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Article

Problems in Medicine Procurement through E-Catalogues at Regional General Hospitals in Indonesia: A Systematic Literature Review

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Abstract. Effective e-purchasing should ensure medicine availability in Regional General Hospitals (RSUDs). In practice, Indonesian RSUDs experience disruptions involving digital systems, supplier stocks, payment flows, administrative procedures, and medicine planning. These problems are important in an archipelagic health system where geographic access, regional autonomy, BLUD cash flow, and dependence on BPJS Kesehatan claims may shape procurement resilience. A systematic synthesis is needed to identify failures and strengthen e-catalogue implementation, including Version 6. Objective: This study mapped e-purchasing problems, examined their variation across RSUD contexts, and identified managerial risks and resolution strategies. A Systematic Literature Review following PRISMA 2020 searched Google Scholar, GARUDA, and Indonesia OneSearch for studies published during 2016–2026. From 241 records, 19 empirical studies were included and appraised using Joanna Briggs Institute tools. Findings were synthesized narratively. Five problem domains emerged: digital infrastructure and data dysfunction, pharmaceutical wholesaler supply reliability, fiscal liquidity and payment friction, regulatory and administrative rigidity, and internal planning weaknesses. Sixteen studies (84.2%) were moderate-to-low quality, two (10.5%) were high quality, and one (5.3%) was critically low quality. Procurement problems reflect interconnected supply-chain governance. Strengthening RKO accuracy, stock information, supplier accountability, BLUD payment governance, and shortage-mitigation mechanisms is essential.

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1. Introduction

Medicine availability is essential to treatment continuity, patient safety, and effective hospital services. Hospital medicine management connects selection, planning, procurement, storage, distribution, and monitoring; procurement links clinical demand with budgets, inventory, suppliers, and pharmaceutical services. Indonesian evidence has identified inaccuracies in medicine requirement planning (Rencana Kebutuhan Obat/RKO) and constraints in e-catalogue procurement as important challenges [1-2]. National data also show that medicine availability varies across regions, with lower availability reported for broader essential-medicine lists and in geographically remote areas [2-3]. Although some national evidence concerns primary health centres, it illustrates the wider importance of reliable medicine supply.

Electronic purchasing through e-catalogues was introduced to support transparency, efficiency, accountability, and accessibility in public procurement. However, a digital ordering platform cannot ensure physical stock availability, timely delivery, accurate demand forecasting, or timely payment. Effective procurement depends on connected processes involving catalogue data, hospital information systems, pharmaceutical wholesalers (PBFs), distribution networks, cash flow, administrative authorization, and coordination among pharmacy, procurement, finance, and clinical units. Broader reviews likewise identify infrastructure, financing, workforce, distribution, and information-system barriers in pharmaceutical supply chains [4-5], while good procurement principles emphasize reliable forecasting, supplier selection, monitoring, and accountability [6].

Studies from Indonesian RSUDs have reported problems involving geography, supplier availability, payment, procurement implementation, inventory, and medicine management [7-8] studies provide valuable local evidence, but generally examine particular hospitals or stages of the procurement process. Their findings remain fragmented, making it difficult to identify recurring problems across settings and understand how those problems create managerial risks.

A further issue is contextual variation. RSUDs differ in geographic accessibility, service capacity, information-system maturity, supplier coverage, and financing arrangements. Yet hospital class is not consistently reported or analyzed, so class alone cannot be assumed to explain procurement performance. The transition to Electronic Catalogue Version 6 also makes it important to consolidate lessons from earlier implementation periods, including stock-data discrepancies, supplier constraints, payment disruptions, and administrative barriers.

This review therefore synthesizes empirical evidence on medicine procurement through e-catalogues and related procurement processes in Indonesian RSUDs. It addresses three questions: (1) What operational and structural problems are reported? (2) How do reported problems vary by hospital and geographical context? (3) What managerial risks and mitigation strategies are described?

2. Experimental Section

2.1. Design and Eligibility

A systematic literature review was conducted in accordance with PRISMA 2020 [8]. Eligible studies were primary empirical journal articles published from January 2016 to August 2026 in Indonesian or English. Studies had to examine medicine procurement, e-purchasing, e-catalogues, or closely related pharmaceutical supply-management processes in Indonesian RSUDs. Qualitative, quantitative, descriptive, cross-sectional, and evaluative designs were eligible. Reviews, conceptual papers,

editorials, theses, conference abstracts without an eligible journal article, studies outside Indonesia, and studies without relevant full-text findings were excluded.

Table 1. Eligibility Criteria Based on the PICOS Framework

PICOS Component	Eligibility Criteria
Population	Regional General Hospitals (Rumah Sakit Umum Daerah/RSUDs) in Indonesia, including hospitals at provincial, city, or regency level.
Intervention/Exposure	Medicine procurement through e-purchasing, e-catalogues, e-procurement, or related pharmaceutical procurement and supply-management processes.
Comparison	Studies with or without a comparison group were eligible, provided that the study reported empirical findings relevant to medicine procurement or pharmaceutical supply management.
Outcomes	Operational or structural procurement problems, medicine availability, stockouts or overstocking, supplier or distributor problems, information-system problems, financial or payment constraints, planning problems, regulatory or administrative constraints, managerial risks, and strategies for prevention or mitigation.
Study Design	Primary empirical studies using qualitative, quantitative, descriptive, cross-sectional, evaluative, or other observational research designs.
Publication Period	January 2016 to August 2026.
Language	Indonesian or English.
Publication Type	Full-text scientific journal articles containing primary empirical research.

