

Perceived Challenges and Barriers in Supply Chain Management in a Selected Tertiary Government Hospital in Mecca, KSA

Achmed M. Sani¹, Dr. Erwin Faller²

Masters of Hospital Administration, St. Bernadette of Lourdes College, Quezon City, Philippines-1123

Email address: Faneera@yahoo.com

Abstract— Supply chain management in tertiary government hospitals, particularly in high-demand settings like Mecca during the Hajj season, faces unique operational challenges. Understanding these barriers from the perspective of hospital personnel is essential for improving healthcare delivery. This qualitative study aimed to explore the perceived challenges and barriers in hospital supply chain management in a selected tertiary government hospital in Mecca, Saudi Arabia. A phenomenological approach was employed. Semi-structured interviews were conducted with ten (10) supply chain personnel, including procurement officers, inventory specialists, logistics coordinators, receiving staff, and clinical end-users. Data were analyzed using thematic analysis in NVivo. Four major themes emerged: (1) coordination delays, with subthemes of communication gaps, administrative bottlenecks, and logistical constraints; (2) inventory imbalance, with subthemes of forecasting limitations, weak monitoring visibility, and wastage risk; (3) supplier variability, with subthemes of quality/quantity inconsistencies, market shortages, and delivery delays; and (4) budget constraints, with subthemes of reduced purchasing power, tender approval delays, and quantity reduction. Perceived barriers to hospital supply chain management are present across coordination, inventory, supplier performance, and financial capacity. Improving supply chain effectiveness requires strengthening internal coordination routines, inventory monitoring systems, supplier management practices, and financial planning processes.

Keywords— Supply Chain Management, Hospital Administration, Perceived Barriers, Tertiary Hospital, Saudi Arabia, Qualitative Research.

I. INTRODUCTION

Supply chain management (SCM) plays a critical role in ensuring the continuous availability of medicines, medical equipment, and other essential healthcare resources required for the effective delivery of healthcare services. Efficient SCM enables healthcare institutions to maintain operational continuity, optimize resource utilization, and improve patient outcomes by ensuring that critical medical supplies are available when needed. Previous studies have emphasized that effective supply chain systems contribute significantly to the efficiency, reliability, and sustainability of healthcare operations, particularly in hospitals experiencing high patient demand and complex logistical requirements (Yani et al., 2023). In tertiary government hospitals located in high-demand areas such as Makkah, Kingdom of Saudi Arabia (KSA), supply chain management has become increasingly challenging because hospitals are expected to provide uninterrupted healthcare services while simultaneously responding to

routine medical needs and the substantial influx of patients during the Hajj season (Aljohani et al., 2022; Alsaleh et al., 2025).

The increasing demand for quality healthcare services has highlighted the importance of understanding the operational challenges affecting hospital supply chain systems. Personnel directly involved in procurement, warehousing, inventory management, and distribution frequently encounter barriers that are not always evident at the administrative or policy level. These barriers include procurement delays, communication breakdowns, inefficient inventory control, and inadequate coordination between hospital departments and external suppliers, all of which may compromise the timely delivery of healthcare services (Habib et al., 2022). Exploring the perspectives of hospital personnel provides valuable insights into the practical challenges that influence the effectiveness of supply chain operations in government healthcare institutions.

Globally, healthcare organizations recognize SCM as a strategic function that directly influences organizational performance, cost efficiency, and patient safety. Modern healthcare supply chains involve complex networks of pharmaceutical manufacturers, medical equipment suppliers, distributors, healthcare providers, regulatory agencies, and patients working collaboratively to ensure the continuous flow of essential healthcare resources (Fiore et al., 2023). Recent developments in healthcare SCM emphasize digital transformation through integrated information systems, strategic sourcing, demand forecasting, and inventory optimization to strengthen supply chain resilience and improve service delivery (Betcheva et al., 2020). Studies have demonstrated that efficient supply chain systems reduce operational delays, minimize medical errors, optimize resource allocation, and enhance overall hospital performance (Mittal & Mantri, 2023; Usumera et al., 2024).

Despite these advancements, government hospitals continue to encounter numerous operational and structural barriers that hinder the effective implementation of modern supply chain practices. Bureaucratic procurement procedures, financial limitations, inadequate inventory management systems, workforce shortages, and fragmented communication frequently contribute to procurement delays, stock shortages, inefficient resource utilization, and interruptions in healthcare delivery (Buttigieg et al., 2020; Dadsena & Pant, 2023). These challenges become even more critical during periods of increased healthcare demand, where supply chain disruptions

may directly affect patient care and organizational efficiency (Balkhi et al., 2022; Vanbrabant et al., 2023; Luca et al., 2025).

The healthcare environment in Makkah presents a unique context for examining hospital supply chain management. During the Hajj season, millions of pilgrims require immediate access to emergency care, specialized treatment, pharmaceuticals, and medical supplies, placing extraordinary pressure on tertiary government hospitals (Aljohani et al., 2022). Consequently, hospitals must maintain resilient procurement systems, effective inventory management, responsive supplier coordination, and efficient logistics to sustain uninterrupted healthcare delivery under rapidly changing operational conditions.

Although previous studies have investigated healthcare supply chain management in various organizational settings, limited qualitative evidence exists regarding the lived experiences of hospital personnel working in tertiary government hospitals in Makkah. Existing literature has predominantly focused on technological innovations, inventory optimization models, and cost-efficiency strategies while providing limited attention to the operational realities experienced by frontline personnel responsible for procurement, warehousing, inventory control, and supply distribution (Almutairi et al., 2021; Ayadi, 2024). Furthermore, few studies have explored how contextual factors such as administrative procedures, financial constraints, workforce capacity, supplier responsiveness, and interdepartmental coordination collectively influence supply chain management in hospitals operating under the unique demands of the Hajj season.

Drawing from the researcher's professional experience in a selected tertiary government hospital in Makkah, several recurring operational issues have been observed, including delays in the procurement of essential medical supplies, communication gaps between supply chain and clinical departments, prolonged approval procedures, limited integration of digital inventory monitoring systems, inconsistent supplier performance, and budgetary constraints affecting procurement decisions. These challenges become increasingly pronounced during periods of peak patient demand, highlighting the vulnerability of hospital supply chain systems under extraordinary healthcare conditions.

