and securely between devices and departments, minimizing the risk of data loss or delays. It also supports remote access capabilities, enabling authorized personnel to access the system from outside the clinic, which is crucial for flexible and responsive healthcare management.

5. **Data Security Systems**: Another critical aspect of Techno ware is the implementation of data security measures. This includes firewalls, encryption, antivirus software, and other security protocols that protect the clinic's data from unauthorized access, breaches, and cyber threats. Ensuring data security is paramount, especially when handling sensitive patient information, as it builds trust and complies with regulatory requirements for patient confidentiality and data protection.

In summary, the Techno ware pillar provides the technological foundation for the E-MIS at Kasih Bunda Clinic. It ensures that the system operates smoothly, with reliable hardware and software working together within a secure and efficient network infrastructure. This enables seamless data flow across departments, supporting the clinic's mission to deliver high-quality patient care through effective and integrated information management.

Info ware is a crucial pillar of the E-Management Information System (E-MIS) at Kasih Bunda Clinic, focusing on both the software and human resources essential for the system's effective operation and maintenance. This pillar bridges the technological components with the human expertise required to ensure the system functions seamlessly and delivers accurate, timely, and secure information across the clinic.

1. **Software Applications**: At the heart of the Info ware pillar is the software that drives the E-MIS. These applications are designed to handle various tasks such as patient management, billing, scheduling, inventory control, and electronic health records (EHR). The software must be user-friendly, reliable, and capable of handling the clinic's specific needs. It is responsible for automating routine tasks, reducing the likelihood of human error, and ensuring that data is processed and stored efficiently. The software also includes specialized tools for reporting and analytics, enabling the clinic's management to make informed decisions based on real-time data.

2. **Human Resources**: The success of the E-MIS relies heavily on the skilled professionals who manage, operate, and maintain the system. This includes various roles, each contributing to the system's smooth and effective functioning:
   - **Data Entry Operators**: These personnel are responsible for inputting data into the system, ensuring that patient records, billing information, and other essential data are accurately and promptly recorded.

They play a key role in maintaining data integrity, as any errors in data entry can lead to significant issues downstream in patient care or financial management.

- o **Computer Operators**: Computer operators oversee the day-to-day operation of the E-MIS, ensuring that the system is running smoothly, and troubleshooting any technical issues that may arise. They ensure that the hardware and software are functioning correctly and that any operational disruptions are quickly addressed to minimize downtime.
- o **Programmers**: Programmers are responsible for developing and customizing the software applications to meet the specific needs of the clinic. They may modify existing software or create new applications to enhance the functionality of the E-MIS, ensuring it remains aligned with the clinic's operational requirements and regulatory standards. Programmers also work on updating the software to fix bugs, improve performance, and incorporate new features.
- o **System Analysts**: System analysts play a strategic role in evaluating the E-MIS's overall effectiveness and identifying areas for improvement. They analyze how different components of the system interact and work to optimize these interactions for better performance. System analysts also ensure that the system is scalable and adaptable to future needs, including potential expansions or changes in clinic operations.
- o **Database Administrators (DBAs)**: DBAs are responsible for the management and organization of the clinic's databases, ensuring that data is stored securely, backed up regularly, and easily retrievable when needed. They maintain the integrity of the data, oversee database performance, and implement security measures to protect sensitive information from unauthorized access. DBAs also manage database updates and migrations, ensuring that the system remains up-to-date with the latest technology and security standards.
3. **Training and Development**: An important aspect of the Info ware pillar is the continuous training and development of the personnel involved in the system's operation. As technology evolves, ongoing training ensures that the staff is proficient in using the latest software features and best practices. Regular training sessions also help in troubleshooting common issues, improving overall system efficiency, and keeping the team aligned with the clinic's objectives.
4. **Collaboration and Communication**: The Info ware pillar also emphasizes the importance of collaboration and communication among the various roles involved in the E-MIS. Effective communication between data entry operators, computer operators, programmers, system analysts, and DBAs is essential for resolving issues quickly, implementing system updates smoothly, and ensuring that the E-MIS continues to meet the clinic's needs. Regular meetings and communication channels are established to facilitate this collaboration, allowing for the exchange of information and ideas that can lead to further system improvements.