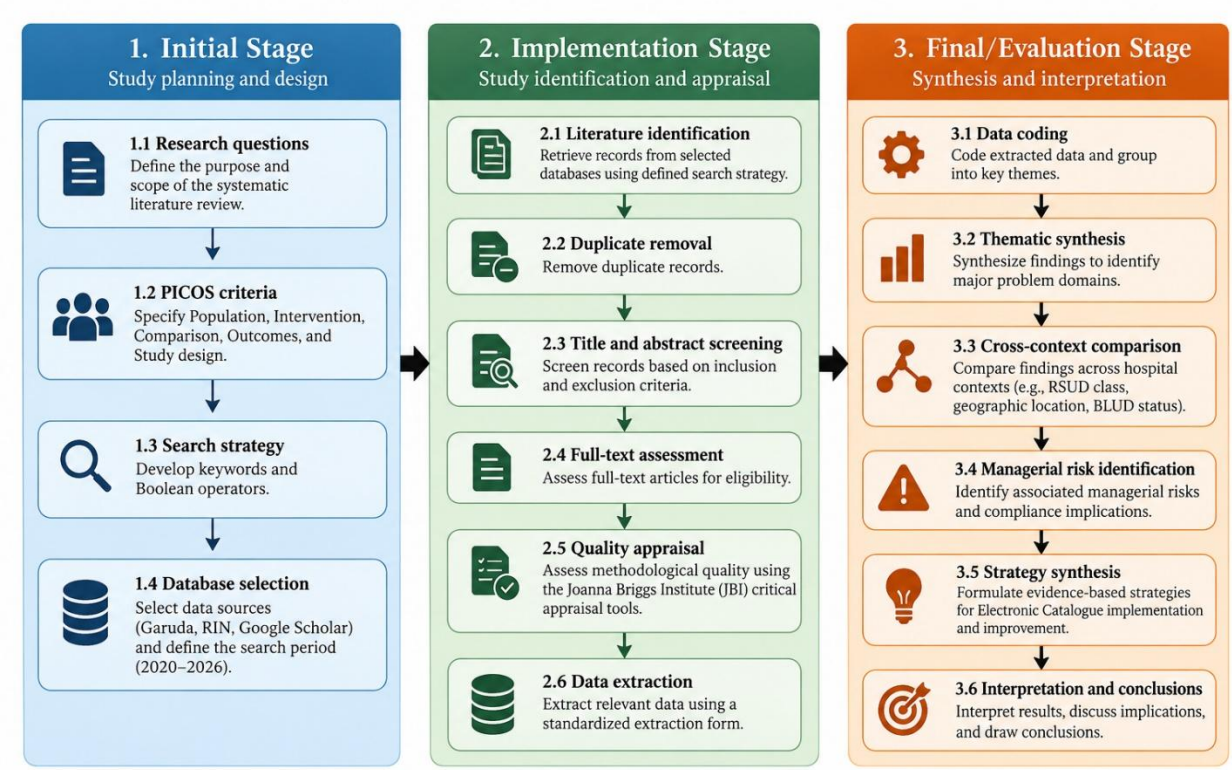


Figure 1. Flowchart of Research

2.2. Search and Selection

Google Scholar, GARUDA, and Indonesia OneSearch were searched on 10–11 August 2026. Search terms combined e-purchasing/e-procurement/e-catalogue with medicine procurement, pharmaceutical supplies, inventory, stockouts, and constraints. Search strings were adapted to each platform. Scopus and PubMed were not used, which may have resulted in omission of studies indexed exclusively in international databases.

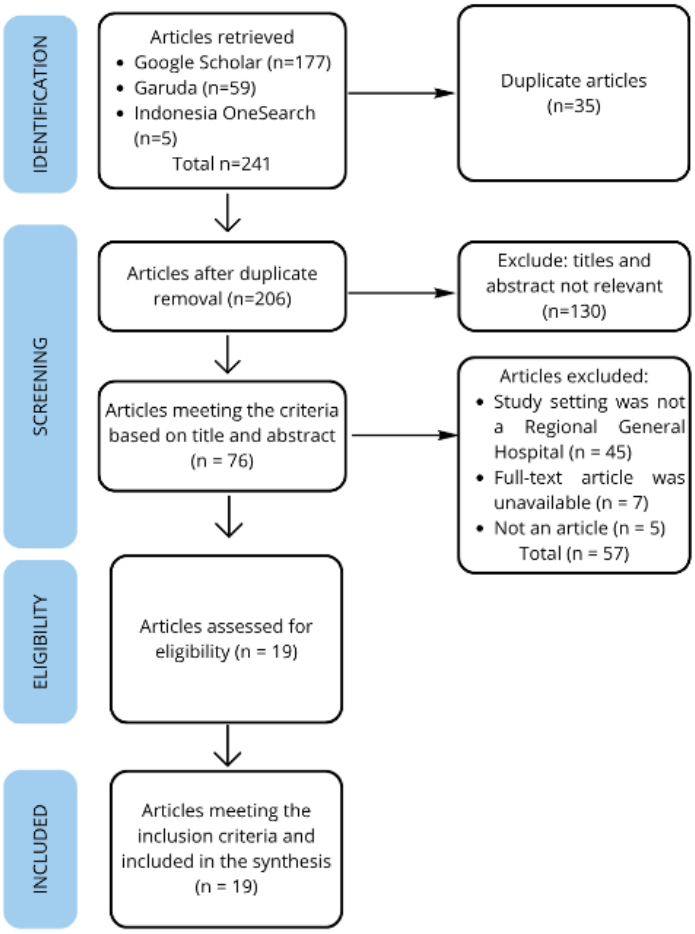


Figure 2. PRISMA flow diagram

The search identified 241 records. After 35 duplicates were removed, 206 records underwent title and abstract screening; 130 were excluded. Seventy-six full texts were assessed, and 57 were excluded (45 did not involve RSUDs, seven lacked accessible full text, and five were not eligible journal articles). Nineteen studies were included in the final synthesis. The selection process followed the sequence of identification, duplicate removal, screening, full-text assessment, and inclusion.