Therefore, this study explores the perceived challenges and barriers in supply chain management in a selected tertiary government hospital in Makkah, Kingdom of Saudi Arabia. Specifically, the study seeks to examine barriers related to procurement processes, inventory management, supplier responsiveness, communication and coordination, financial constraints, and operational practices. The findings are expected to contribute to the growing body of knowledge on healthcare supply chain management and provide evidence-based recommendations that may assist hospital administrators, policymakers, and healthcare professionals in strengthening supply chain resilience, improving operational efficiency, and enhancing the quality of healthcare services in public hospital settings.

II. LITERATURE REVIEW

Supply Chain Management in Healthcare

Supply chain management (SCM) has been widely recognized as a strategic organizational function that enhances operational efficiency, cost control, and service quality across various industries. Studies have consistently demonstrated that effective SCM improves coordination among stakeholders, reduces operational costs, and strengthens organizational performance through integrated planning, procurement, inventory management, and distribution systems (Al-Faouri et al., 2024; Al-Madi et al., 2021; Komakech et al., 2025). Although SCM principles originated in manufacturing and service industries, these concepts have increasingly been adopted in healthcare organizations to improve the availability of medical supplies and support uninterrupted healthcare delivery.

Within the healthcare sector, SCM has become increasingly important due to rising operational costs, growing patient demand, and the complexity of hospital logistics. Hospital supply chains involve multiple stakeholders, including suppliers, procurement units, warehouse personnel, healthcare professionals, and regulatory agencies, all of whom must coordinate effectively to ensure the continuous availability of medicines and medical equipment. Previous studies have reported that fragmented procurement systems, inadequate standardization, and weak interdepartmental coordination contribute to operational inefficiencies that directly affect healthcare service delivery (Islam & Habib, 2024; Habib et al., 2022; Langarizadeh et al., 2024; Setiawati et al., 2023).

Operational Challenges in Hospital Supply Chain Management

Several studies have identified common barriers that hinder the effectiveness of hospital supply chain management. Mittal and Mantri (2023) reported that insufficient data standardization, inaccurate inventory records, conflicting organizational priorities, and poor information quality frequently result in procurement delays, stock shortages, and increased operational costs. Likewise, Setiawati et al. (2023) emphasized that weak collaboration among supply chain partners limits hospitals' purchasing power and reduces their ability to negotiate favorable procurement agreements. These operational barriers negatively influence the timely availability of medical supplies and may compromise patient care, particularly in resource-constrained government hospitals.

Financial limitations, bureaucratic procurement procedures, inadequate workforce capacity, and communication gaps also remain persistent challenges within healthcare supply chains. Tortorella et al. (2023) identified rapidly changing medical technologies, high procurement costs, inconsistent product standardization, and limited information technology infrastructure as major implementation barriers. Similarly, Dadsena and Pant (2023) highlighted insufficient leadership support, limited workforce training, competing organizational priorities, and inadequate data systems as factors that delay the successful implementation of modern SCM practices.

Strategies for Improving Healthcare Supply Chains

Researchers have proposed several strategies to strengthen healthcare supply chain performance. Collaborative

procurement through Group Purchasing Organizations (GPOs) has been identified as an effective mechanism for reducing procurement costs by allowing hospitals to negotiate collectively with suppliers (Usuemerai et al., 2024). Kulkarni and Smith (2022) likewise reported that purchasing alliances improve negotiating power while reducing transaction costs through shared purchasing agreements.

In addition to collaborative purchasing, technological innovations continue to transform hospital supply chain operations. Electronic procurement systems, Enterprise Resource Planning (ERP) platforms, digital inventory management systems, and automated procurement processes have been shown to improve coordination, reduce administrative workload, enhance inventory visibility, and strengthen supplier relationships (Hosteins, 2024; Chansamut, 2023; Bialas et al., 2023). However, the successful implementation of these technologies depends on organizational readiness, financial capability, and workforce competence.

Supply Chain Performance and Organizational Agility

Supply chain performance has been evaluated using various operational indicators, including resource utilization, organizational flexibility, responsiveness, customer satisfaction, and operational efficiency. Dey et al. (2019) and Lee et al. (2022) proposed performance measurement frameworks emphasizing operational effectiveness and adaptability. Similarly, Es-satty et al. (2024) identified resource utilization, output performance, and system flexibility as critical indicators of supply chain effectiveness, while Chowdhury et al. (2024) emphasized customer satisfaction, financial performance, and responsiveness to changing operational conditions.

Researchers have also stressed the importance of organizational agility in responding to unexpected disruptions. Berthot (2023) argued that agile supply chains enable healthcare organizations to respond rapidly to fluctuations in demand, emergencies, and changing operational conditions. Mittal and Mantri (2023) further emphasized that strategic integration of supply chain activities enhances organizational resilience by improving coordination among procurement, logistics, inventory management, and clinical operations.

Hospital Supply Chain Management in Saudi Arabia

Studies focusing on healthcare supply chain management in Saudi Arabia remain relatively limited. Almutairi et al. (2021) identified organizational culture, leadership commitment, and workforce capability as essential factors influencing the successful implementation of lean healthcare supply chain practices. Ayadi (2024) further emphasized that supply chain resilience and integration strengthen hospitals' ability to respond to disruptions while improving operational performance.

The healthcare environment in Makkah presents unique logistical challenges because of the annual Hajj pilgrimage, during which millions of pilgrims require immediate access to healthcare services. Aljohani et al. (2022) highlighted the increasing pressure placed on hospital logistics and healthcare supply systems during Hajj, emphasizing the importance of

responsive procurement and efficient resource distribution. Likewise, Alsaleh et al. (2025) reported that coordination challenges during medical convoy transfers significantly affect continuity of patient care, further demonstrating the critical role of efficient hospital supply chain management in high-demand healthcare settings.

Research Gap

Although previous studies have established the importance of hospital supply chain management, existing literature has primarily focused on quantitative performance indicators, technological innovations, procurement optimization, and private healthcare settings. Limited qualitative evidence exists regarding the lived experiences and perceived challenges of personnel directly involved in hospital supply chain operations, particularly within tertiary government hospitals. Furthermore, few studies have examined hospital supply chain management in the unique operational environment of Makkah, where healthcare systems experience extraordinary demand during the Hajj season.

This gap highlights the need for an in-depth qualitative investigation of the barriers encountered by hospital personnel responsible for procurement, inventory management, warehousing, and logistics. Therefore, the present study explores the perceived challenges and barriers in supply chain management in a selected tertiary government hospital in Makkah, Kingdom of Saudi Arabia, to provide context-specific evidence that may support improvements in healthcare supply chain systems.

