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RESEARCH ARTICLE

Evaluation of Service Efficiency, Implementation of National Quality Indicators and Clinical Pathway for Cardiovascular Care at Mokopido Tolitoli Regional Hospital

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ABSTRACT

Keywords

Implementation,
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Hospitals, as essential healthcare institutions, play a critical role in ensuring the quality and efficiency of healthcare services. The increasing demand for accountability, cost-efficiency, and improved service quality has led to the implementation of key efficiency indicators such as Average Length of Stay (AvLOS), Bed Occupancy Rate (BOR), Bed Turnover (BTO), and Turnover Interval (TOI) to optimize hospital operations. In response, the Indonesian Ministry of Health has introduced Regulation No. 30 of 2022 concerning the National Hospital Quality Indicators (INM-RS), which includes cardiovascular services as a national priority. The use of Clinical Pathways (CP) in disease management, including cardiovascular conditions, aims to reduce variation in services, improve efficiency, and enhance care quality. This study aims to evaluate the relationship between efficiency indicators, INM, and the implementation of CP in managing cardiovascular diseases at Mokopido Tolitoli Regional General Hospital. The results highlight the hospital's achievements in various quality indicators, efficiency metrics, and CP implementation, shedding light on the gaps in the integration of policies and their practical application.

INTRODUCTION

Hospitals, as healthcare service institutions, play a crucial role in ensuring the quality and efficiency of healthcare delivery. In the era of healthcare system transformation, the demand for accountability, cost efficiency, and improved service quality has become increasingly strong. Efficiency indicators, such as Average Length of Stay (AvLOS), Bed Occupancy Rate (BOR), Bed Turnover (BTO), and Turnover Interval (TOI), are important measures for effectively managing hospital resources and operations (Kemenkes, 2023).



Furthermore, the Indonesian Ministry of Health has issued Regulation No. 30 of 2022 concerning the National Hospital Quality Indicators (INM-RS) and National Priority Programs, one of which is cardiovascular services at Advanced Health Facilities (FK-TL). The INM-RS consists of 13 indicators that serve as key metrics to assess the quality of services based on output, which can be compared across institutions. The implementation of these indicators aims to drive continuous improvements in healthcare services.

On the other hand, Clinical Pathways (CP) are evidence-based clinical instruments that function as guidelines for disease management, including the care of patients with cardiovascular diseases such as heart failure, myocardial infarction, and hypertension. The use of CP is expected to reduce service variation, improve efficiency, and enhance the quality of care.

However, in practice, there remains a gap between policies, the recording of quality and efficiency indicators, and the implementation of CP in hospitals, particularly in the management of complex cardiovascular cases. Therefore, this research is essential to comprehensively evaluate the relationship between the achievement of efficiency indicators, INM, and the implementation of cardiovascular CP (Indonesia, n.d.).

METHODOLOGY

Research Type

This study is a descriptive retrospective, evaluative research with a mixed-method approach, combining both quantitative and qualitative methods.

Research Method

1. Quantitative: The study uses secondary data and questionnaires related to national quality indicators.
2. Qualitative: In-depth interviews will be conducted with management, quality officers, and service staff.

Population and Sample

1. Population: The quality report documents for six months, along with all healthcare personnel, management, and quality staff at Mokopido Hospital.
2. Sample: The sample will consist of quality reports from 2023-2024, with purposive sampling applied, including 30 respondents for the quantitative portion and 5 key informants for qualitative interviews.
 - Sample Criteria: Quality reports on efficiency and national quality that have been validated.



- Respondent Criteria: Willingness to participate, credible quality management officers.

Data Analysis Techniques

1. Quantitative Data: Analyzed using descriptive statistics (frequency, mean, standard deviation).
2. Qualitative Data: Analyzed using thematic analysis techniques.

Research Instruments

1. Document audit sheet (observation form).
2. Questionnaire based on national quality indicators (Ministry of Health, 2022).

F. Data Presentation

The data will be presented in the form of tables, graphs, and thematic narratives.

RESULT AND DISCUSSION

The research was conducted at Mokopido Tolitoli Regional General Hospital, Jl. Lanoni No. 37, Baru Village, Baolan District, Tolitoli Regency, Central Sulawesi. Sera Eika, this research has obtained ethical approval from Research Ethics Approval Number 003898/KEPK POLTEKKES KEMENKES PALU/2025. The research uses secondary data from the National Quality Indicator Achievement Report (INM), Quality of Service Efficiency and Clinical Pathway Implementation. Secondary data sources were taken from the person in charge of the Quality Committee and from the person in charge of the Medical Record Installation. Data were taken from the Semester I Report (January-June, 2025). The results of the Evaluation Implementation are depicted in the following table and graph:



1. Results of the Evaluation of the National Quality Indicators of Mokopido Regional General Hospital

Table 4.1 Achievement of National Quality Indicators at Mokopido Tolitoli Regional Hospital Semester I (January-June) 2025.