2.3. Quality Appraisal and Synthesis

Methodological quality was appraised using the relevant Joanna Briggs Institute checklists for qualitative and analytical cross-sectional studies [9]. Scores were interpreted using categories defined for this review; these categories are not universal JBI thresholds. Two studies were rated high quality, 11 moderate, five low, and one critically low. Appraisal informed the caution applied to interpretation but was not used as an automatic exclusion criterion.

Table 2. Methodological quality assessment of qualitative studies based on the JBI Critical Appraisal Checklist for Qualitative Research

No	Study (Author, Year)	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total	Category
1	(Yunita et al., 2016)	N	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
2	(Mulyanti et al., 2023)	N	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
3	(Arwani & Batubara, 2022)	U	Y	Y	Y	U	N	N	Y	U	Y	5/10	Low
4	(Faisal et al., 2025)	N	Y	Y	Y	U	N	N	Y	U	Y	5/10	Low
5	(Ananta & Andriani, 2022)	N	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
6	(Kumayas et al., 2023)	N	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
7	(Wahyuddin et al., 2024)	U	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
8	(Faisal & Sari, 2020)	N	Y	Y	U	U	N	N	Y	U	Y	4/10	Low
9	(Erpidawati et al., 2021)	N	N	U	U	U	N	N	U	U	Y	1/10	Critically Low
10	(Nugraha & Pujiyanto, 2023)	N	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
11	(Awal et al., 2020)	N	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
12	(Paryono et al., 2025)	N	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
13	(Rauf et al., 2018)	N	Y	Y	U	Y	N	N	Y	U	Y	5/10	Low
14	(Friska et al., 2019)	N	Y	Y	Y	Y	N	N	Y	Y	Y	7/10	Moderate
15	(Mulyati et al., 2024)	N	Y	Y	Y	Y	N	N	Y	U	Y	6/10	Moderate
16	(Yuliana et al., 2024)	N	Y	Y	Y	Y	N	N	Y	N	Y	6/10	Moderate

Table 3. Methodological quality assessment of quantitative studies based on the JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies

No	Study (Author, Year)	P1	P2	P3	P4	P5	P6	P7	P8	Total	Category
1	(Junaedi et al., 2025)	U	Y	Y	Y	N	N	U	Y	4/8	Low
2	(Widodo & Pujiyanto, 2020)	Y	Y	U	Y	N	N	Y	Y	6/8	High
3	(Basir et al., 2024)	Y	Y	Y	Y	N	N	Y	Y	7/8	High

Data extracted included author/year, study setting, hospital characteristics, design, procurement problems, contributing factors, consequences, and mitigation strategies. Findings were standardized and grouped into thematic domains. Because the studies differed in design, setting, outcomes, and reporting, a narrative thematic synthesis was used rather than meta-analysis. A study could contribute to more than one domain; domain counts therefore indicate representation in the included literature, not population prevalence.

3. Results and Discussion

3.1. Characteristics and Quality of the Evidence

The 19 included studies, published between 2016 and 2026, covered hospitals in multiple Indonesian regions, including Aceh, North Sumatra, West Java, Central Java, South Sulawesi, Southeast Sulawesi, West Sumatra, Riau, East Java, and North Sulawesi. Designs were mainly descriptive,

qualitative, evaluative, or cross-sectional. Some studies focused directly on e-purchasing, whereas others examined broader pharmaceutical management in which procurement was one component [10-23].

Table 4. Classification of RSUDs by level, type/class, and journal author(s)

RSUD	Level	Type/Class	Author(s) (Year)
RSUD Dr. Zainoel Abidin	Province	A	[17]
RSUD Meuraxa	City	B	
RSUD Konawe Regency	Regency	C	[14]
RSUD South Tapanuli	Regency	C	[8]
RSUD Majalaya	Regency	B	[11]
RSUD Dr. Adnaan WD Payakumbuh	City	C	[24]
Madani Regional Hospital	City	C	[23]
RSUD Ciawi	Regency	B	[22]
Hospital X (West Bandung Region)	Not stated	C	[19]
RSUD Dr. Soetomo	Province	A	[20]
RSUD La Temmamala	Regency	B	[16]
RSUD Tugurejo Semarang	Province	B	[12]
RSUD Simeulue Regency	Regency	C	[9]
RSUD Syekh Yusuf	Regency	B	[25] [26]
RSUD Makassar City	City	B	[7]
RSUD Sultan Fatah Demak	Regency	C	[15]
RSUD Dr. Dradjat Prawiranegara	Regency	B	[13]
RSUD North Sulawesi	Province	B	[18]
RSUD Prof. Dr. H. M. Anwar Makkatutu	Regency	B	[21]

The evidence included Class A, B, and C hospitals; no eligible study provided sufficient evidence for Class D hospitals. Hospital class was inconsistently reported and was not systematically analyzed as an independent determinant. The descriptive evidence showed procurement issues across hospital levels and classes, suggesting that geography, supplier conditions, cash flow, and information-system maturity may be more informative contextual factors than classification alone.