III. CONCEPTUAL FRAMEWORK

The present study is anchored on the Resource-Based Theory (RBT), which explains that organizational performance is influenced by the effective utilization and management of internal resources and capabilities. Originally introduced by Penrose (1959) and further developed by Barney (1991), RBT posits that organizations achieve sustained performance when valuable, rare, difficult-to-imitate, and well-organized resources are strategically coordinated to support organizational objectives. In healthcare organizations, this theory provides a useful perspective for understanding how internal resources influence the efficiency and effectiveness of hospital supply chain management.

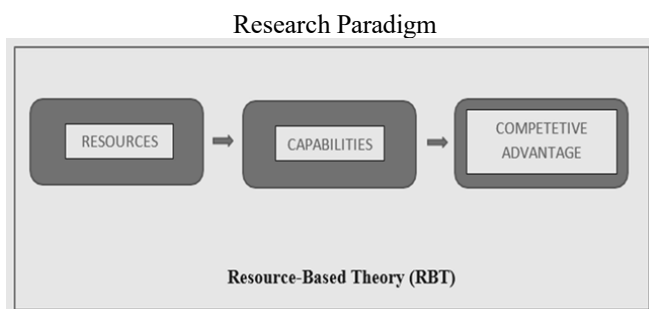
Within the context of tertiary government hospitals, organizational resources include both tangible and intangible assets that support supply chain operations. Tangible resources consist of medical supplies, pharmaceuticals, warehouse facilities, procurement systems, transportation resources, and information technology infrastructure. Intangible resources include employee expertise, institutional knowledge, leadership capability, organizational culture, and established operational procedures. Previous studies have demonstrated that the availability and effective management of these resources significantly influence procurement efficiency, inventory management, coordination among departments, and the continuity of healthcare services (Alali et al., 2022; Luca et al., 2025).

In addition to organizational resources, RBT emphasizes the

importance of organizational capabilities, referring to the hospital's ability to integrate, coordinate, and utilize available resources effectively. These capabilities include procurement planning, inventory control, supplier relationship management, interdepartmental coordination, information sharing, and decision-making processes. Hospitals possessing stronger supply chain capabilities are better equipped to respond to fluctuations in demand, minimize procurement delays, reduce stock shortages, and sustain operational efficiency during periods of increased healthcare demand (Ayadi, 2024; Vanbrabant et al., 2023).

The theory further suggests that effective alignment between organizational resources and capabilities contributes to improved organizational performance. Within hospital supply chain management, this performance is reflected in the continuous availability of essential medical supplies, efficient resource utilization, cost-effective procurement, and reliable support for quality patient care. Although government hospitals do not compete in a traditional commercial environment, sustained operational effectiveness represents an important indicator of organizational performance, particularly in high-demand healthcare settings such as Makkah during the Hajj season (Lestari et al., 2021; Mahasneh et al., 2020).

Guided by the Resource-Based Theory, the present study explores the perceived challenges and barriers encountered by hospital personnel involved in supply chain management within a selected tertiary government hospital in Makkah, Kingdom of Saudi Arabia. The theory serves as the interpretive framework for understanding how limitations in organizational resources and operational capabilities influence procurement practices, inventory management, coordination, supplier responsiveness, and the overall effectiveness of hospital supply chain operations.



IV. RESEARCH OBJECTIVES

General Objective

This study aims to explore the perceived challenges and barriers in hospital supply chain management in a selected tertiary government hospital in Makkah, Kingdom of Saudi Arabia.

Specific Objectives

This study specifically aims to:

1. Explore how inefficient coordination between suppliers and hospital supply chain personnel affects the timely delivery of essential medical supplies.
2. Examine how inventory management practices contribute

to resource wastage and supply chain inefficiencies within the hospital.

3. Identify the challenges encountered when suppliers are unable to meet the operational demands of the hospital
4. Investigate how financial constraints influence procurement processes and overall hospital supply chain management
5. Explore additional challenges and experiences perceived by hospital personnel regarding supply chain management and identify potential strategies for improving operational efficiency.

V. METHODOLOGY

Research Design

This study employed a qualitative phenomenological research design to explore the perceived barriers in hospital supply chain management at a selected tertiary government hospital in Makkah, Kingdom of Saudi Arabia. A qualitative approach was considered appropriate because it allows an in-depth exploration of participants' lived experiences, perceptions, and interpretations regarding supply chain practices within their organizational context (Habib et al., 2022). The phenomenological approach focused on understanding the experiences of hospital personnel directly involved in procurement, inventory management, warehousing, and supply distribution (Phillips et al., 2022).

Data were collected through semi-structured interviews and analyzed using thematic analysis following the six-step framework developed by Braun and Clarke (2006), consisting of familiarization with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report. This analytical approach enabled the systematic identification of recurring patterns and meanings related to coordination issues, inventory management, supplier responsiveness, and financial constraints.

Research Participants

The participants consisted of hospital personnel directly involved in supply chain-related activities, including procurement and purchasing personnel, warehouse and inventory staff, receiving personnel, pharmacy staff, and clinical end-users responsible for requesting and monitoring medical supplies.

Participants were selected using purposive sampling to ensure that only individuals with direct experience in hospital supply chain operations were included. Where necessary, snowball sampling was employed to identify additional key informants recommended by previous participants because of their operational responsibilities.

Eligibility criteria required participants to be currently employed at the study site and actively involved in procurement, receiving, storing, issuing, monitoring, or distributing medical supplies. Personnel without direct supply chain responsibilities were excluded.

Approximately 10 to 12 interviews were initially planned, consistent with phenomenological research emphasizing depth rather than numerical representation. A total of ten participants were interviewed. Data collection concluded after thematic

saturation was achieved, wherein no new concepts or meaningful information emerged from subsequent interviews.

Research Instrument

The primary data collection instrument was a researcher-developed semi-structured interview guide consisting of ten open-ended questions designed to explore participants' experiences and perceptions regarding hospital supply chain management. Semi-structured interviews provided flexibility to probe participants' responses while maintaining consistency across interviews (Tiwari et al., 2025).

The interview guide underwent content validation by three experts specializing in supply chain management, qualitative research, and hospital administration. Revisions were incorporated based on their recommendations before the conduct of data collection.