No.	Indicator	Target (PMK 30/2022)	January	February	March	April	May	June	Average (%)	Category
1.	Hand hygiene compliance	≥85%	96.60	96.60	97.00	96.60	97.00	95.60	96.57	Good
2.	Compliance with the use of personal protective equipment	100%	96.83	96.83	97.30	96.70	96.70	96.60	96.83	Not enough
3.	Patient identification compliance	100%	100.00	99.90	99.98	100.00	99.98	98.99	99.81	Not enough
4.	Emergency cesarean section response time	≥80%	-	-	-	-	-	-	n/a	Not enough
5.	Outpatient waiting time	≥80%	54.37	45.63	46.63	46.63	45.27	46.50	47.51	Not enough
6.	Postponement of elective surgery	≤5%	-	1.00	-	-	-	-	0.17	Good
7.	Compliance with doctor's visit times	≥80%	97.19	96.88	99.07	93.27	89.27	88.25	93.99	Good
8.	Reporting of critical laboratory results	100%	97.66	97.16	95.08	94.78	87.50	84.89	92.85	Not enough
9.	Compliance with the use of the national formulary	≥80%	96.66	97.16	95.08	94.78	93.01	98.95	95.94	Good
10.	Compliance with clinical pathways	≥80%	98.73	90.39	98.10	98.90	98.74	88.37	79.19	Not enough
11.	Compliance with patient fall risk prevention efforts	100%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	Good
12.	Complaint response time speed	≥80%	-	100.00	100.00	100.00	100.00	100.00	83.33	Good
13.	Patient satisfaction	≥76.6%	83.83	84.07	82.58	82.58	82.58	82.50	83.02	Good

Source: Secondary Data, August 2025

Notes:

Good: if the achievement is average ≥ of the national target for indicators Number 1,2,3,4,5,7,8,9,10,11,12 and ≤5% of indicator number 6



Not enough :when the average achievement< of the national target in indicators Number 1,2,3,4,5,7,8,9,10,11,12 and >5% indicator number 6.

Based on table 4.1 of the 13 National Quality Indicators (NIM) of Mokopido Hospital, it can be seen that 7 (53.85%) of the 13 indicators are in the good category, and 6 (46.15%) of the 13 indicators are in the poor category. One indicator has no data available and 1 (one) indicator "Delay in elective surgery" only has 1 month of data available even though the achievement is Good Achieving the national target ($\leq 5\%$).

2. Inpatient Efficiency Evaluation Results

The following are the results of the evaluation of the efficiency of Mokopido Hospital in inpatient services for the first semester (January-June) 2025.

Table 4.2 Inpatient Efficiency of Mokopido Regional General Hospital

No.	Indicator	Standard (PMK No. 1171 /2011)	January	February	March	April	May	June	Average (%)	Category
1.	AvLOS (Average Length of Stay)	6-9 days	4	4	3	4	3	3	3.5	Efficient
2.	BOR (Bed Occupancy Rate)	60-85%	90	84.8	68	86.8	80	91.7	83.6	Over Capacity
3.	BTO (Bed Turnover)	40-50 times	8	7.6	6.9	7.3	7	7.9	7.5	Less Efficient
4.	TOI (Turn Over Interval)	1-3 days.	1	1	1	1	1	1	1.0	Efficient

Source: Secondary Data, August 2025

Based on Table 4.2 Average value of Semester I (January-June) 2025, inpatient efficiency at Mokopido Regional Hospital, BOR was over capacity, AvLOS and TOI were efficient and BTO was less efficient.

3. Evaluation Results of the Implementation of the Clinical Pathway for Cardiovascular Disease

Mokopido Regional Hospital has implemented a Clinical Pathway (CP) for three cardiovascular diseases: Coronary Artery Disease (CAD), hypertension, and stroke. The following table shows the results of an evaluation of 50 medical records for the implementation of CP for cardiovascular diseases during the first semester (January-June) 2025.



Table 4.3 Evaluation of the Implementation of the Clinical Pathway for Cardiovascular Disease (N=50 Medical Records)

No	Variable	Average value (%)	Category
1.	CP Usage Compliance	100.0	Good
2.	CP Compliance	96.8	Good
3.	Alignment of Medical/Nursing Procedures with CP	96.5	Good
4.	Achievement of Clinical Outcome Targets (according to CP)	97.6	Good
5.	Achievement of Target Treatment Time (according to CP)	87.6	Good
6.	The Existence of Variation (Variance) in the Implementation of CP	86.4	Good
7.	Patient and Family Education according to CP	90.4	Good
	Average CP Implementation Value	93.6	Good

Source: Secondary Data, August 2025

Note: Criteria: Less (<56%) Sufficient (56-80%) Good (>80%).

