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Analysis of Planning and Procurement of Diagnostic Medical Equipment at Jayapura Regional Hospital: Challenges and Optimization Strategies

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A B S T R A C T

This research aims to analyze the planning and procurement processes of diagnostic medical equipment at Jayapura Regional Hospital in Papua Province. Using a qualitative approach with case study design, this research involved in-depth interviews with 11 informants consisting of key, primary, and supporting stakeholders. The results indicate that the planning and procurement processes are influenced by three determinant factors: government regulations, budget availability, and hospital management strategies. Jayapura Regional Hospital implements a bottom-up approach in planning that involves active participation from various staff levels. The primary constraints identified include budget limitations, funding allocation instability, and equipment specification mismatches. Optimization of the Hospital Management Information System (HMIS) has become a strategic solution to improve the efficiency of planning and procurement processes, while a comprehensive medical equipment maintenance program is essential to ensure continuity and quality of diagnostic services. This research recommends implementing data-based planning, strengthening the bottom-up approach, optimizing inter-departmental coordination, and developing a structured equipment maintenance program to improve the effectiveness of diagnostic medical equipment procurement at Jayapura Regional Hospital.

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INTRODUCTION

Logistics management of medical equipment is a crucial component in the delivery of optimal healthcare services. As a strategic management process for the movement and storage of goods from suppliers to end users, effective medical equipment logistics management plays an important role in ensuring the availability of medical equipment that meets needs and quality standards. The Republic of Indonesia Law Number 36 of 2009 regarding Health in articles 98 and 104 has underscored the importance of managing medical equipment that is safe, beneficial, high-quality, and accessible to the community (Anggreini et al., 2024). This regulation emphasizes the responsibility of healthcare institutions in providing adequate medical equipment infrastructure to support quality healthcare services.

In the context of hospital services, the procurement of medical equipment holds a strategic position as a determinant of healthcare quality. The availability of appropriate and standardized medical equipment not only enables more accurate diagnoses but also accelerates treatment processes and increases the effectiveness of medical procedures. Sagala and Sitompul (2019) affirm that the availability of standardized medical equipment enables healthcare professionals to optimize their performance in providing high-quality services to patients. Conversely, delays and inaccuracies in medical equipment procurement can cause significant disruptions to hospital operations and negatively impact the quality of medical services provided.

Hospitals, as referral healthcare facilities, have the responsibility to provide adequate medical equipment to support various diagnostic, therapeutic, and other medical intervention procedures. Nugraha et al. (2021) emphasize that the medical equipment procurement system in Regional Public Hospitals must be conducted with principles of effectiveness, efficiency, and transparency in accordance with applicable regulations. These principles form an important foundation in ensuring that the medical equipment procurement process is carried out with high accountability and is oriented toward improving the quality of healthcare services.

The aspects of transparency and accountability in medical equipment procurement are factors that cannot be ignored. Research conducted by Hutabarat (2020) shows that weak supervision in the medical equipment procurement process potentially increases the risk of misappropriation and deviation. Implementation of a more transparent and digital technology-based system can be a strategic solution to improve the efficiency and effectiveness of medical equipment procurement, especially in healthcare institutions such as Jayapura Regional Hospital.

The increasing number of patients with varying disease complexities has driven the need for higher medical equipment in hospital settings. Shelemo (2023) identifies that inefficient medical equipment procurement processes can result in serious consequences, including delayed equipment delivery, increased operational costs, and decreased service quality to patients. Therefore, effective and efficient management of medical equipment procurement becomes a prerequisite for maintaining optimal healthcare service standards.

Nevertheless, the implementation of ideal medical equipment logistics management concepts still faces various substantial constraints. The Indonesian Ministry of Health (2017) identifies several barriers in medical equipment procurement in healthcare facilities, including distribution delays, specification mismatches with hospital needs, and budget limitations. Suboptimal planning and complex bureaucracy in the procurement process are determinant factors that affect the performance of medical equipment procurement. This condition has implications for the hindrance of healthcare services that should be optimally provided to the community.

In addition to regulatory and transparency factors, the availability of competent human resources in managing medical equipment procurement also becomes a significant challenge. Khoirunnisa Ghefira et al. (2023) reveal that limitations in workforce with comprehensive knowledge about goods and services procurement management can result in errors in equipment technical specifications, supplier selection, and budget planning processes. This indicates the importance of human resource capacity development in medical equipment logistics management.