In summary, the Info ware pillar integrates the software and human resources necessary for the successful operation of the E-MIS at Kasih Bunda Clinic. It ensures that the system is not only technologically sound but also managed and maintained by a team of skilled professionals who are equipped to handle the complex and dynamic nature of healthcare information management. This synergy between software and human resources is vital for maintaining data accuracy, security, and accessibility, ultimately contributing to the clinic's goal of providing high-quality patient care.

Human ware is a critical pillar of the E-Management Information System (E-MIS) at Kasih Bunda Clinic, focusing on the human element that drives the system's success. This pillar underscores the importance of the managerial and operational roles responsible for ensuring that the E-MIS functions smoothly and effectively. While it shares some physical components with Info ware, such as the involvement of personnel like data entry operators and programmers, Human ware emphasizes the leadership, coordination, and human-centered processes that are essential for the system's overall efficacy.

1. **Managerial Executor**: At the top of the Human ware pillar is the managerial executor, who plays a pivotal role in overseeing the implementation and ongoing management of the E-MIS. This individual is responsible for setting strategic objectives for the system, ensuring that it aligns with the clinic's broader goals of improving patient care and operational efficiency. The managerial executor also coordinates between different departments, ensuring that the system meets the needs of various stakeholders, from medical staff to administrative personnel. They are tasked with making high-level decisions regarding system upgrades, policy changes, and resource allocation, ensuring that the E-MIS remains a valuable asset to the clinic.
2. **Operational Staff**: The day-to-day operation of the E-MIS relies on a team of technical and administrative staff who ensure that the system is functioning as intended. This includes:

    o **Data Entry Operators**: These individuals are at the forefront of the system's operation, inputting critical data such as patient records, billing information, and inventory updates. Their role is vital for maintaining the accuracy and reliability of the information within the system, as any errors at this stage can have a significant impact on patient care and administrative efficiency.

    o **Programmers**: Programmers within the Human ware pillar are responsible for developing and maintaining the software that runs the E-MIS. They address any technical issues that arise, implement system updates, and customize the software to meet the clinic's specific needs. Their expertise ensures that the E-MIS is continuously optimized and capable of adapting to new challenges and requirements.

    o **System Analysts**: System analysts work closely with the managerial executor and other staff to assess the performance of the E-MIS. They identify any bottlenecks or inefficiencies in the system and recommend solutions to improve overall functionality. Their insights are crucial for long-term planning, ensuring that the system can evolve with the clinic's needs.

    o **Database Administrators (DBAs)**: DBAs manage the clinic's databases, ensuring that all data is stored securely and can be accessed efficiently when needed. They are responsible for maintaining data integrity, backing up information, and implementing security measures to protect against data breaches. Their role is essential for ensuring that the E-MIS operates within regulatory guidelines and that patient information remains confidential.

3. **Training and Support**: Human ware also involves the continuous training and development of all personnel involved in the E-MIS. This ensures that staff members are proficient in using the system and aware of the latest updates and best practices. Regular training sessions help to minimize errors, improve efficiency, and ensure that the system is used to its full potential. Support structures are also put in place to assist staff with any challenges they encounter, fostering a collaborative environment where issues can be resolved quickly and effectively.

4. **Human-Centered Design**: A key aspect of the Human ware pillar is the emphasis on human-centered design and user experience. The system is tailored to meet the needs of its users, with interfaces and workflows designed to be intuitive and accessible. This approach reduces the learning curve for new users, minimizes the risk of errors, and ensures that the system enhances rather than hinders the daily operations of the clinic. By prioritizing the user experience, the Human ware pillar ensures that the E-MIS is not only technically sound but also user-friendly and aligned with the needs of the clinic's staff.

In summary, the Human ware pillar focuses on the human components that are essential for the effective operation of the E-MIS at Kasih Bunda Clinic. It highlights the importance of leadership, coordination, and the roles of various operational staff in ensuring that the system runs smoothly and meets the clinic's objectives. By emphasizing training, support, and human-centered design, Human ware ensures that the E-MIS is not just a technological tool, but a well-integrated system that supports the clinic's mission to provide high-quality patient care.