Document analysis was likewise conducted using selected hospital policies, procurement guidelines, internal reports, and supply chain documents to provide contextual support and facilitate data triangulation.

Data Collection Procedure

Prior to data collection, ethical approval was obtained from the St. Bernadette of Lourdes College Ethics Review Board (ERB Approval No. ERB-2026-062) and the King Abdullah Medical City Institutional Review Board (IRB Approval No. 25-1477). Permission to conduct the study was subsequently secured from the hospital administration.

Eligible participants were invited to participate voluntarily. Written informed consent, including permission for audio recording, was obtained before each interview. Face-to-face interviews were conducted at schedules convenient to participants while ensuring privacy and confidentiality throughout the interview process. Participants were informed of their right to decline participation or withdraw from the study at any stage without consequence. All interviews were audio-recorded, transcribed verbatim, and prepared for thematic analysis.

Statistical Analysis

Interview transcripts were analyzed using thematic analysis following Braun and Clarke's (2006) six-phase framework. The researcher first familiarized himself with the transcripts through repeated reading before generating initial codes representing significant statements related to hospital supply chain management. Similar codes were subsequently organized into categories and refined into broader themes describing participants' perceived barriers. Emerging themes were continuously reviewed and validated against the original transcripts to ensure consistency and accuracy. NVivo qualitative data analysis software was utilized to facilitate transcript organization, coding, theme development, and data management, thereby improving the rigor and transparency of the analytical process (Amaya et al., 2022).

VI. RESULTS AND DISCUSSION

Coordination Between Suppliers and Supply Chain Management Staff

The findings revealed that participants experienced several coordination challenges between suppliers and supply chain management staff in the selected tertiary government hospital in Makkah, Saudi Arabia. Based on the NVivo thematic analysis, the results indicated that communication gaps emerged as the most dominant coordination issue, generating 20 coding references from 9 out of 10 participants (90%). This finding suggests that ineffective communication between suppliers and hospital departments contributed to delayed deliveries, stock shortages, and disruptions in procurement activities. Participants emphasized that inconsistent information sharing and delayed order confirmations often resulted in emergency purchasing and additional operational costs.

This finding supports the study of Habib et al. (2022), who explained that fragmented communication and poor coordination among supply chain stakeholders contribute to procurement delays, inventory shortages, and reduced operational efficiency in hospitals. Likewise, Langarizadeh et al. (2024) emphasized that effective communication enhances responsiveness, continuity of supply, and overall hospital supply chain performance.

Similarly, logistical constraints emerged as the second most common coordination challenge, generating 12 coding references from 9 out of 10 participants (90%). Participants identified transportation delays, traffic regulations, and seasonal congestion during Hajj and Umrah as significant external factors affecting the timely delivery of medical supplies. These findings indicate that although logistical barriers are often beyond the hospital's direct control, they significantly influence procurement efficiency and supply availability.

These findings are consistent with Hosteins (2024), who reported that logistical inefficiencies contribute to procurement delays and interruptions in healthcare service delivery. Likewise, Aljohani et al. (2022) highlighted that hospitals in Makkah experience unique logistical challenges during pilgrimage seasons because of increased transportation demand and traffic restrictions.

The findings further revealed that administrative procedures generated the lowest number of coding references, with 5 references from 5 out of 10 participants (50%). Participants explained that lengthy approval procedures, procurement documentation, and multiple authorization requirements prolonged purchasing lead times and delayed the acquisition of essential medical supplies. Although mentioned less frequently than communication and logistical issues, administrative delays remained an important operational concern affecting procurement efficiency.

This finding supports Chansamut (2023), who argued that electronic procurement systems reduce paperwork and improve procurement efficiency by shortening approval processes. Similarly, Bialas et al. (2023) emphasized that digital procurement systems enhance workflow efficiency and minimize administrative delays in healthcare organizations.

Inventory Management Practices Leading to Wastage of Resources in Hospital Supply Chain Management

The findings revealed that participants experienced several inventory management challenges that contributed to the wastage of resources in the selected tertiary government hospital in Makkah, Saudi Arabia. Based on the NVivo thematic analysis, forecasting limitations emerged as the most dominant inventory management issue, with 9 out of 10 participants (90%) identifying inaccurate demand forecasting as a primary cause of overstocking, stockouts, and resource wastage. Participants explained that inaccurate demand estimates often resulted in excessive procurement of some medical supplies while causing shortages of other essential items. These findings indicate that ineffective forecasting negatively affects inventory balance and operational efficiency.

This finding supports the study of Mittal and Mantri (2023), who explained that poor inventory information and inaccurate demand forecasting contribute to stockouts, procurement delays, and increased operational costs in healthcare supply chains. Similarly, Balkhi et al. (2022) emphasized that demand uncertainty weakens inventory management strategies and increases the likelihood of inventory imbalance and wastage.

Similarly, weak monitoring visibility emerged as the second most common inventory management challenge, with 7 out of 10 participants (70%) reporting limited access to real-time inventory information and unreliable consumption records. Participants indicated that procurement decisions were frequently based on estimated demand rather than actual consumption data, making it difficult to monitor inventory movement and determine appropriate replenishment levels. These findings suggest that insufficient monitoring systems reduce the accuracy of inventory decisions and increase the risk of shortages and excess stock.

These findings are consistent with Yudianti et al. (2021), who emphasized that systematic inventory monitoring improves replenishment decisions and minimizes wastage of healthcare resources. Likewise, Islam and Habib (2024) explained that technology integration and real-time inventory monitoring strengthen decision-making by improving information quality and inventory visibility.

The findings further revealed that wastage risk was identified by 6 out of 10 participants (60%). Participants explained that medical supplies with short shelf lives frequently expired because procurement decisions relied on estimated demand instead of real-time consumption data. They further noted that poor inventory planning increased the likelihood of expired products, unnecessary disposal, and financial losses for the hospital.

This finding supports Langarizadeh et al. (2024), who highlighted that flexibility and responsiveness in inventory management are essential to preventing supply wastage and maintaining continuity of healthcare services. Similarly, Yudianti et al. (2021) emphasized that effective inventory control systems reduce product expiration and improve resource utilization through timely replenishment and stock monitoring.