The medical equipment procurement process in government healthcare institutions must comply with applicable regulatory frameworks, such as Presidential Regulation Number 16 of 2018 regarding Government Goods/Services Procurement. Rika Widianita (2023) identifies that medical equipment procurement challenges encompass administrative, technical, and business aspects. The auction mechanism as one of the procurement procedures often faces bureaucratic obstacles that can hinder the timely acquisition of needed medical equipment.

Jayapura Regional Hospital, as the main referral hospital in Papua Province, has a vital role in providing quality healthcare services to the community. The availability of adequate medical equipment becomes a determinant factor in ensuring optimal care quality. However, based on a preliminary study, in 2022, Jayapura Regional Hospital experienced serious challenges related to the procurement of CT Scan diagnostic equipment. Program damage to the CT Scan owned by the hospital has disrupted the continuity of diagnostic services for patients. To address this issue, a budget allocation of approximately 2-3 billion rupiah is needed for repairs, but such a budget is not yet available. The impact of this condition is highly significant considering that CT Scan is vital equipment in diagnosing various diseases.

Based on the complexity of these issues, this research aims to analyze the planning and procurement processes of diagnostic medical equipment at Jayapura Regional Hospital, identify the challenges faced, and formulate strategic recommendations to improve the efficiency and effectiveness of the medical equipment procurement system. This research is expected to contribute to improving healthcare service quality through the implementation of a more optimal and sustainable medical equipment procurement system.

THEORETICAL REVIEW

Medical Equipment Logistics Management Concept

Medical equipment logistics management is an integral component in effective and efficient healthcare institution management. Fadila et al. (2025) define logistics management as the application of management principles in logistics activities that include planning, implementation, and control of efficiency and effectiveness of the flow of goods storage, services, and information from the point of origin to the point of consumption. In the context of hospital services, logistics management plays an important role in ensuring the availability of medical equipment to support optimal medical services.

Logistics management activities in hospitals include several interconnected stages: planning, procurement, storage, distribution, disposal, and evaluation and monitoring. Each stage has a crucial role in ensuring the availability of adequate and quality medical equipment, thus requiring good coordination between stages to optimize its function (Fadila et al., 2025; Muttaqin, 2021; Muttaqin et al., 2020). Medical equipment is defined as instruments, machines, or implants that do not contain drugs and function to prevent, diagnose, cure, and alleviate diseases, care for patients, restore health, or form the structure and function of the human body (Indonesian Ministry of Health, 2021). The regulation of its use and distribution is strictly supervised by relevant health institutions to ensure the safety, quality, and efficacy of medical equipment.

Muhammad Guntur et al. (2024) classify medical equipment into several main categories based on their functions:

1. Diagnostic Equipment: Used to diagnose health conditions, such as stethoscopes, blood pressure monitors, and ultrasound machines.
2. Therapeutic Equipment: Functions to treat or manage diseases, such as dialysis machines, surgical tools, and inhalation devices.
3. Rehabilitative Equipment: Designed to assist the patient recovery process, such as wheelchairs, hearing aids, and physiotherapy equipment.
4. Preventive Equipment: Used to prevent diseases or health conditions, such as sterilization equipment and contraceptive devices.
5. Monitoring Equipment: Functions to continuously monitor patient health conditions, such as heart monitors and glucometers.

Putu et al. (2024) emphasize that the use of medical equipment also has risk aspects that need attention, including potential medical complications, misuse, technological limitations, cost and accessibility challenges, and psychological risks for patients. Therefore, careful risk evaluation and comprehensive understanding of medical equipment are highly necessary to increase treatment effectiveness and ensure patient safety.

Planning and Procurement of Medical Equipment

Medical equipment planning is a crucial stage in health logistics management that becomes the foundation for the successful provision of appropriate and quality medical equipment. Nizamuddin et al. (2024) emphasize that medical equipment planning requires a systematic management approach to

achieve the objective of fulfilling medical equipment needs. Pratasik et al. (2023) complement this concept by defining medical equipment needs planning as an activity to determine the quantity and needs of medical equipment according to selection results in a certain period, with the aim of ensuring medical equipment availability.

Based on the guidelines from the Directorate of Public Goods and Health Supplies (2008), the stages of medical equipment needs planning include:

1. Selection: The process of determining whether the goods inventory is truly needed according to the number of patients and types of diseases.
2. Usage compilation: Collecting monthly usage data from each service unit over a certain period.
3. Need calculation: Determining the specific quantity of medical equipment needed.
4. Planning evaluation: Assessing the effectiveness of the planning process and making necessary adjustments.

