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THE ROLE OF HOSPITAL MANAGEMENT IN PRODUCTIVITY, REVENUE, EFFICIENCY, AND EFFECTIVENESS OF JKN PATIENT SERVICES: A CASE STUDY OF A PRIVATE HOSPITAL (XYZ) IN INDONESIA, 2023–2024

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ABSTRACT

This study examines how the management of XYZ Private Hospital governs the productivity, efficiency, and revenue of health services delivered to patients covered by the National Health Insurance (JKN) scheme under the INA-CBGs' prospective payment system. A case study design with a mixed-methods approach was employed, combining quantitative data from INA-CBGs' claim reports and JKN revenue (inpatient and outpatient) for 2023–2024 with qualitative data from in-depth interviews, focus group discussions, and a review of managerial documents. The findings indicate a sharp increase in JKN patient volume across almost all CMG and CBG groups, both inpatient and outpatient, accompanied by substantial growth in hospital revenue, positioning JKN as the primary revenue source. However, the casemix is dominated by medical cases at severity level 1, resulting in a high–volume–low–yield performance pattern that relies heavily on volume expansion rather than higher revenue per case. The analysis further reveals a persistent gap between actual care costs and INA-CBGs tariffs, especially for chronic and catastrophic conditions, exacerbated by undercoding, incomplete clinical documentation, and pending or lost claims, resulting in significant revenue leakage. Managerial interventions such as clinical pathway implementation, adherence to the National Formulary, quality and cost control programs, and strategic purchasing have improved operational efficiency but have not yet been fully integrated into a casemix-based revenue strategy that aligns productivity and efficiency with optimized reimbursement. The study concludes that the financial sustainability of JKN-dependent private hospitals crucially depends on the quality of casemix and claims governance, the alignment of operational efficiency with INA-CBGs algorithms, and business model innovation that balances social commitments with economic viability.

Keywords: National Health Insurance (JKN); INA-CBGs; hospital management; casemix (CBG, CMG, severity), productivity, cost efficiency, and hospital revenue.

INTRODUCTION

Indonesia's National Health Insurance (Jaminan Kesehatan Nasional, JKN) is a government program designed to provide comprehensive health security so that all citizens can live healthy, productive, and prosperous lives. The benefits of this program are delivered through individual health services encompassing health promotion, disease prevention, curative treatment, and rehabilitative care, including medicines and medical supplies, using cost- and quality-controlled managed care techniques.(Peraturan Menteri Kesehatan 2016).

JKN is implemented on the principles of social insurance and equity, namely equal access to medically necessary services regardless of the amount of contribution paid. Contributions are set as a proportion of income for those who can afford to pay. At the same time, the government finances premiums for the poor and near-poor through contribution assistance. (Kemenkes 2024)

As of 1 October 2025, BPJS Kesehatan data show that JKN membership has reached approximately 282.7 million people, or around 98.6% of Indonesia's total population, of whom about 41.5% (116.9 million) are contribution-assisted participants.(BPJS Kesehatan 2024)

The rapid achievement of near-universal coverage creates new challenges for private hospitals, which now account for 60–70% of JKN patient volume, compared with less than 10% before JKN was introduced. In practice, many private hospitals face a structural mismatch between their actual costs and the INA-CBGs package tariffs, particularly for chronic and catastrophic diseases, where national studies report that real costs can be 25–60% higher than the reimbursed tariffs. This structural gap, combined with suboptimal cost control, casemix management, and claims administration, threatens the financial sustainability of JKN-dependent private hospitals and positions hospital management as a critical determinant of productivity, efficiency, and revenue in the INA-CBGs era.(Dumaris *et al.* 2016)

LITERATURE REVIEW

Hospitals are complex organizations that must simultaneously pursue quality of care, operational efficiency, and financial sustainability, particularly under prospective payment systems such as INA-CBGs. Under this system, hospital reimbursement is no longer based on itemized services (service fees) but on case groups (casemix) that assume similar clinical characteristics and resource use within each group. In Indonesia, the INA-CBGs structure includes 789 inpatient groups and 286 outpatient groups, with tariffs set centrally by the Ministry of Health and BPJS Kesehatan.(Peraturan Menteri Kesehatan Nomor 26 2021)

The INA-CBGs coding structure comprises a first character denoting the Case Main Group (CMG), which reflects the affected body system, followed by a numeric Case Base Group (CBG) indicating inpatient or outpatient case type, additional numeric digits specifying subgroups, and a final digit I–III representing severity level. Higher severity levels receive higher tariffs because they are assumed to require more intensive use of medicines, consumables, diagnostics, and clinical care. From a health economics perspective, persistent gaps between INA CBG tariffs and actual costs create financial pressure on hospitals that fail to manage resources efficiently and to document and code clinical complexity accurately (Kasra, Nur, and Aljunid 2012).