Supplier Challenges in Meeting Hospital Demand

The findings revealed that participants encountered several challenges related to supplier performance that affected the

continuity of hospital supply chain management in the selected tertiary government hospital in Makkah, Saudi Arabia. Based on the NVivo thematic analysis, quality and quantity inconsistencies emerged as the most dominant supplier-related challenge, with 8 out of 10 participants (80%) reporting that suppliers occasionally failed to deliver the required quantity of medical supplies or maintain the expected quality, particularly during periods of peak demand and emergencies. Participants emphasized that inconsistent supplier performance disrupted procurement activities and affected the continuous availability of essential medical supplies.

This finding supports the study of Langarizadeh et al. (2024), who emphasized that supplier responsiveness, continuity, and availability are critical indicators of hospital supply chain performance. Similarly, Ayadi (2024) explained that supply chain resilience and supplier integration are essential in maintaining healthcare operations, particularly during periods of increased demand and supply uncertainty.

Similarly, delivery delays emerged as the second most common supplier challenge, with 7 out of 10 participants (70%) identifying delayed deliveries as a major cause of supply interruptions and increased workload among hospital personnel. Participants explained that late deliveries often resulted in shortages of essential medical supplies, forcing healthcare workers to seek alternative sources and adjust clinical operations to maintain patient care. These findings indicate that timely supplier performance remains essential to ensuring uninterrupted healthcare services.

These findings are consistent with Habib et al. (2022), who reported that supply disruptions reduce hospital efficiency and negatively affect healthcare service delivery. Likewise, Chowdhury et al. (2024) emphasized that organizational flexibility and resilient supply chain practices help minimize the impact of delivery disruptions and improve service continuity.

The findings further revealed that market shortages were identified by 5 out of 10 participants (50%). Participants explained that certain procurement delays were caused not by supplier inefficiency but by the limited availability of medical supplies in the broader market. During these situations, suppliers were unable to fulfill hospital requests because the required items were unavailable from manufacturers or distributors. This indicates that external market conditions also influence hospital procurement performance beyond the control of individual suppliers.

This finding supports Ayadi (2024), who emphasized that resilient healthcare supply chains require proactive strategies to address external supply risks and market disruptions. Similarly, Mittal and Mantri (2023) explained that supply shortages and procurement constraints increase operational challenges and reduce the efficiency of healthcare supply chain systems.

Financial Constraints Affecting Supply Chain Management

The findings revealed that financial constraints significantly influenced the effectiveness of supply chain management in the selected tertiary government hospital in Makkah, Saudi Arabia. Based on the NVivo thematic analysis, reduced purchasing power emerged as the most dominant financial challenge, with

6 out of 10 participants (60%) reporting that limited financial resources restricted the hospital's ability to procure adequate quantities of essential medical supplies. Participants explained that budget limitations often affected procurement decisions, resulting in reduced purchasing capacity and limiting the availability of necessary healthcare resources. These findings indicate that financial capacity plays a critical role in maintaining a stable and responsive hospital supply chain.

This finding supports the study of Islam and Habib (2024), who explained that financial resources directly influence procurement efficiency, inventory availability, and overall healthcare supply chain performance. Similarly, Kulkarni and Smith (2022) emphasized that strategic procurement practices are necessary to optimize limited financial resources while ensuring continuous access to essential medical supplies.

Similarly, tender approval and payment delays emerged as the second most common financial challenge, with 5 out of 10 participants (50%) identifying procurement approval processes and delayed payment cycles as factors that prolonged purchasing lead times. Participants reported that procurement activities were frequently delayed while waiting for tender approvals, particularly during year-end budget periods and other administrative cycles. These findings suggest that financial procedures, in addition to budget limitations, contribute to delays in the procurement process.

These findings are consistent with Chansamut (2023), who explained that electronic procurement systems improve procurement efficiency by streamlining approval processes and reducing administrative delays. Likewise, Bialas et al. (2023) highlighted that digital procurement and enterprise resource planning systems enhance workflow efficiency and shorten purchasing cycles within healthcare organizations.

The findings further revealed that quantity reduction and prioritization were reported by 4 out of 10 participants (40%). Participants explained that limited financial resources often required the hospital to reduce procurement quantities and prioritize only the most essential medical supplies. Although this strategy enabled the hospital to manage available resources, respondents acknowledged that it also increased the risk of inventory shortages and affected the continuity of healthcare services.

This finding supports Usuemera et al. (2024), who emphasized that healthcare organizations must implement resource optimization strategies to sustain operations under financial constraints. Similarly, Komakech et al. (2025) explained that adequate financial resources strengthen organizational capabilities, while limited resources reduce the ability of healthcare institutions to maintain stable inventory and continuous service delivery.

Interpretation of the Findings

Overall, the findings demonstrate that hospital supply chain management in the selected tertiary government hospital in Makkah, Saudi Arabia is influenced by interconnected operational and organizational factors that affect the efficiency and continuity of healthcare service delivery. Among the four major themes identified, communication gaps emerged as the most dominant coordination challenge (20 coding references;

90% of participants), while forecasting limitations were the most frequently reported inventory management issue (9 out of 10 participants; 90%). These findings indicate that ineffective communication and inaccurate demand forecasting are the primary contributors to procurement delays, inventory imbalance, and resource wastage within the hospital supply chain.

The findings further revealed that supplier-related challenges, particularly quality and quantity inconsistencies (80%) and delivery delays (70%), significantly affected the continuous availability of essential medical supplies, especially during periods of high demand. In addition, financial constraints, including reduced purchasing power (60%), tender approval delays (50%), and quantity reduction strategies (40%), further limited the hospital's capacity to respond effectively to procurement and inventory requirements. These results suggest that supply chain performance is not influenced by a single factor but rather by the interaction of coordination, inventory management, supplier performance, and financial capability.

Taken together, the findings support the view that an effective hospital supply chain requires integrated management practices that strengthen communication among stakeholders, improve demand forecasting and inventory monitoring, establish reliable supplier partnerships, and enhance financial planning and procurement processes. Addressing these interconnected challenges can improve procurement efficiency, reduce inventory wastage and supply disruptions, optimize resource utilization, and ensure the continuous availability of essential medical supplies, ultimately contributing to better patient care and overall hospital performance.

VII. CONCLUSION

This study examined the perceived barriers to hospital supply chain management in the selected tertiary government hospital in Makkah, Saudi Arabia. Based on the findings, the study concludes that the effectiveness of hospital supply chain management is influenced by four major areas: coordination between suppliers and supply chain management staff, inventory management practices, supplier performance, and financial constraints. Although the hospital continues to maintain its supply chain operations, several recurring challenges affect the timely procurement, availability, and distribution of essential medical supplies.