The JBI appraisal showed that most studies were of moderate-to-low quality. Common limitations included incomplete methodological reporting and limited analytical comparison. Accordingly, the synthesis identifies recurring patterns in the available literature rather than estimating the prevalence of problems across all RSUDs.

3.2. Five Recurring Procurement-Problem Domains

3.2.1 Digital Infrastructure and Data Dysfunction

Six studies (31.6%) reported digital infrastructure or data problems, including unstable connectivity, discrepancies between physical stock and catalogue data, delayed updates, and limited integration between hospital information systems (SIMRS) and the national platform [12-13], [25-26]. These weaknesses can cause procurement staff to act on outdated or inaccurate information. A product may appear available electronically but be unavailable in physical stock, while disconnected pharmacy and financial systems make it difficult to coordinate replenishment. Digitalization therefore needs reliable data governance and interoperability, not merely access to an online ordering portal [5].

3.2.2 Pharmaceutical Wholesaler and Supplier Reliability

Supplier reliability was also identified in six studies (31.6%). Reported issues included manufacturer or distributor shortages, incomplete order fulfillment, unilateral order cancellation or rejection, and prolonged delivery times [18], [21]. These findings show that an electronic order does not guarantee physical delivery. Procurement monitoring should therefore include order-fulfillment rates, delivery lead times, cancellations, stockout frequency, and supplier responsiveness. Remote hospitals may face additional constraints when distributors prioritize larger or more accessible orders.

3.2.3 Fiscal Liquidity and Payment Friction

Four studies (21.1%) described financial or payment-related constraints, including delayed reimbursement, cash-flow pressure, outstanding supplier obligations, and restrictions on further orders [14], [15]. For RSUDs operating under the BLUD framework, medicine procurement depends partly on the timing and predictability of cash inflows. Payment delays may affect procurement continuity, but the reviewed evidence does not establish a universal causal relationship between BPJS Kesehatan claim delays and medicine shortages. Hospitals should integrate procurement commitments with cash-flow forecasts and monitor outstanding payments.

3.2.4 Internal Planning and Inventory Weaknesses

Four studies (21.1%) reported inaccurate RKO preparation, reliance on historical consumption without adequate forecasting, weak stock monitoring, or limited coordination between pharmacy and clinical or managerial units [1], [8], [15], [22]. Inaccurate demand estimates can contribute to stockouts or excess inventory, regardless of the purchasing platform used. Preventive measures include validating RKO against consumption and service trends, conducting periodic stock reconciliation, applying appropriate inventory-analysis methods, and setting reorder points for critical medicines.

3.2.5 Regulatory and Administrative Rigidity

Three studies (15.8%) reported administrative delays, authorization and verification burdens, or difficulties adapting to changing procurement procedures [7], [13], [16]. These requirements support accountability but may delay procurement when responsibilities or documentation requirements are unclear. Hospitals should establish transparent workflows, clarify roles, and document the rationale and authorization for permitted alternative procurement. Emergency responses should remain compliant with applicable rules.

Taken together, the five domains indicate that medicine procurement performance depends on the coordination of information, physical supply, financial resources, internal planning, and administrative processes. Digital dysfunction may reduce the accuracy of procurement decisions, while supplier unreliability can prevent electronically processed orders from being fulfilled. These problems may become more difficult to manage when hospitals face cash-flow constraints or inaccurate demand forecasts. Administrative requirements may further extend procurement lead times when responsibilities and documentation procedures are unclear. The domains should therefore be understood as interconnected dimensions of procurement vulnerability rather than independent problems. This interpretation also explains why improving the electronic platform alone may not be sufficient to ensure medicine availability.

Table 5. Typology of e-catalogue procurement problems

Problem Domain	Empirical Manifestation at RSUDs	Literature Reference
Digital Infrastructure & Data Dysfunction	Disruptions to LPSE/LKPP server connections; asymmetry between actual and system stock data (phantom stock); and the absence of real-time integration between local hospital pharmacy information systems (SIMRS) and the national e-catalogue portal.	[9], [7], [25], [26], [12], [16]
Pharmaceutical Wholesaler (PBF) Supply Reliability Deficit	Stock unavailability at manufacturers, unilateral rejection/cancellation of purchase orders by distributors, quota discrimination against remote regional hospitals, and delivery lead times exceeding tolerance limits.	[7], [13], [18], [15], [21], [5]
Fiscal Liquidity & Payment Friction	Delayed disbursement of BPJS Kesehatan claims disrupting BLUD cash flow, accumulation of overdue debt to distributors, and account-suspension sanctions imposed by e-catalogue vendors.	[1], [4], [12], [27]
Regulatory & Administrative Rigidity	Delayed issuance of the Commitment-Making Officer (PPK)/Procurement Official decree, multi-layered bureaucratic verification of payment documents, and rigidity of the transition rules for new e-catalogue system versions.	[28], [3], [16]
Internal Planning Weaknesses	Inaccuracy in preparing the Medicine Requirement Plan (RKO), manual consumption forecasting without quantitative methods (ABC/VEN/EOQ), and weak coordination between the medical committee and the pharmacy installation.	[1], [14], [15], [22]

3.3. Contextual Differences Across RSUDs

The descriptive mapping found digital and supplier-related problems across Class A, B, and C hospitals. Planning weaknesses appeared in Class B and C studies, while fiscal constraints were reported in Class C studies. These patterns should not be interpreted as comparative prevalence: the number of studies per class was unbalanced, and blank cells in the underlying mapping indicate a lack of explicit reporting, not proof that a problem was absent.