Within this context, hospital management plays a pivotal role in: designing an optimal mix of JKN and non-JKN patients; negotiating private tariffs; controlling costs through clinical pathways, length-of-stay management, and utilisation review; ensuring accurate coding of diagnoses and procedures; and strengthening internal audit and claims processes to mitigate financial risk. The effectiveness of these managerial strategies is reflected in key performance indicators such as casemix index, productivity of CBG/CMG groups, severity distribution, length of stay, claim rejection and loss rates, and the contribution of JKN revenue to overall hospital income.(Rahayuningrum, Tamtomo, and suryono 2016)

Conceptually, this study frames hospital management as the key driver influencing three intermediate domains—productivity of JKN services (measured through CBG, CMG, and severity), operational efficiency (length of stay and resource use), and service effectiveness (appropriateness of care and claims performance)—which together determine the hospital's revenue from JKN. This framework underpins the research objectives and guides the empirical analysis of XYZ Private Hospital in the 2023–2024 period (Mutia Handayani 2021)

METHODOLOGY

Research Objectives

The general objective of this study is to explain how the management of XYZ Private Hospital governs the productivity, revenue, and efficiency of services for JKN patients in the context of the disparity between actual costs and INA-CBGs tariffs. The specific objectives are to:

1. Analyze the level of service productivity for JKN patients at XYZ Private Hospital based on *Case Base Groups (CBG), Case Main Groups (CMG),* and severity levels for inpatient and outpatient care in 2023–2024.(Aljunid *et al*. 2011)
2. Describe the hospital's revenue patterns from JKN services and their contribution to the total revenue of XYZ Private Hospital in 2023–2024.
3. Evaluate the role and strategies of XYZ Private Hospital's management in cost containment, improving operational efficiency, and mitigating the risk of loss arising from INA-CBGs tariff gaps.
4. Formulate managerial recommendations to strengthen the financial sustainability and quality of services at XYZ Private Hospital in the JKN era.

Scope of the Study

Object scope

1. The study focuses on a single facility, XYZ Private Hospital, where JKN covers more than 90% of patients.
2. The objects of analysis include: service productivity, JKN revenue, actual cost structure, INA-CBGs claims, and management policies and practices related to JKN.

Substantive scope

1. Financing of JKN patient services in private hospitals within the INA-CBGs tariff framework.
2. The focus is on the relationships among service productivity, revenue, and tariff gaps, and on management strategies (coding accuracy, clinical pathways, length-of-stay control, fraud mitigation, and revenue-mix management).

Time scope

The quantitative analysis covers the 2023–2024 period, in line with the availability of claim and revenue reports.

Methodological scope

The study employs a case study design with a mixed-methods approach.

Quantitative data

1. Sources: INA-CBGs claim reports (BPJS text/BAV files) for 2023–2024 and JKN revenue reports (inpatient and outpatient) of XYZ Hospital for 2023–2024.
2. Variables: number of cases, distributions of CMG, CBG, hospital claim revenue, and severity levels.
3. Data collection: secondary data extraction from the hospital information system (HIS) and BPJS claim system, then processed into CMG, CBG, severity, and revenue tables.

Qualitative data

1. Techniques: in-depth interviews with the director and key managers (finance manager, casemix team leader, service manager); focus group discussions with unit heads

responsible for cost control, casemix, claims, and JKN service strategies; and document review of SOPs, management policies, claim audit files, and internal JKN/INA-CBGs guidelines.

2. Focus of information: cost control strategies, casemix and coding management, LOS management, handling of pending/lost claims, and revenue-mix and business sustainability strategy.

Conceptual Framework

The conceptual framework incorporates:

1. One independent variable: Hospital Management Role (including coding accuracy) **(X)**.
2. Three mediating variables: Hospital Productivity (CBG, CMG, and severity level) **(Y1)**, Efficiency of JKN Services (LOS) **(Y3)**, Effectiveness of JKN Services **(Y4).**
3. One primary dependent variable: Hospital Revenue from JKN Patient Services **(Y2).**

These variables are linked in a causal pathway in which hospital management influences the productivity, efficiency, and effectiveness of JKN services, which, in turn, determine JKN-related revenue.

RESULTS

This study examined the productivity and revenue performance of XYZ Private Hospital in serving JKN patients. The number of inpatient cases rose from 8,119 in 2023 to 10,506 in 2024, while outpatient visits increased from 84,487 to 140,128 over the same period. In 2023, revenue from BPJS patients totaled IDR 81,520,552,300, comprising IDR 52,930,603,100 from inpatient care and IDR 28,589,949,200 from outpatient services. In 2024, total revenue rose to IDR 116,795,050,440, with IDR 67,220,238,200 from inpatient care and IDR 49,574,812,240 from outpatient services. This comparison indicates that in 2024, the contribution of inpatient services to BPJS revenue increased, alongside very substantial growth in outpatient volume.