The findings further indicate that communication gaps, inaccurate inventory forecasting, inconsistent supplier performance, and limited financial resources collectively contribute to procurement delays, inventory imbalances, supply shortages, and operational inefficiencies. These barriers not only affect procurement processes but also influence the continuity of healthcare services by increasing the risk of delayed deliveries, product wastage, and interruptions in the availability of critical medical supplies.

Overall, the study concludes that strengthening communication and coordination mechanisms, improving inventory planning and monitoring systems, enhancing supplier management practices, and optimizing financial planning and procurement processes are essential to improving hospital supply chain performance. Addressing these barriers will

enable healthcare institutions to enhance procurement efficiency, minimize resource wastage, ensure continuous availability of medical supplies, and ultimately support the delivery of safe, timely, and high-quality patient care.

VIII. PRACTICAL IMPLICATIONS

The findings of this study provide several practical implications for hospital administrators, supply chain personnel, healthcare providers, suppliers, and policymakers involved in improving hospital supply chain management. The results highlight that strengthening coordination, inventory systems, supplier relationships, and financial planning is essential to maintaining a reliable and responsive healthcare supply chain.

For hospital administrators, the findings emphasize the importance of establishing effective communication mechanisms among supply chain departments, clinical units, procurement offices, and external suppliers. Developing standardized communication protocols, regular coordination meetings, and clear escalation procedures may reduce delays, prevent shortages, and improve the continuity of medical supply availability. The findings also suggest that administrative processes should be streamlined through digital procurement systems to minimize approval delays and improve operational efficiency.

For supply chain managers and inventory personnel, the study highlights the need to improve inventory visibility and forecasting practices. Implementing real-time inventory monitoring systems, automated stock alerts, and data-driven forecasting methods may help reduce overstocking, stockouts, and wastage of medical supplies. These practices can support better resource utilization, particularly for high-demand and short shelf-life healthcare products.

For supplier management teams, the findings demonstrate the importance of strengthening supplier evaluation and resilience strategies. Hospitals may benefit from assessing supplier performance during peak demand periods, maintaining alternative supplier networks, and developing contingency plans to address delivery delays, market shortages, and supply disruptions. These strategies can improve supply continuity and reduce dependence on limited sources.

For finance and procurement units, the results emphasize the need for effective financial planning and procurement cycle management. Ensuring timely budget allocation, improving tender approval processes, and protecting essential medical supplies from unnecessary quantity reductions may enhance procurement flexibility and prevent disruptions in healthcare services.

For policymakers and healthcare organizations, the findings provide evidence that hospital supply chain performance requires integrated strategies involving technology adoption, operational planning, supplier collaboration, and financial support. Strengthening these areas may contribute to more efficient healthcare delivery, especially in high-demand environments such as Makkah, Saudi Arabia, where hospitals experience additional logistical pressures during peak seasons.

Finally, for future researchers and academic institutions, this study may serve as a reference for further investigations on

healthcare supply chain management, particularly studies examining digital transformation, predictive analytics, supplier resilience, and inventory optimization strategies in tertiary healthcare settings. The findings contribute to the growing body of knowledge regarding operational challenges and improvement opportunities within hospital supply chain systems.

IX. RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed:

1. Establish clear communication protocols among departments, procurement units, and suppliers, including standardized order confirmation procedures, escalation pathways for urgent items, and regular cross-departmental coordination meetings. (Based on Finding 1: communication gaps affected 90% of participants)
2. Implement real-time inventory tracking systems that provide consumption data, automated reorder alerts, and visibility of stock levels across departments before investing in advanced analytics. (Based on Finding 2: weak monitoring visibility affected 70% of participants)
3. Transition from estimate-based to data-driven forecasting using historical consumption patterns, patient volume projections, and seasonal demand variations (particularly Hajj and Umrah periods). (Based on Finding 2: forecasting limitations affected 90% of participants)
4. Conduct supplier capability assessments focused on peak demand performance and maintain multi-supplier sourcing for critical items to provide alternatives when primary suppliers fail. (Based on Finding 3: quality/quantity inconsistencies affected 80% of participants)
5. Establish formal escalation procedures for supplier delays, including expedited approval for alternative sourcing and dedicated shortage response protocols, rather than relying on regular staff to "scramble" for alternatives. (Based on Finding 3: delivery delays affected 70% of participants)
6. Streamline approval workflows by identifying redundant approval stages, setting maximum turnaround times, and prioritizing electronic procurement systems to reduce tender-related and end-of-year delays. (Based on Finding 4: tender approval delays affected 50% of participants)
7. Protect critical supplies from quantity reductions by developing evidence-based prioritization criteria that shield life-saving and high-use items from across-the-board budget cuts. (Based on Finding 4: quantity reduction affected 40% of participants)
8. Future researchers should include multiple tertiary government hospitals across Saudi Arabia, employ mixed-methods approaches linking qualitative findings with quantitative indicators, and assess the effectiveness of interventions suggested by participants, including real-time tracking systems and forecasting.

ACKNOWLEDGMENT

The authors express their sincere gratitude to the faculty members, research advisers, respondents, and participating

institution for their invaluable support and cooperation throughout the completion of this study. Special appreciation is extended to all individuals who shared their knowledge, expertise, and encouragement, making this research possible.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this research.

Funding Statement

This research received no external funding and was conducted independently as part of the academic requirements of the researchers.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request, subject to institutional research policies and ethical considerations.