Organiware is a fundamental pillar of the E-Management Information System (E-MIS) at Kasih Bunda Clinic, focusing on the formal procedures, policies, and governance structures that regulate the system's operation. This pillar ensures that the E-MIS is not only technologically sound and well-managed but also compliant with the clinic's strategic objectives, regulatory requirements, and best practices in healthcare management. Organiware is vital for maintaining order, consistency, and accountability in how the system is used and managed within the clinic.

1. **Formal Procedures and Policies**: Organiware encompasses a comprehensive set of formal procedures and policies that dictate how the E-MIS should be operated. These procedures cover everything from data entry and processing to the generation of reports and the management of patient records. By establishing clear guidelines, the clinic ensures that all staff members understand their roles and responsibilities within the system, minimizing the risk of errors, data breaches, or non-compliance with regulatory standards. These procedures also help to standardize operations across the clinic, ensuring consistency in how tasks are performed and how data is handled.

2. **Data Processing Management**: One of the key aspects of Organiware is the management of data processing procedures. This involves creating and maintaining protocols for how data should be collected, entered, processed, stored, and retrieved within the E-MIS. These protocols ensure that data is handled efficiently and accurately, providing a reliable basis for patient care and administrative decision-making. Effective data processing management also includes regular audits and checks to verify that data is being managed according to established standards, ensuring the system's integrity and reliability.

3. **Guidelines for System Use**: Organiware includes detailed guidelines that instruct staff on how to use the E-MIS effectively. These guidelines cover various aspects of system operation, from logging in and navigating the interface to more complex tasks like generating reports or managing user access. The

guidelines are designed to be clear and user-friendly, making it easy for staff at all levels to understand and follow them. This reduces the likelihood of errors and ensures that the system is used in a way that maximizes its benefits for the clinic.

4. **Compliance with Formal Policies**: Compliance with formal policies is a critical component of Organiware. The policies ensure that the E-MIS adheres to legal and regulatory requirements, particularly concerning patient privacy, data security, and healthcare standards. Organiware also involves monitoring and enforcing compliance, with regular reviews and updates to policies as needed to adapt to changes in regulations or clinic operations. By prioritizing compliance, Organiware helps to protect the clinic from legal risks and enhances its reputation for providing high-quality, secure, and ethical patient care.

5. **Supervision and Oversight**: The management of the E-MIS is under the direct supervision of the main director, reflecting the system's strategic importance to the clinic. The main director is responsible for overseeing the implementation of Organiware, ensuring that all procedures and policies are aligned with the clinic's goals and that they are being followed diligently by all staff members. This level of oversight underscores the critical role of the E-MIS in the clinic's operations, from patient care to administrative efficiency. The main director's involvement also ensures that the system is continuously evaluated and improved; keeping it aligned with the clinic's evolving needs and challenges.

6. **Strategic Importance**: Organiware highlights the strategic significance of the E-MIS within the clinic. By establishing a robust framework of procedures and policies, Organiware ensures that the system is not only a tool for day-to-day operations but also a key component of the clinic's long-term strategy for growth, efficiency, and quality improvement. The integration of Organiware within the clinic's management structure means that the E-MIS is positioned as a central element in achieving the clinic's mission to provide excellent patient care and efficient service delivery.

In summary, Organiware is the pillar that governs the formal procedures, policies, and oversight mechanisms essential for the effective and compliant operation of the E-MIS at Kasih Bunda Clinic. By establishing clear guidelines, ensuring compliance with regulations, and placing the system under the direct supervision of the main director, Organiware provides a structured and strategic framework that supports the clinic's goals and ensures the E-MIS is used to its full potential in delivering high-quality patient care.

The implementation of the E-Management Information System (E-MIS) at Kasih Bunda Clinic is strategically designed to enhance the quality of patient services by embedding the system within the clinic's broader strategic policy framework. This integration is structured around the 4M framework—Man, Money, Material, and Method—each representing a critical resource or approach necessary for the system's successful implementation and operation.