Table 1. Patient Distribution by Patient Type

TYPE PASIEN	2023			2024		
	Sum of PATIENT	Sum of INCOME	AVERAGE INCOME PER PATIENT	Sum of PATIENT	Sum of INCOME	AVERAGE INCOME PER PATIENT
IN PATIENT	8,119	52,930,603,100	6,519,350	10,506	67,220,238,200	6,398,271
OUT PATIENT	84,487	28,589,949,200	338,395	140,128	49,574,812,240	353,782
Grand Total	**92,606**	**81,520,552,300**	880,294	**150,634**	**116,795,050,440**	775,356

Source: Processed by the author

In terms of casemix, inpatient CMG data show that in 2023 the largest proportion of cases by body system was obstetric patients (delivery) at 18.81%, and this group remained the largest in 2024 at 14.71%. There were increases of 247–461 patients per year in CMG groups such as Ear, Nose, Mouth and Throat, Digestive System, Respiratory System, and Infectious and Parasitic Diseases, accompanied by additional annual revenue of IDR 1,049,679,600 to IDR 2,595,706,500. The Central Nervous System and Nephro-Urinary System groups grew by 91–151 patients with extra revenue of IDR 1,021,276,600 to IDR 1,266,027,100, whereas the Newborn and Neonates group increased by 66 patients but experienced a revenue decline of IDR 720,035,700.

Table 2. Comparison of CMG for inpatient patients with Revenue for the years 2023 and 2024

CMG IN PATIENT	IN PATIENT 2023	IN PATIENT 2024	SELISIH KENAIKAN PATIENT	JUMLAH TOTAL PENDAPATAN 2023	JUMLAH TOTAL PENDAPATAN 2024	SELISIH KENAIKAN PENDAPATAN
	JUMLAH	JUMLAH				
Central nervous system Groups	475	566	91	3.208.957.100	4.230.233.700	1.021.276.600

CMG IN PATIENT	IN PATIENT 2023	IN PATIENT 2024	SELISIH KENAIKAN PATIENT	JUMLAH TOTAL PENDAPATAN 2023	JUMLAH TOTAL PENDAPATAN 2024	SELISIH KENAIKAN PENDAPATAN
	JUMLAH	JUMLAH				
Eye and Adnexa Groups	11	34	23	81.996.400	296.712.600	214.716.200
Ear, nose, mouth & throat Groups	409	870	461	1.943.433.100	4.539.139.600	2.595.706.500
Respiratory system Groups	1.014	1.261	247	14.702.489.100	16.953.850.900	2.251.361.800
Cardiovascular system Groups	415	535	120	2.532.516.600	2.762.008.300	229.491.700
Digestive system Groups	1.020	1.427	407	3.471.720.300	4.732.880.700	1.261.160.400
Hepatobiliary & pancreatic system Groups	235	266	31	1.476.327.400	2.169.935.300	693.607.900
Musculoskeletal system & connective tissue Groups	230	381	151	2.292.120.500	4.501.725.600	2.209.605.100
Skin, subcutaneous tissue & breast Groups	224	221	- 3	1.305.823.300	1.349.566.600	43.743.300
Endocrine system, nutrition & metabolism Groups	126	168	42	708.479.500	933.846.600	225.367.100
Nephro-urinary System Groups	637	788	151	4.786.212.800	6.052.239.900	1.266.027.100
Male reproductive System Groups	39	86	47	335.669.500	851.033.700	515.364.200
Female reproductive system Groups	559	703	144	2.015.750.000	2.731.432.400	715.682.400
Deliveries Groups	1.527	1.545	18	8.677.454.800	8.976.696.300	299.241.500
Newborns & Neonates Groups	287	221	- 66	2.170.359.200	1.450.323.500	-720.035.700
Haemopoeitic & immune system Groups	107	178	71	455.544.400	837.644.300	382.099.900
Myeloproliferative system & neoplasms Groups	8	7	- 1	101.834.800	73.977.300	-27.857.500
Infectious & parasitic diseases Groups	763	1.194	431	2.499.147.000	3.548.826.600	1.049.679.600
Mental Health and Behavioral Groups	2	6	4	9.625.500	45.406.500	35.781.000
Substance abuse & dependence Groups			-			0
Injuries, poisonings & toxic effects of drugs Groups	10	20	10	67.889.400	104.933.200	37.043.800
Factors influencing health status & other contacts with health services Groups	21	29	8	87.252.400	77.824.600	-9.427.800
Ambulatory Groups-Episode						
Total	**8.119**	**10.506**	2.387	**52.930.603.100**	**67.220.238.200**	14.289.635.100

Source: Processed by the author

For outpatient CMG (Table 3), the Eye and Adnexa, Ear, Nose, Mouth and Throat, Nephro-Urinary System, and Ambulatory Episode groups recorded increases of 2,879–30,667 patients per year in 2024 compared with 2023, with additional revenue of IDR 3,256,214,300 to IDR 6,443,863,400 per year. Overall, outpatient volume grew across almost all groups, from a minimum increase of 1 patient in the Newborn and Neonates group to 4,321 additional patients in the Musculoskeletal System and Connective Tissue group, with incremental revenue of IDR 323,000 to IDR 670,754,000.