Author Contributions (CRediT)

- Conceptualization: Authors
- Methodology: Authors
- Data Collection: Authors
- Formal Analysis: Authors
- Writing – Original Draft: Authors
- Writing – Review & Editing: Authors
- Supervision: Research Adviser

REFERENCES

- [1] Ahmed, S. K. (2024). The pillars of trustworthiness in qualitative research. *Journal of Medicine, Surgery, and Public Health*, 2, 100051. <https://doi.org/10.1016/j.glmedi.2024.100051>
- [2] Ahumada-Canale, A., Jeet, V., Bilgrami, A., Seil, E., Gu, Y., & Cutler, H. (2023). Barriers and facilitators to implementing priority setting and resource allocation tools in hospital decisions: A systematic review. *Social Science & Medicine*, 322, 115790. <https://doi.org/10.1016/j.socscimed.2023.115790>
- [3] Alali, A. M., Rejal, H. M. A. A., Abu, N. H. B., & Alali, H. (2022). The impact of supply chain preparedness on healthcare service quality: A literature review. *International Journal of Sustainable Development and Planning*, 17(5), 1425–1433. <https://doi.org/10.18280/ijstdp.170506>
- [4] Al-Faouri, E. H., Huson, Y. A., Alkrarha, A. S., Aljawarneh, N. M., & Alqmo, T. J. (2024). Mapping the landscape: A bibliometric analysis of digital leadership, service quality, and supply chain management. *Uncertain Supply Chain Management*, 13(3), 543–560. <https://doi.org/10.5267/j.uscm.2024.8.013>
- [5] Aljohani, A., Nejaim, S., Khayyat, M., & Aboulola, O. (2022). E-government and logistical health services during Hajj season. *Bulletin of the National Research Centre*, 46(1), Article 87. <https://doi.org/10.1186/s42269-022-00801-4>
- [6] Al-Madi, F., Alfalah, T., Shraah, A. A., & Abu-Rumman, A. (2021). Supply chain practices and organizational performance: Evidence from Jordanian medical devices firms. *Uncertain Supply Chain Management*, 9(4), 831–844. <https://doi.org/10.5267/j.uscm.2021.8.006>
- [7] Almutairi, A., Almani, M., Al-Ashaab, A., & Saloni, K. (2021). Prioritized solutions for overcoming barriers when implementing lean in the healthcare supply chain: A Saudi perspective. *Logistics*, 5(1), Article <https://doi.org/10.3390/logistics5010009>
- [8] Alsaleh, G., Khan, A., Alabdulatif, L., Alhazmi, J., & Althobaiti, A. (2025). Quality of care and challenges in medical convoy transfers during Hajj season 2023: A cross-sectional study. *Frontiers in Disaster and Emergency Medicine*, 3, Article 1534361. <https://doi.org/10.3389/femer.2025.1534361>
- [9] Amaya, N., Torres, C. A. B., Nicolás-Rojas, Y. W., & Pando-Ezcurra, T. (2022). Role of internal resources in building competitive advantage in a knowledge-intensive organization in an emerging market. *VINE Journal of Information and Knowledge Management Systems*, 54(5), 1153–1171. <https://doi.org/10.1108/VJKMS-01-2022-0029>
- [10] Ayadi, F. (2024). Enhancing supply chain performance of Saudi hospitals through resilience: The roles of supply chain integration and innovation. *Uncertain Supply Chain Management*, 12(4), 2855–2872. <https://doi.org/10.5267/j.uscm.2024.4.017>
- [11] Balkhi, B., Alshahrani, A. M., & Khan, A. (2022). Just-in-time approach in healthcare inventory management: Does it really work? *Saudi Pharmaceutical Journal*, 30(12), 1830–1838. <https://doi.org/10.1016/j.jsps.2022.10.013>
- [12] Berthot, B. D. (2023). Agile supply chain management theories, empirical data, and future directions. *Informing Science and IT Education Conference Proceedings*, 15, 1–12. <https://doi.org/10.28945/5153>
- [13] Betcheva, L., Erhun, F., & Jiang, H. (2020). Healthcare supply chains. In *The Oxford handbook of healthcare management* (pp. 1–30). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780190066727.013.13>
- [14] Bialas, C., Bechtis, D., Aivazidou, E., Achillas, C., & Aidonis, D. (2023). Digitalization of the healthcare supply chain through the adoption of ERP systems in hospitals. *Sustainability*, 15(4), Article 3163. <https://doi.org/10.3390/su15043163>
- [15] Boulding, H., & Hinrichs, S. (2021). Factors influencing procurement behaviour and decision-making in a UK healthcare provider. *BMC Health Services Research*, 21(1), Article 1040. <https://doi.org/10.1186/s12913-021-07065-0>
- [16] Buttigieg, S. C., Bezzina, F., Xuereb, A., & Dey, P. K. (2020). Healthcare supply chain management: Application in the Maltese healthcare system. *Health Services Management Research*, 33(2), 55–65. <https://doi.org/10.1177/0951484819871003>
- [17] Chansamut, A. (2023). A digital system model for healthcare management in Thai supply chains. *International Journal of Supply Chain Management*, 12(2), 33–44. <https://doi.org/10.59160/ijscm.v12i2.6127>
- [18] Chowdhury, M. M. H., Chowdhury, P., Quaddus, M., Rahman, K. W., & Shahriar, S. (2024). Flexibility in enhancing supply chain resilience. *Global Journal of Flexible Systems Management*, 25(2), 395–412. <https://doi.org/10.1007/s40171-024-00391-2>
- [19] Dadsena, K. K., & Pant, P. (2023). Analyzing barriers in supply chain digitization from a sustainability perspective. *Operations Management Research*, 16(4), 1684–1701. <https://doi.org/10.1007/s12063-023-00351-6>
- [20] Demirtaş, M., & Gider, Ö. (2023). Financial performance analysis of a Ministry of Health hospital before and after affiliation. *Hacettepe Sağlık İdaresi Dergisi*, 26(3), 401–418. <https://dergipark.org.tr/tr/pub/hacettespid/issue/80040/1259369>
- [21] Dey, P. K., Yang, G., Malesios, C., De, D., & Evangelinos, K. (2019). Performance management of supply chain sustainability in SMEs. *Computational Economics*, 58(3), 573–599. <https://doi.org/10.1007/s10614-019-09948-1>
- [22] Dixit, M. R., & Shivhare, D. S. K. (2025). Performance assessment of predictive forecasting techniques for hospital supply chains. *International Journal of Research and Scientific Innovation*, 12(8), 819–833. <https://doi.org/10.51244/ijrsi.2025.120800069>
- [23] Es-satty, A., Naimi, M., Lemghari, R., & Okar, C. (2024). Machine learning techniques and supply chain performance. *International Journal of Advanced Computer Science and Applications*, 15(7), 1–10. <https://doi.org/10.14569/IJACSA.2024.0150719>
- [24] Fiore, M., Capodici, A., Rucci, P., Bianconi, A., Longo, G., Ricci, M., Sanmarchi, F., & Golinelli, D. (2023). Blockchain for the healthcare supply chain: A systematic review. *Applied Sciences*, 13(2), Article 686. <https://doi.org/10.3390/app13020686>
- [25] Gupta, R. (2024). A qualitative inquiry into implementation challenges of circular economy practices in supply chains. *Research Square*. <https://doi.org/10.21203/rs.3.rs-4284012/v1>
- [26] Habib, M. M., Chowdhury, F., Sabah, S., & Debnath, D. (2022). A study on hospital supply chain management. *American Journal of Industrial and Business Management*, 12(5), 806–819. <https://doi.org/10.4236/ajibm.2022.125042>
- [27] Hosteins, G. (2024). Supply chain analytics in healthcare. *Technical University of Denmark*. <https://local.forskningssportal.dk>
- [28] Islam, S., & Habib, M. M. (2024). Integrating technology in hospital supply chains. *International Journal of Supply Chain Management*, 13(1), 35–48. <https://doi.org/10.59160/ijscm.v13i1.6223>
- [29] Komakech, R. A., Ombati, T. O., Kikwatha, R. W., & Wainaina, M. G. (2025). Resource-based view theory and supply chain management. *Management Science Letters*, 15(4), 261–274. <https://doi.org/10.5267/j.msl.2024.6.004>
- [30] Kosiol, J., Fraser, L., Fitzgerald, A., & Radford, K. (2023). Resource-based view: A strategic perspective for public health service managers.