1. **Man**: This component emphasizes the importance of human resources in the effective operation of the E-MIS. It ensures that the clinic is staffed with skilled personnel who are capable of managing and operating the system. This includes both technical experts, such as programmers and system analysts, and administrative staff, like data entry operators, all of whom are essential for the system's smooth functioning. By focusing on the right mix of skills and expertise, the clinic ensures that the E-MIS is not only implemented correctly but also maintained and utilized to its fullest potential.

2. **Money**: This element addresses the financial resources necessary to support the E-MIS. It involves budgeting for the system's development, ongoing maintenance, and operational costs. Ensuring adequate funding is crucial for the sustainability of the system, allowing the clinic to continuously update and improve the E-MIS, thereby avoiding issues related to obsolescence or system failure. Strategic financial planning also ensures that the clinic can invest in new technologies or enhancements that further optimize the E-MIS's effectiveness in delivering high-quality patient care.

3. **Material**: The Material component focuses on the physical and technological resources required to support the E-MIS infrastructure. This includes essential hardware, such as servers and computers, as well as software applications and networking devices that facilitate the system's operation. By investing in robust and reliable material resources, the clinic ensures that the E-MIS has the technological foundation needed to operate efficiently, process data accurately, and support the various functions required by the clinic's staff.

4. **Method**: Method refers to the strategies, procedures, and management practices that govern the operation of the E-MIS. This includes the development of policies and guidelines that ensure the system is used effectively and consistently across the clinic. It also involves the implementation of best practices in system management, data processing, and patient service delivery. By adopting a methodical approach to system operation, the clinic ensures that the E-MIS is not only technically sound but also integrated into the clinic's daily routines in a way that maximizes its benefits for both staff and patients.

By aligning the E-MIS with the 4M framework, Kasih Bunda Clinic optimizes the system's effectiveness in enhancing service quality. This alignment ensures that every aspect of the system, from its human and financial resources to its material and procedural components, is carefully managed to improve administrative processes, streamline operations, and ultimately enhance patient care. The result is a more efficient clinic that can deliver higher-quality services, contributing to overall better performance and patient satisfaction.

Based on the analysis, several optimization recommendations have been proposed to enhance the management of Kasih Bunda Clinic in Cimahi through the implementation of the E-Management Information System (E-MIS) as a strategy for improving clinical service quality. These recommendations include: 1) If the clinic opts to use vendor services for system support, it is advisable to acquire the source code of the clinic's information system, allowing the E-MIS programmer to make necessary adjustments or further program developments as needed. 2) To ensure the validity of the information generated by the E-MIS and to phase out manual recording, top management must implement a policy regarding the cut-off process, which is a critical part of converting manual data to the information system. This policy should include time targets, rewards, and sanctions to support the successful adoption of the E-MIS. 3) Section heads should ensure that copies of the Standard Operating Procedures (SOP), organizational structure, and technical instructions are maintained by Human Resources (HR) and regularly verify that users have access to the information system manual. 4) It is recommended that all management levels— Operational, Tactical, and Strategic—commit to realizing an ideal E-MIS that enhances clinic performance, delivers fast and comfortable service to customers, and complies with the Minister of Health Regulation Number 18 of 2022, which mandates the implementation of clinical information systems in all clinics for effective policy formulation in the healthcare sector.

5. CONCLUSIONS

The current implementation of the E-Management Information System (E-MIS) at Kasih Bunda Clinic is structured around four key pillars: Techno ware, which includes the physical components necessary for data processing such as hardware, software, and supporting devices like computer networks and communication systems; Info ware, which involves the physical components like hardware, software, and key personnel roles such as Data Entry Operators, Computer Operators, Programmers, System Analysts, and Database Administrators; Human ware, which emphasizes the managerial and operational roles responsible for the system's execution, including data entry operators and programmers; and Organiware, which covers the formal procedures, policies, and guidelines necessary for managing and operating the E-MIS under the supervision of the main director. The implementation of the E-MIS to improve patient service quality at Kasih Bunda Clinic is guided by a strategic policy framework known as the 4M framework—Man, Money, Material, and Method—ensuring that the system's implementation is aligned with the clinic's broader strategic goals and is positioned to enhance overall clinical performance.

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