The main objective of this planning process is to ensure the availability of the right types and quantities of medical equipment according to needs, avoid stock-out events, and increase the efficiency of resource use.

Medical Equipment Procurement Process

Medical equipment procurement is a series of activities to obtain medical equipment according to the needs of healthcare institutions. Putu et al. (2024) define medical equipment procurement as the process of planning, selection, purchasing, and distribution of medical equipment needed to support healthcare services in hospitals. This process must be carried out in accordance with applicable regulations, such as Presidential Regulation Number 16 of 2018 regarding Government Goods/Services Procurement.

Ndun (2020) in his research reveals that procurement of medical equipment through a transparent and efficient system can increase accountability and prevent budget misuse. Furthermore, the implementation of an e-procurement system has been proven to increase the efficiency and effectiveness of medical equipment procurement in hospitals. Sri Puji Lestari et al. (2021) state that the purpose of goods procurement is to ensure the availability of medical equipment with sufficient types and quantities according to needs, with guaranteed quality, and can be obtained when needed.

Regulations and Challenges in Medical Equipment Procurement

Regulations governing medical equipment procurement in Indonesia include various policies aimed at ensuring the effectiveness, efficiency, and transparency of the procurement process. Noveranty et al. (2024) explain that the Minister of Health Regulation Number 1182/MENKES/PER/2009 emphasizes the importance of using medical equipment that has distribution permits and meets national and international standards.

The electronic catalog system managed by the Government Goods and Services Procurement Policy Agency (LKPP) has been implemented to increase

transparency and accountability in medical equipment procurement, especially for government hospitals. Presidential Regulation Number 16 of 2018 regarding Government Goods/Services Procurement becomes the main legal foundation governing the mechanisms of goods and services procurement, including medical equipment, in government institutions.

Khoirunnisa Ghefira Yusrani et al. (2023) identify various challenges in medical equipment procurement in general hospitals, including suboptimal planning, budget constraints, and technical issues in the auction process. One of the main constraints identified is the lack of coordination between hospitals, local governments, and suppliers, which can cause discrepancies between medical equipment needs and what is available in the market.

Meta-synthesis studies conducted by several researchers show that problems in medical equipment procurement are quite diverse. Kenedi et al. (2017) found that inadequate policies or SOPs, insufficient staff numbers, and limited funds are the main constraints in medical equipment procurement at Padang Pariaman Regional Hospital. Patola et al. (2018) revealed that medical equipment procurement at Faisal Islamic Hospital Makassar is constrained by budget, causing some medical equipment to be unavailable.

Utami et al. (2020) identified that the application of accounting information systems in medical equipment procurement at BLUD RSU Jampangkulon has not been fully effective because only certain personnel understand the system. Meanwhile, Anggreini et al. (2024) identified several factors causing unfulfilled orders, such as insufficient stock, mismatched goods specifications, price increases, and supplier changes.

Arpan (2022) formulates four strategic steps to address medical equipment procurement challenges:

1. Data collection: Gathering comprehensive information about products, such as product data sheets, official studies and reports, documents, pricing plans, and supplier contact information to help the procurement team evaluate the suitability of products with clinical needs.
2. Negotiation: Conducting evaluation and negotiation to ensure that product/service solutions meet personnel and patient needs at competitive prices.
3. Testing and trials: Preparing testing and trial periods to assess the suitability of products or services with the needs of healthcare institutions.
4. Completion: After evaluating product/service information, pricing plans, and data from the testing period, the procurement team can determine whether the product/service meets clinical and financial needs, and subsequently allocate budget funds for investment.

Milapastiniari et al. (2021) emphasize the importance of technology in increasing the efficiency and transparency of medical equipment procurement. The application of e-procurement and e-catalog systems has been proven to reduce complicated bureaucracy and accelerate the procurement process. Several

hospitals in Indonesia have also begun implementing technology-based inventory management systems that can monitor medical equipment stock in real-time, which helps in decision-making regarding the purchase of new equipment and ensures the availability of medical equipment according to needs.