Table 6. Cross-tabulation of RSUD Class and Reported Procurement Problem Domains

RSUD Class	Digital Infrastructure & Data	PBF/Supplier Reliability	Fiscal Liquidity & Payment	Internal Planning	Regulatory & Administrative
Class A	✓	✓	—	—	—
Class B	✓	✓	—	✓	✓
Class C	✓	✓	✓	✓	—
Class D	—	—	—	—	—

Geographical accessibility can shape supplier coverage, transportation time, internet reliability, and the willingness of distributors to fulfill smaller orders. Studies from island and remote settings

illustrate how distance interacts with infrastructure and distribution processes [9], [15]. Financial capacity is another contextual factor: delayed inflows may constrain payment, while immature information systems may increase manual reconciliation and delay reorder decisions [1], [15], [16], [22]. These factors can operate across formal hospital classes.

These contextual factors may interact and produce different operational challenges even among hospitals with similar formal classifications. For example, a hospital with limited access to suppliers may need longer procurement lead times and more careful safety-stock planning, whereas a hospital experiencing unpredictable cash inflows may face difficulty maintaining continuity of orders despite having adequate supplier access. Similarly, limited integration between pharmacy and financial information systems may delay the identification of stock requirements and the reconciliation of procurement commitments. These examples illustrate plausible mechanisms suggested by the reviewed studies; they should not be interpreted as confirmed causal relationships.

The findings also highlight the importance of distinguishing between institutional classification and operational capacity. Hospital class provides an administrative description, but it does not necessarily capture supplier coverage, geographical accessibility, information-system maturity, procurement volume, or the timing of financial inflows. Consequently, procurement improvement programs should be adapted to the constraints documented at each hospital rather than relying exclusively on class-based assumptions. Future comparative studies should test these relationships using consistent indicators and sufficiently balanced samples across hospital categories.

Table 7. Structural-operational determinants

Structural Determinant	Operational Characteristics	Specific Impact on E-Purchasing	Literature Reference
Geographic accessibility (hinterland / 3T areas)	Remote/archipelagic regions, multimodal distribution routes, unstable internet infrastructure (case studies at RSUD Simeulue and RSUD Konawe)	Very long delivery lead times; frequent stockouts because PBFs reject small-volume orders; servers frequently time out.	[4], [12]
BLUD cash flow capacity	High dependence on regional budget (APBD) subsidies or delayed JKN claim disbursement	Payment delays trigger automatic blocking of new orders by distributors; loss of priority in national stock allocation.	[1], [15], [16], [27]
Hospital information system (SIMRS) maturity	Semi-manual recording systems, not yet connected to accounting and pharmacy warehouse modules	High deviation between RKO and actual needs; delayed detection of reorder points; high risk of medicine expiry.	[4], [1], [15], [22]

The evidence therefore supports a contextual, rather than class-based, interpretation of procurement performance. Future comparative studies should measure geography, procurement volume, supplier lead time, cash-flow conditions, and SIMRS integration consistently. Such designs would allow stronger testing of whether and how these factors are associated with medicine availability.

3.4. Managerial Risks and Mitigation Strategies

The five domains are interconnected. Inaccurate planning can interact with supplier shortages; catalogue data discrepancies can delay the identification of stock risks; and payment pressure can

weaken supplier responsiveness. These interactions may increase the risk of stockouts, delayed treatment, emergency purchasing, excess inventory, medicine expiry, financial pressure, and compliance problems. Because the included studies were heterogeneous, these are synthesized managerial pathways rather than quantified causal effects.

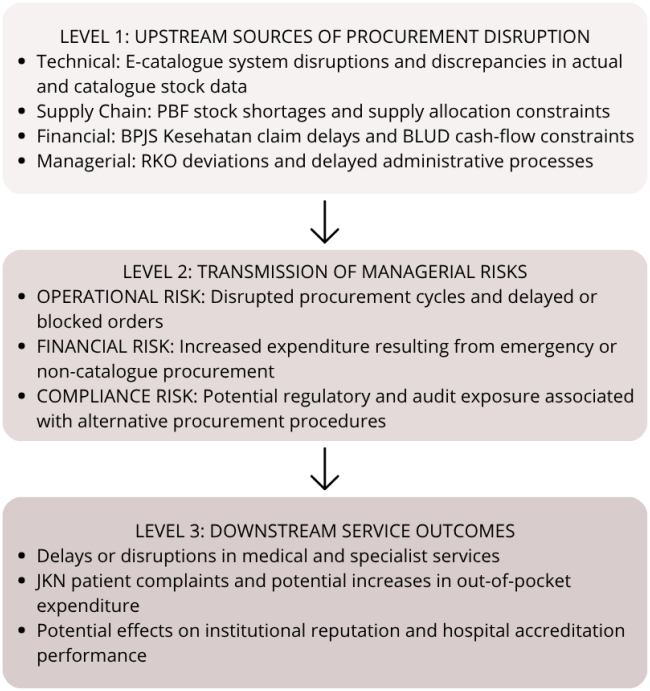


Figure 3. Managerial Risk Chain Diagram

At the hospital level, prevention should begin with a validated RKO based on consumption, service utilization, clinical priorities, current stock, and supplier lead times. Pharmacy and procurement teams should reconcile physical and electronic stock regularly and connect inventory, ordering, delivery, and payment information wherever feasible. Supplier performance should be reviewed periodically, with recurring cancellations and delays escalated to management. Cash-flow forecasts should be aligned with procurement schedules and outstanding supplier liabilities.