Based on Table 4.3 of the Implementation of the Clinical Pathway for Cardiovascular Disease in Semester I of 2025 at Mokpido Regional Hospital, the average score was 93.6% (Good). The highest score was 100%, and the lowest score was 86.4%, indicating variations in the implementation of CP, but still in the good category(Kemenkes, 2022).

DISCUSSION

1. National Hospital Quality Indicators

Table 4.1 compares the national hand hygiene compliance target (85%) with actual achievement over six months. Hand hygiene achievement shows high consistency with minimal fluctuation.

The analysis of achievements exceeded national targets. All hand hygiene achievements consistently exceeded the minimum standard of 85%, as stipulated in the Regulation of the Minister of Health of the Republic of Indonesia No.. 30 of 2022, regarding the National Quality Indicator (INM) of Health Services, which sets a target of Hand Hygiene Compliance $\geq 85\%$ as a mandatory indicator of service quality in health facilities. Stable Consistency. Cumulative achievement from January–June 2025 averaged 96.5% (Good). This is in accordance with the results of research (Sari, D. et al., 2023) "Analysis of Hand Hygiene Compliance in Type B Hospitals in Indonesia "Scientific Journal of Health, Vol. 22(1)"Compliance >90% can only be achieved with an active monitoring approach and reward system." And Research Results(Kurniawati, H. & Lestari, A., 2024)"The Role of Supervision in Improving Hand Hygiene Compliance"Indonesian Journal of Nursing, Vol.



12(2)“Direct feedback from supervisors increased HH compliance by 15% in 3 months.” WHO Guidelines on Hand Hygiene in Health Care (2023 Update). Emphasizes the 5 moments of hand hygiene and the need for a direct observation-based monitoring system to maintain high compliance.

Hospitals, as healthcare service institutions, must prioritize patient and staff safety, and one key aspect of this is compliance with the use of personal protective equipment (PPE). This is especially significant in the era of healthcare system transformation, where the demand for high-quality, efficient, and cost-effective healthcare services is escalating. Hospitals are increasingly required to meet strict regulations and quality standards, such as those set by the Indonesian Ministry of Health, to ensure safety and quality care. Compliance with the use of PPE is a fundamental part of this effort, directly impacting the effectiveness of healthcare delivery, staff protection, and patient safety.

PPE, including masks, gloves, gowns, and face shields, serves as a primary line of defense in preventing the spread of infections within healthcare settings. The importance of PPE is particularly crucial in high-risk environments such as hospitals where healthcare workers are exposed to infectious agents, including viruses and bacteria that could jeopardize their health and the health of their patients. Adequate PPE use helps mitigate the risk of healthcare-associated infections (HAIs), protecting both patients and medical personnel from potential harm.

In alignment with national healthcare quality standards, such as those in the Indonesian Ministry of Health Regulation No. 30 of 2022, hospitals are expected to achieve full compliance (100%) with PPE usage. This requirement emphasizes the importance of maintaining stringent infection control protocols in hospitals. Compliance with PPE use is not only an operational necessity but also a regulatory obligation that influences hospital ratings and performance metrics.

However, based on the evaluation of Mokopido Tolitoli Regional General Hospital, it is evident that compliance with PPE usage has room for improvement. As noted in the research results, the compliance rate for PPE use in the first semester of 2025 averaged 96.83%, falling short of the 100% target set by national quality indicators (PMK 30/2022). Although this is a high level of compliance, it still indicates a gap, which could potentially lead to an increased risk of infections if not addressed. The hospital's performance in this area needs continuous monitoring and improvement strategies to meet the regulatory expectations.

This shortfall could be attributed to several factors, including lapses in training, inconsistent supervision, or insufficient resources that could hinder staff from following PPE protocols. In addition, the cultural and behavioral aspects of healthcare personnel's adherence to safety protocols play a significant role. Regular training, audits, and providing immediate feedback on PPE compliance could further enhance the adherence



rate. Moreover, fostering a culture of accountability where healthcare workers understand the importance of PPE compliance not only for their protection but also for patient safety is critical.

The gap between the required 100% and the observed compliance rate of 96.83% suggests that ongoing efforts to strengthen PPE usage through regular assessments, leadership involvement, and reinforcing safety protocols are essential. Hospitals should invest in systems to track PPE use, provide timely reminders, and involve all staff in regular training and awareness programs about infection prevention.