Hospital Context as a Healthcare Institution

Hospitals serve as healthcare institutions that provide medical care, medical support, and nursing services to the community. Shelemo (2023) explains that based on the Minister of Health Regulation Number 147 of 2010 regarding Hospital Licensing, a hospital is defined as a healthcare institution that provides comprehensive individual healthcare services that include inpatient, outpatient, and emergency services.

Fitria Dwi Ayuningtyas et al. (2024) elaborate that the task of a hospital is to provide high-quality and affordable healthcare services to improve community health and implement healthcare service initiatives efficiently and effectively. Hospital functions include providing medical services and recovery, maintaining and improving individual health, organizing staff training and development, and conducting research and development of medical technology.

Hospital classification in Indonesia is regulated in the Republic of Indonesia Law Number 44 of 2009 regarding Hospitals. Based on facilities and service capabilities, general hospitals are classified into Class A, B, C, and D Hospitals, while special hospitals are classified into Class A, B, and C Special Hospitals.

As healthcare institutions, hospitals have the responsibility to provide adequate medical equipment to support optimal medical services. Effective and efficient medical equipment procurement becomes one of the key factors in ensuring the quality of healthcare services provided to the community.

Although there are several previous studies discussing medical equipment procurement in hospitals, there are still gaps in the literature regarding comprehensive analysis of planning and procurement of diagnostic medical equipment, especially in the context of hospitals in regions with unique geographical and demographic characteristics such as Papua. This research aims to fill these gaps by analyzing the input, process, and output of planning and procurement of diagnostic medical equipment at the Jayapura Regional Hospital in Papua Province.

The main contribution of this research is to identify specific factors affecting the planning and procurement of diagnostic medical equipment at Jayapura Regional Hospital, analyze the constraints and challenges faced, and formulate strategic recommendations to improve the efficiency and effectiveness of the medical equipment procurement system. The results of this research are expected to provide new insights and contribute to the development of policies and practices in medical equipment logistics management in healthcare institutions, especially in regions with similar characteristics.

METHODOLOGY

This research uses a qualitative approach with a case study design at Jayapura Regional Hospital, Papua Province in March 2025. Informants were

selected through purposive sampling technique, consisting of key, primary, and supporting informants from various management levels and stakeholders to obtain a comprehensive perspective. The research location was chosen due to the status of Jayapura Regional Hospital as the main referral hospital in Papua Province that plays a vital role in providing healthcare services to the local community.

Data collection was conducted through three main techniques: participative observation, in-depth interviews, and documentation. Participative observation involved researchers directly in the daily activities of procurement department employees. In-depth interviews were conducted with semi-structured guidelines for 60-90 minutes per informant, covering topics of planning processes, procurement mechanisms, constraints, and implications of diagnostic medical equipment availability. Documentation was carried out by reviewing official documents related to planning and procurement, including hospital profiles, procurement documents, policies, and evaluation reports.

Data analysis adopted the Miles and Huberman interactive model consisting of data reduction, data presentation, and verification and conclusion drawing. Data reduction included transcription, identification, and categorization of main themes. Data presentation was conducted through descriptive narratives, matrices, and flow charts. Verification and conclusion drawing were carried out by identifying patterns between themes and validation through method and source triangulation to ensure data validity. The entire analysis process took place interactively and continuously during data collection until reaching saturation point.

RESULTS AND DISCUSSION

Input of Diagnostic Medical Equipment Planning and Procurement

The results of this research indicate that medical equipment procurement at Jayapura Regional Hospital is influenced by three main factors: government regulations, budget availability, and hospital resource management strategies. The procurement process is not only based on medical needs but must also comply with formal regulations such as Presidential Regulation No. 16 of 2018 and Presidential Regulation No. 12 of 2021 regarding goods and services procurement.

Jayapura Regional Hospital implements a bottom-up planning system that starts from service units as proposers of needs. These proposals are then discussed in workshop forums and compiled by the planning department to be included in the RKA RENJA document. This approach ensures that planning is responsive to actual needs in the field and involves active participation from various stakeholders in the decision-making process.

Planning and procurement of diagnostic medical equipment is a strategic process that directly impacts the quality of medical services. This process includes a series of systematic stages from needs identification, budget planning, equipment selection, procurement, to equipment maintenance. The success of this process depends on various factors, including regulatory frameworks, budget allocation, and hospital management capacity (Octavia & Handayani, 2022).

The findings of this research align with the results of Muchtar's (2018) study which identifies two main approaches in medical equipment planning and procurement: top-down and bottom-up approaches. The top-down approach is characterized by decision-making by top management which is then implemented through hierarchical structures, while the bottom-up approach originates from field staff who have direct understanding of daily operational needs.