When prevention is insufficient, hospitals need documented shortage-mitigation procedures. Options reported in the literature include inter-hospital borrowing, coordination with Health Offices, clinically appropriate therapeutic substitution, and alternative procurement when permitted [7], [9], [14-16]. These measures require clear authorization, documentation, price verification, and clinical oversight. National and regional authorities can support hospitals through more reliable catalogue data, interoperable systems, supplier accountability, and guidance for handling shortages during transitions between catalogue versions.

The preventive measures should be implemented as a coordinated management process rather than as separate administrative activities. RKO validation, stock reconciliation, supplier monitoring, and cash-flow forecasting provide complementary information for procurement decisions. For example, stock records and consumption trends can identify medicines approaching their reorder points, while supplier lead-time data can help determine when replenishment should begin. Financial projections can then be used to assess whether planned orders can be supported by available cash flow.

Coordination among pharmacy, procurement, finance, and clinical units is essential because weaknesses in one function may reduce the effectiveness of the others.

The prioritization of preventive measures should also consider the clinical importance of the medicines involved. A shortage of a critical medicine may have more immediate implications for continuity of care than a shortage of a less urgent item. Hospitals should therefore identify critical medicines, establish appropriate monitoring thresholds, and define escalation procedures when suppliers cannot fulfill orders as expected. Inventory targets must nevertheless be adjusted to local consumption, storage capacity, budget availability, and product characteristics to avoid creating excessive stock or increasing the risk of expiry. The reviewed literature supports the relevance of stronger planning and monitoring, although it does not establish a single inventory model that is optimal for all RSUDs.

Table 8. Intervention Strategies: Preventive Vs. Mitigative

Intervention Category	Specific Managerial Strategy	Risk Control Target	Literature Reference
Preventive strategy (proactive / planned)	Strengthening RKO preparation through historical consumption data and ABC/VEN-based prioritization. Establishing safety stock and reorder-point monitoring for critical medicines. Improving integration between pharmacy information systems and procurement/stock data. Strengthening coordination among pharmacy units, procurement officers, medical committees, and clinicians. Monitoring supplier performance and maintaining proactive communication with PBFs.	Reducing RKO deviation, improving early detection of potential stockouts, strengthening inventory control, and improving supplier responsiveness.	[1], [25], [18], [15], [27], [5]
Mitigative strategy (reactive / rescue)	Borrowing medicines from other RSUDs or Health Offices when shortages occur. Using alternative procurement channels when e-catalogue supply is unavailable. Applying therapeutic substitution when clinically appropriate and approved by the relevant committee. Strengthening communication with suppliers to resolve urgent shortages and delayed orders.	Maintaining medicine availability and continuity of therapy during procurement disruptions, while minimizing service interruption and emergency procurement costs.	[12], [13], [16]

The choice of a mitigation strategy should depend on the source and urgency of the shortage. When the problem concerns inaccurate catalogue information, verification with the supplier and correction or escalation through the relevant system may be more appropriate than immediately changing procurement channels. When the constraint concerns physical availability or delayed delivery, coordination with other hospitals, the Health Office, or suppliers may be necessary. Therapeutic substitution requires clinical assessment and approval through the applicable hospital

procedures, whereas alternative procurement must comply with current procurement regulations. Distinguishing among these situations can help hospitals avoid responses that address the immediate symptom without resolving the underlying cause.

At the organizational level, hospitals can strengthen preparedness by documenting responsibilities, communication channels, authorization requirements, and records that must be retained during a shortage. Such procedures can reduce uncertainty when urgent decisions are required and support subsequent evaluation of the response. At the same time, the effectiveness of these measures should be assessed using operational outcomes, including the duration of stockouts, time required to obtain replacement supplies, frequency of emergency procurement, and continuity of treatment. These indicators would allow hospital management to determine whether mitigation arrangements improve resilience in practice rather than merely confirming that procedures have been established.

3.5. Policy Implications

At the national level, LKPP and the Ministry of Health should prioritize catalogue reliability, system interoperability, and clear procedures for reporting stock discrepancies and supplier non-fulfillment, consistent with good pharmaceutical procurement principles [5-6]. Supplier governance should incorporate measurable indicators of availability, fulfillment, cancellation, and delivery performance. At the regional and BLUD levels, finance and procurement units should coordinate cash-flow planning with the clinical priority of medicines. At the hospital level, accurate RKO, inventory monitoring, cross-unit coordination, and contingency procedures should be treated as core management functions.

The main implication is that e-purchasing should be evaluated as a supply-chain governance system. Transaction speed alone is insufficient; evaluation should also consider whether medicines are physically available, delivered on time, paid for sustainably, and procured in compliance with regulations. These recommendations are consistent with the broader procurement principle that transparent purchasing must be supported by sound planning, supplier management, and monitoring [4], [5], [29].

The implementation of e-catalogue policies may also influence the pattern of medicine procurement in hospitals. Evidence from a study at Fatmawati Central General Hospital in Indonesia examined changes in medicine procurement profiles following the implementation of the e-catalogue policy, highlighting the relevance of evaluating procurement outcomes beyond the adoption of the electronic purchasing system alone [30].

Policy implementation should be accompanied by measurable performance indicators and clear responsibilities at each governance level. National authorities can focus on catalogue-data quality, platform reliability, and mechanisms for addressing supplier non-fulfillment. Regional authorities can facilitate coordination among hospitals and support responses to supply constraints that extend beyond the capacity of an individual institution. Meanwhile, hospital management should ensure that procurement planning, pharmacy inventory, supplier performance, and financial monitoring are reviewed together. This division of responsibilities would help connect national procurement standards with the operational realities faced by individual RSUDs.