- Asia Pacific Journal of Health Management, 18(1). <https://doi.org/10.24083/apjhm.v18i1.2053>
- [30] Kulkarni, P., & Smith, L. D. (2022). Strategic procurement of high-cost medical devices. *International Journal of Strategic Decision Sciences*, 13(1), 1–16. <https://doi.org/10.4018/IJSDS.305831>
- [31] Langarizadeh, M., Fallahnezhad, M., & Vahabzadeh, A. (2024). Key performance indicators of hospital supply chains: A systematic review. *BMC Health Services Research*, 24(1), Article 1610. <https://doi.org/10.1186/s12913-024-11954-5>
- [32] Lee, K. L., Azmi, N. A. N., Hanaysha, J. R., Alzoubi, H. M., & Alshurideh, M. T. (2022). Digital supply chains and organizational performance. *Uncertain Supply Chain Management*, 10(2), 495–506. <https://doi.org/10.5267/j.uscm.2021.12.002>
- [33] Lestari, M. W., Surjoputro, A., & Sariatmi, A. (2021). Sustainable competitive advantage in hospital industry. *Public Health of Indonesia*, 7(3), 95–102. <https://doi.org/10.36685/phi.v7i3.421>
- [34] Luca, C., Carbonara, N., & Pellegrino, R. (2025). Digital technologies, staff skills, and hospital resilience. *Technological Forecasting and Social Change*, 215 124075. <https://doi.org/10.1016/j.techfore.2025.124075>
- [35] Mahasneh, M. S. M., Alnahdi, S. A., & Bani-Hani, J. S. (2020). Innovation in health services and competitive advantage. *International Journal of Business and Social Science*, 11(3), 89–99. <https://doi.org/10.30845/ijbss.v11n3a8>
- [36] Mittal, A., & Mantri, A. (2023). A literature survey on healthcare supply chain management. *F1000Research*, 12, 759. <https://doi.org/10.12688/f1000research.131440.2>
- [37] Phillips, J., Alipio, J. K., Hoskins, J. L., & Cohen, M. Z. (2022). The experience of frontline nurses during COVID-19: A phenomenological study. *Western Journal of Nursing Research*, 45(4), 327–340. <https://doi.org/10.1177/01939459221129944>
- [38] Sala-Vilar, L. R. (2024). From mediation to transformation: The role of innovation intermediaries in the AI and digital era. Technical University of Denmark. <https://local.forskningportal.dk>
- [39] Schutte, C., Niemann, W., & Kotzé, T. (2022). Exploring relationship power in supply chain sustainability practices. *South African Journal of Industrial Engineering*, 33(1), 1–13. <https://doi.org/10.7166/33-1-2209>
- [40] Setiawati, M., Pasaribu, A., Halim, D. P., & Darmawan, J. (2023). Hospital supply chain partnerships and performance. *Petra International Journal of Business Studies*, 6(2), 213–225. <https://doi.org/10.9744/petraijbs.6.2.213-225>
- [41] Tiwari, M., Lodorfos, G., McClelland, Z., & Nair, S. (2025). Leadership during healthcare supply chain crises. *International Studies of Management and Organization*. <https://doi.org/10.1080/00208825.2025.2465002>
- [42] Tiyetibo, P. A., Opoku-Mensah, F. A., & Amofo, I. Q. (2025). Logistics management practices and healthcare service quality. *Discover Health Systems*, 4(1). <https://doi.org/10.1007/s44250-025-00273-z>
- [43] Tortorella, G. L., Prashar, A., Antony, J., Fogliatto, F. S., González, V. A., & Filho, M. G. (2023). Industry 4.0 adoption in healthcare supply chains. *Operations Management Research*, 17(2), 389–405. <https://doi.org/10.1007/s12063-023-00366-z>
- [44] Tufa, B. B., & Tebeka, S. M. (2025). Humanitarian logistics management in pharmaceutical supply chains. *Research Square*. <https://doi.org/10.21203/rs.3.rs-5404660/v1>
- [45] Usuemerai, P. A., Ibikunle, O. E., Abass, L. A., Alemode, V., Nwankwo, E. I., & Mbata, A. O. (2024). Advanced supply chain optimization for emerging market healthcare systems. *International Journal of Management & Entrepreneurship Research*, 6(10), 3321–3335. <https://doi.org/10.51594/ijmer.v6i10.1637>
- [46] Vanbrabant, L., Verdonck, L., Mertens, S., & Caris, A. (2023). Improving hospital material supply chain performance. *Computers & Industrial Engineering*, 180, 109235. <https://doi.org/10.1016/j.cie.2023.109235>
- [47] Yani, F. A., Anggreini, D., Maha, I. K., Firzah, N., Lubis, A. S., & Agustina, D. (2023). Health supplies management strategy in improving hospital services. *PROMOTOR*, 6(6), 616–624. <https://doi.org/10.32832/pro.v6i6.466>
- [48] Yudianti, N. W. Y., Lestari, P. N. E., Darma, G. S., & Suardana, I. R. (2021). Inventory control of disposable medical materials. *Jurnal Administrasi Kesehatan Indonesia*, 9(2), 180–190. <https://doi.org/10.20473/jaki.v9i2.2021.180-190>