The implementation of a bottom-up system at Jayapura Regional Hospital facilitates field staff contribution in the planning and procurement process, thus increasing accuracy in identifying medical equipment needs. However, this approach requires effective coordination between various organizational levels to ensure that proposals from field staff align with strategic policies and budget availability.

Social Situation and Characteristics

The social situation in this research focuses on the context of diagnostic medical equipment procurement at Jayapura Regional Hospital in Papua Province in 2024. As the main referral hospital in Papua Province, Jayapura Regional Hospital faces significant challenges related to the procurement and maintenance of medical equipment, especially CT Scans. The CT Scan owned by the hospital has experienced program damage since 2022, thus disrupting the continuity of diagnostic services for patients. This condition is further exacerbated by limited budget for repairs estimated to require funds of about 2-3 billion rupiah.

The damage to the CT Scan equipment has a broad impact on the quality of healthcare services at Jayapura Regional Hospital, considering the vital role of this equipment in diagnosing various diseases. This situation reflects the complexity of issues in medical equipment procurement and maintenance in healthcare institutions operating in regions with unique geographical and demographic characteristics such as Papua.

Process of Diagnostic Medical Equipment Planning and Procurement

The research results identify three main constraints in the process of medical equipment planning and procurement at Jayapura Regional Hospital: budget efficiency, policy revision, and equipment specification compatibility. Budget efficiency causes prioritization of essential needs such as drugs and consumables, while medical equipment maintenance becomes constrained due to significant budget cuts. Ad hoc budget revisions, such as PSU policies, often disrupt the implementation of previously arranged procurement plans. In terms of equipment specifications, Jayapura Regional Hospital prioritizes compatibility with service needs even though this means having to switch to new vendors if existing vendors cannot provide equipment with appropriate specifications.

Planning and procurement of diagnostic medical equipment in hospitals face various constraints that can impact service quality, especially due to budget limitations and fluctuations. Limited funds hinder the hospital's capacity in procurement and maintenance of needed medical equipment, while budget

fluctuations make long-term planning difficult because changes in fund allocation can shift priorities and procurement schedules.

Additionally, procurement of equipment that does not match specifications can result in underutilization or even non-utilization, thus leading to inefficient use of resources and decreased quality of healthcare services. Therefore, comprehensive planning and transparent procurement policies are needed to optimize the use of hospital resources (Wahyuddin et al., 2024). These findings align with the results of Retnosari et al.'s (2022) research which demonstrates a direct correlation between budget efficiency and procurement policies with hospital service quality. Procurement policies need to be adjusted to applicable regulations and the hospital's financial conditions so that the process runs effectively and does not disrupt operational continuity.

Mature planning in medical equipment procurement must include consideration of various factors, including sustainability of equipment maintenance, compatibility of specifications with service needs, and flexibility in adaptation to policy changes and budget revisions.

Output of Diagnostic Medical Equipment Planning and Procurement

The research results show that optimization of the Hospital Management Information System (HMIS) is a strategic solution to improve the efficiency and effectiveness of hospital management. HMIS enables digitalization of administrative processes without the need for direct meetings or use of physical documents, thus resulting in cost savings for office stationery and acceleration of information access.

In budget preparation, data can be accessed directly through the system without the need for physical file transportation, thus facilitating coordination with external parties such as BAPPEDA and BPKD. Besides system optimization, medical equipment maintenance is also identified as a crucial factor, including conformity testing, electrical network inspection, exposure testing, calibration, and equipment rejuvenation to ensure optimal functionality of medical equipment. The urgent need for replacement of damaged CT scan equipment is also identified to ensure continuity of diagnostic services.

HMIS optimization is a strategic intervention to improve the efficiency of data management and hospital needs, where each unit can directly input needs without the need for physical meetings, thus making the process more efficient and cost-effective. Additionally, regular medical equipment maintenance programs, including conformity testing, electrical network inspection, exposure testing, calibration, and equipment rejuvenation, are essential to ensure diagnostic accuracy and service quality. Replacement of obsolete or damaged medical equipment, such as CT scan, is also a priority need to ensure continuity of optimal medical services (Saputra Mokoagow et al., 2024).