Policy evaluation should also distinguish between improvements in electronic transactions and improvements in actual medicine availability. A higher number of completed transactions does not necessarily demonstrate that orders were delivered in full or within an appropriate time. Evaluations should therefore consider transaction completion alongside fulfillment rates, delivery lead times, stockout frequency, and the continuity of essential medicine supplies. These measures would provide a more comprehensive basis for assessing whether e-purchasing reforms improve the reliability and accountability of medicine procurement.

3.6. Limitations

This review has several limitations. First, the search used Google Scholar, GARUDA, and Indonesia OneSearch, without Scopus or PubMed; relevant internationally indexed studies may have been missed. Second, the included studies were predominantly moderate-to-low quality and varied in design and reporting. Third, hospital class and contextual characteristics were not consistently available, limiting direct comparisons. Fourth, thematic synthesis involves interpretive judgment. Finally, no formal publication-bias analysis or GRADE-CERQual assessment was conducted. The findings should therefore be interpreted as a structured map of recurring reported problems, not as prevalence estimates or proof of causal relationships.

4. Conclusion

This review identified five recurring domains of medicine procurement problems in Indonesian RSUDs: digital infrastructure and data dysfunction, supplier reliability deficits, fiscal liquidity and payment friction, internal planning weaknesses, and regulatory or administrative rigidity. The domains are interconnected and were reported across different hospital contexts. Available evidence does not establish hospital class as a determinant of procurement performance; geographic accessibility, cash-flow capacity, supplier conditions, and information-system maturity may be important contextual factors.

Strengthening procurement requires reliable and interoperable information, accurate RKO, supplier-performance monitoring, coordinated cash-flow management, and documented shortage-mitigation procedures. E-catalogue implementation should therefore be assessed by its contribution to actual medicine availability and continuity of hospital services, not solely by the completion of electronic transactions. Future research should expand database coverage and use standardized indicators and comparative designs.

References

[1] Anggraini, E. (2023). Analisis Faktor-Faktor Yang Mempengaruhi Rencana Kebutuhan Obat Dan E-Procurement Di Rumah Sakit Di Indonesia. *Majalah Farmaseutik*, *19*(2), 214-220.

[2] Fanda, R. B., Probandari, A., Yuniar, Y., Hendarwan, H., Trisnantoro, L., Jongeneel, N., & Kok, M. O. (2024). The availability of essential medicines in primary health centres in Indonesia: achievements and challenges across the archipelago. *The Lancet Regional Health-Southeast Asia*, *22*.

[3] Fanda, R. B., Probandari, A., Yuniar, Y., Van Gurp, M., Van der Hoeven, W. G., Hendarwan, H., ... & Kok, M. O. (2026). Local systems, local solutions: which factors drive essential medicine availability in public health facilities across Indonesia?. *BMJ Global Health*, *11*(2), e019616.

[4] Alfaouri, M., Jaaron, A. A., & Igudia, E. (2025). Pharmaceutical supply chain management challenges in developing countries: a systematic literature review. *Journal of African Business*, *26*(4), 798-841.

[5] Yadav, P. (2024). Digital transformation in the health product supply chain: a framework for analysis. *Health systems & reform*, *10*(2), 2386041.

[6] World Health Organization. (1999). Operational principles for good pharmaceutical procurement, Geneva.

[7] Andriani, H. (2022). Analisis Seleksi dan Pengadaan Obat di Instalasi Farmasi RSUD Kota Makassar Tahun 2021 di Era Pandemi COVID-19. *Syntax Literate: Jurnal Ilmiah Indonesia*, *7*(12), 17581-17591.

[8] Arwani, H., & Batubara, S. (2022). Evaluasi manajemen pengelolaan obat di instalasi farmasi rumah sakit umum daerah Tapanuli Selatan. *Kapital Deli Sumatera*, *1*(1).