2. Inpatient Efficiency AvLOS (Average Length of Stay)

Based on Table 4.2, the average value for Semester I (January-June) 2025, inpatient efficiency at Mokopido Regional Hospital shows that BOR was over capacity, AvLOS and TOI were efficient, and BTO was less efficient. The average AvLOS value of 3.5 days is significantly below the standard of 6–9 days. This indicates that patients are generally discharged very quickly compared to the ideal duration.

Advantages: Inpatient care is relatively quick, reflecting effective handling of mild cases or fast referrals.

Potential drawbacks: It could indicate that patients are discharged too early or that more complex cases are transferred or referred, which may affect the quality of care and patient safety.

This result aligns with findings from various studies suggesting that an extremely low or high AvLOS could signal issues (discharge speed vs. delayed recovery). Srimayarti et al. (2023) at RSIA Mutiara Bunda found an average AvLOS of 2.69 days, which "meets the standards" based on the internal conditions of the hospital, although the ideal standard may vary depending on the complexity of the case.

BOR (Bed Occupancy Rate)

With a BOR of 83.6%, it falls within the ideal range of 60–85%, but it is close to the upper limit. However, according to the table, it is categorized as "Over Capacity," meaning there are periods when BOR exceeds the upper limit, such as January (90%) and June (91.7%). A high BOR indicates maximal bed utilization, but consistently staying above the ideal limit may lead to overload, a lack of spare beds for surges, and risks of deteriorated service during high load periods.

This aligns with studies in the literature where many hospitals face issues with low BOR



(not optimal), which hampers efficiency. In contrast, Mokopido Hospital's BOR shows significant fluctuation, similar to the findings by Rahmi et al. (2022) at Baubau City Hospital, where BOR remained far below the ideal standard from 2019 to 2021 (38.33%, etc.). This is further supported by research from Pradnyantara et al. (2024) on "Inpatient Service Efficiency Transformation" at RS DKT Dr. Soetarto, where only AvLOS met the standards, while BOR and BTO were not deemed efficient.

BTO (Bed Turnover)

The average BTO value is only 7.5 times per period (month). The ideal standard is 40–50 times per year (approximately 3–4 times per month if distributed evenly). However, the table seems to compare monthly frequencies to the annual standard, resulting in a "less efficient" category for low BTO. A low BTO means that beds do not turnover frequently, leading to lost opportunities for new patients to be served, and bed efficiency declines.

Srimayarti et al. (2023) found a BTO of 72 times per year at RSIA Mutiara Bunda, which was considered "above average" based on internal hospital standards, although the ideal national context might differ.

TOI (Turn Over Interval)

With a TOI of 1.0 day, it falls within the ideal range of 1–3 days. This means that on average, there is a 1-day gap between one patient's discharge and the next patient's admission. A low TOI indicates efficient bed usage with minimal downtime. This study is consistent with Sari et al. (2023) who found a TOI of around 1.4 days in a Class III ward at a hospital in Palembang.

Overall, Mokopido Hospital shows mixed efficiency: high bed occupancy and rapid turnover (TOI), but a low frequency of bed usage (BTO). This may be due to a low number of incoming patients (patient filtering, referrals), mild case profiles, or limitations on complex procedures. Excessive BOR can create strain on capacity during patient surges.

Overall, the implementation of the Clinical Pathway for cardiovascular diseases at Mokopido Regional Hospital in Semester I 2025 shows excellent performance (93.6%). The highest score (100%) indicates the successful integration of the CP into the service system, while the lowest score (86.4%) points to areas that can still be improved, particularly regarding implementation variations. Strengthening aspects of service time management and variance analysis is necessary to further optimize service quality.



CONCLUSION

This research confirms the significant role that Islamic healthcare management practices, particularly through the use of Clinical Pathways (CP), play in improving the efficiency and quality of care in hospitals. The findings show that while many indicators for hospital quality, such as hand hygiene and patient satisfaction, were met with good results, some areas, including compliance with clinical pathways and timely reporting, require further improvement. The study underscores the importance of continuous monitoring and feedback in achieving high standards of healthcare delivery. Furthermore, the integration of efficiency indicators like AvLOS, BOR, and BTO into clinical practices offers valuable insights into optimizing hospital resources and services. The research contributes to enhancing the understanding of how regulatory frameworks, quality indicators, and CP implementation can be better aligned to improve healthcare service delivery. Future research should focus on addressing the existing gaps, especially in the management of complex cases, to ensure a more seamless integration of policies and operational practices.

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