These findings align with the results of Ali et al.'s (2024) research which proves that the implementation of hospital management information systems and systematic equipment maintenance programs can improve the efficiency and quality of healthcare services. HMIS enables structured data management, acceleration of administrative processes, and reduction of dependence on physical documents, thus making decision-making more responsive and

accurate. Regular medical equipment maintenance programs, including conformity testing, electrical network inspection, exposure testing, calibration, and equipment rejuvenation, are essential to ensure that diagnostic equipment continues to function optimally and has high accuracy.

The research results also indicate patient expectations for improved service quality, especially related to examination waiting times and facility comfort. Patients suggest that the MRI examination waiting time, which currently reaches three to five days, can be shortened to one day to increase service responsiveness.

Additionally, patients also express the need for improved comfort in waiting rooms. Both aspects represent patient expectations for healthcare services that are not only efficient and responsive but also consider comfort aspects during the service process. Therefore, improving examination schedule efficiency and optimizing waiting room facilities become two priority areas in the quality improvement strategy in the radiology installation.

CONCLUSIONS AND RECOMMENDATIONS

Research on planning and procurement of diagnostic medical equipment at Jayapura Regional Hospital has produced several substantive conclusions. First, the process of planning and procurement of diagnostic medical equipment at Jayapura Regional Hospital is influenced by three determinant factors: government regulations, budget availability, and hospital management strategies. The implementation of a bottom-up approach in planning at Jayapura Regional Hospital has facilitated needs identification that is more responsive to actual conditions in the field and encouraged active participation from various staff levels. Nevertheless, optimization of planning and procurement processes requires a balance between bottom-up and top-down approaches, with emphasis on effective coordination between departments to integrate operational proposals with strategic policies and resource availability.

Second, identification of constraints in the process of planning and procurement of diagnostic medical equipment at Jayapura Regional Hospital found three main barriers: budget limitations, funding allocation instability, and equipment specification mismatches. Budget limitations cause the hospital to strictly prioritize essential needs such as drugs and consumables, while medical equipment maintenance is often constrained. Budget instability due to ad hoc policy revisions also disrupts the implementation of previously arranged procurement plans. Addressing these constraints requires a more strategic approach, including implementation of decision support systems and data-based planning to optimize the allocation of limited resources.

Third, optimization of the Hospital Management Information System (HMIS) is a strategic solution to improve the efficiency of planning and procurement processes. Digitalization of administrative processes through HMIS can reduce dependence on physical documents, accelerate information access, and facilitate coordination with external parties. Additionally, a comprehensive and systematic medical equipment maintenance program, including conformity testing, electrical network inspection, exposure testing, calibration, and equipment

rejuvenation, is essential to ensure continuity and quality of diagnostic services. Accurate needs analysis is also required in the procurement of new equipment to ensure relevance and effectiveness of resource use.

Fourth, implementation of these strategic recommendations is projected to significantly improve the effectiveness of planning and procurement of diagnostic medical equipment at Jayapura Regional Hospital. Integration of HMIS in the management process, efficiency of budget management, planned equipment maintenance programs, and supporting regulatory frameworks are key elements that are interconnected in efforts to improve healthcare service quality. A holistic approach that considers technological, human resource, financial, and policy aspects is needed to produce sustainable transformation in the medical equipment planning and procurement system at Jayapura Regional Hospital.

Based on comprehensive analysis results of the planning and procurement process of diagnostic medical equipment at Jayapura Regional Hospital, strategic recommendations to improve the effectiveness and efficiency of this system are that Jayapura Regional Hospital needs to implement data-based and service needs-based planning considering critical aspects such as existing equipment conditions, procurement urgency level, and available budget constraints. The bottom-up approach in proposing medical equipment needs to be maintained with improvements in documentation and evaluation systems to ensure each unit obtains equipment that suits the specific needs of medical services.

FURTHER STUDY

Based on the findings and limitations of this research, several important aspects that can be explored in subsequent research include: comparative analysis of the effectiveness of medical equipment procurement systems in various hospitals with similar characteristics; evaluation of the impact of HMIS implementation on the efficiency of medical equipment procurement processes longitudinally; studies on alternative financing models for medical equipment procurement in regions with limited resources; and investigation of factors affecting compliance with diagnostic medical equipment maintenance standards. Additionally, research on the impact of end-user involvement in the decision-making process of medical equipment procurement on utilization levels and user satisfaction can also provide valuable insights for the development of more responsive and effective medical equipment procurement policies.

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