[9] Awal, S., Nugraha, T., & Syamsul, D. (2020). Analisis kebijakan pengadaan obat secara e-purchasing di Rumah Sakit Umum Daerah Kabupaten Simeulue. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, *3*(1), 31-39.
[10] Susanti, E., & Muslimah, R. (2021). Analisis Proses Pendistribusian Obat di Rumah Sakit Umum Daerah Dr. Adnaan WD Payakumbuh. *Jurnal Amanah Kesehatan*, *3*(1), 53-62.
[11] Faisal, M., & Sari, V. (2020). Evaluasi Pengadaan Logistik Farmasi pada Rumah Sakit Umum Daerah Majalaya Kabupaten Bandung. *Proceeding FRIMA (Festival Riset Ilmiah Manajemen dan Akuntansi)*, (1), 775-784.
[12] Friska, E., Suryoputro, A., & Kusumastuti, W. (2019). Analisis Proses Pengadaan Guna Menjamin Ketersediaan Obat Di RSUD Tugurejo Semarang. *Media Kesehatan Masyarakat Indonesia*, *18*(4), 135-139.
[13] Jefrinaldi, M., Marbun, R. A. T., & Lubis, B. (2026). Evaluation Of Medicine Procurement Policies On Health Administration And Medicine Demand at X Community Health Center, Deli Serdang Regency In 2025. *JURNAL KESMAS DAN GIZI (JKG)*, *8*(2), 1000-1007.
[14] Binekada, I. M. C. (2023). Analisis Sistem Pengelolaan Obat Di Instalasi Farmasi Blud Rumah Sakit Umum Kabupaten Konawe Tahun 2022. *Medika Alkhairaat: Jurnal Penelitian Kedokteran dan Kesehatan*, *5*(3), 112-128.
[15] Mulyati, M., Setyawan, H., & Martini, M. (2024). Analisis Perencanaan dan Pengadaan Obat di Instalasi Farmasi RSUD Sultan Fatah Kabupaten Demak. *MAHESA: Malahayati Health Student Journal*, *4*(5), 1938-1945.
[16] Rauf, J., Palutturi, S., & Ahri, R. A. (2018). Analisis Pengelolaan Obat Pada Tahap Pengadaan Di Instalasi Farmasi Rsud La Temmamala Kabupaten Soppeng. *Jurnal Mitrasehat*, *8*(2).
[17] Yunita, F., Imran, M., & Mudatsir, M. (2016). Manajemen Pengelolaan Obat-Obatan Di Instalasi Farmasi Rumah Sakit Banda Aceh Dalam Menghadapi Bencana Gempa Bumi. *Jurnal Kedokteran Syiah Kuala*, *16*(2), 81-87.
[18] Kumayas, F. I., Fatimawali, P. J., & Posangi, J. (2023). Evaluasi Implementasi Permenkes Nomor 72 Tahun 2016 Terhadap Manajemen Perencanaan, Pengadaan dan Pengendalian Obat di Instalasi Farmasi Rumah Sakit Umum Daerah Provinsi Sulawesi Utara. *J Kesehat Tambusai*, *4*(2), 2112-2131.
[19] Nugraha, E. C. (2023). Analisis implementasi pengelolaan obat program Jaminan Kesehatan Nasional di RS X wilayah Bandung Barat. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, *6*(12), 2450-2457.
[20] Zaman, K., & Megasari, A. D. (2025). Penerapan Metode Belanja Barang dan Jasa Pemerintah Melalui Sistem E-Purchasing (E-katalog) di RSUD Dr. Soetomo. *Balance: Jurnal Akuntansi dan Manajemen*, *4*(2), 1449-1445.
[21] Wahyuddin, A. W., AP, A. R. A., & Muchlis, N. (2024). Analisis Sistem Manajemen Logistik Alat Kesehatan di Rumah Sakit Umum Daerah Prof. Dr. HM Anwar Makkatutu Kabupaten Bantaeng Tahun 2024: Analysis of the Logistics Management System for Medical Devices at the Regional General Hospital Prof. Dr. HM Anwar Makkatutu Bantaeng Regency Year 2024. *Journal of Aafiyah Health Research (JAHR)*, *5*(1), 374-387.
[22] Widodo, I. U., & Pujianto, P. (2022). Analisis Perencanaan Obat Berdasarkan Metode ABC Indeks Kritis di Instalasi Farmasi Rumah Sakit Umum Daerah Ciawi. *Jurnal ARSI: Administrasi Rumah Sakit Indonesia*, *6*(2), 4.
[23] Yuliana, A. S., Melan, M. E. W., Salim, A., & Zaky, A. (2023). Analisis Sistem Pengelolaan Obat Di Instalasi Farmasi Rawat Jalan Rumah Sakit Daerah Madani Kota Pekanbaru. *Journal of Hospital Administration and Management*, *4*(2), 1-13.
[24] Susanti, E., & Muslimah, R. (2021). Analisis Proses Pendistribusian Obat di Rumah Sakit Umum Daerah Dr. Adnaan WD Payakumbuh. *Jurnal Amanah Kesehatan*, *3*(1), 53-62.

[25] Basir, B., & Yuliana, B. (2024). Pengaruh Sistem Pengadaan Dan Kebijakan Internal Terhadap Ketersediaan Obat Di Rumah Sakit Umum Daerah Syekh Yusuf Kabupaten Gowa. *Pharmacology And Pharmacy Scientific Journals*, *3*(2), 147-154.
[26] Faisal, A. Muh. Multazam, dan A. S. Batara. (2025). Evaluasi Sistem Pengadaan Obat Berdasarkan Permenkes Nomor 33 Tahun 2017 di Instalasi Farmasi RSUD Syekh Yusuf Kabupaten Gowa Tahun 2024, *J. Innov. Creat.*, vol. 5, no. 3, hlm. 12636–12652.
[27] Saputra, W. A., Puspandari, D. A., & Kurniawan, M. F. (2019). Evaluasi Pengadaan Obat dengan E-Purchasing Melalui E-Catalogue di Rumah Sakit Jiwa Grhasia Daerah Istimewa Yogyakarta Tahun 2017–2018. *Jurnal Kebijakan Kesehatan Indonesia: JKKI*, *8*(3), 113-120.
[28] de Assis, A. G., Dos Santos, A. F. A., Dos Santos, L. A., da Costa, J. F., Cabral, M. A. L., & de Souza, R. P. (2022). Classification of medicines and materials in hospital inventory management: a multi-criteria analysis. *BMC medical informatics and decision making*, *22*(1), 325.
[29] Clark, M. (2012). Management Sciences for Health. MDS-3: Managing Access to Medicines and Health Technologies, Arlington, VA: Management Science for Health Drug Supply.
[30] Permata, S., Anggriani, Y., & Lesilolo, M. S. (2020). Analisis Dampak Kebijakan E-Catalogue terhadap Profil Pengadaan Obat di Instalasi Farmasi RSUP Fatmawati. *PHARMACY: Jurnal Farmasi Indonesia (Pharmaceutical Journal of Indonesia)*, 1-12.