Table 3. Comparison of Outpatient CMG with 2023 and 2024 Revenue

CMG OUTPATIENT	OUTPATIENT 2023	OUTPATIENT 2024	SELISIH KENAIKAN PATIENT	JUMLAH TOTAL PENDAPATAN 2023	JUMLAH TOTAL PENDAPATAN 2024	SELISIH KENAIKAN PENDAPATAN
	JUMLAH	JUMLAH				
Central nervous system Groups	105	168	63	36.354.100	58.300.800	21.946.700
Eye and Adnexa Groups	1.756	4.635	2.879	1.091.635.800	4.655.273.000	3.563.637.200
Ear, nose, mouth & throat Groups	7.098	14.526	7.428	3.320.271.900	6.576.486.200	3.256.214.300
Respiratory system Groups	222	401	179	104.147.400	185.568.400	81.421.000
Cardiovascular system Groups	700	1.018	318	328.482.800	474.976.400	146.493.600
Digestive system Groups	356	555	199	105.998.200	155.729.900	49.731.700
Hepatobiliary & pancreatic system Groups			-			-
Musculoskeletal system & connective tissue Groups	9.546	13.867	4.321	1.362.765.200	2.033.519.200	670.754.000
Skin, subcutaneous tissue & breast Groups	645	2.587	1.942	278.033.800	1.106.129.200	828.095.400
Endocrine system, nutrition & metabolism Groups	14	32	18	9.270.400	19.463.200	10.192.800
Nephro-urinary System Groups	11.052	15.252	4.200	8.941.337.500	13.104.086.640	4.162.749.140
Male reproductive System Groups	17	14	- 3	8.903.100	7.750.400	- 1.152.700
Female reproductive system Groups	11	24	13	5.169.900	10.518.700	5.348.800
Deliveries Groups			-			-
Newborns & Neonates Groups	12	11	- 1	3.899.100	3.576.100	- 323.000
Haemopoeitic & immune system Groups	10	4	- 6	7.118.200	2.224.000	- 4.894.200
Myeloproliferative system & neoplasms Groups			-			-
Infectious & parasitic diseases Groups			-			-
Mental Health and Behavioral Groups	236	392	156	69.403.900	120.607.300	51.203.400
Substance abuse & dependence Groups			-			-
Injuries, poisonings & toxic effects of drugs Groups			-			-
Factors influencing health status & other contacts with health services Groups	10.282	13.550	3.268	4.066.007.400	5.765.588.900	1.699.581.500
Ambulatory Groups-Episode	42.425	73.092	30.667	8.851.150.500	15.295.013.900	6.443.863.400
Total	**84.487**	**140.128**	55.641	**28.589.949.200**	**49.574.812.240**	20.984.863.040

Source: Processed by the author

At the CBG type level for inpatient care, 2024 saw an increase in the number of cases across surgical, medical, and obstetric-gynecology groups, with additional revenue ranging from IDR 299,241,500 to IDR 8,377,497,300, while pediatric CBGs experienced a reduction of 66 patients and a revenue decline of IDR 720,035,700. For outpatient CBGs, there was an increase in cases for the Outpatient Major Procedure, Significant Procedure, and Medical groups, with patient differences of 383 to 31,081 and additional revenue of IDR 2,949,187,800 to IDR 11,472,168,240, whereas pediatric outpatient CBGs declined by one patient, with a revenue decrease of IDR 323,000.

Table 4. Comparison of CBG for Inpatient Patient Types with Revenue for 2023 and 2024

CBG TYPE INPATIENT	2023	2024	SELISIH KENAIKAN PATIENT	2023	2024	SELISIH KENAIKAN PENDAPATAN
	Jumlah Kasus	Jumlah Kasus		TOTAL PENDAPATAN	TOTAL PENDAPATAN	
Inpatient Surgical	1.452	2.114	662	22.370.235.900	30.747.733.200	8.377.497.300
Inpatient Medical	4.853	6.626	1.773	19.712.553.200	26.045.485.200	6.332.932.000
Inpatient O&G	1.527	1.545	18	8.677.454.800	8.976.696.300	299.241.500
Inpatient Paediatric	287	221	- 66	2.170.359.200	1.450.323.500	- 720.035.700
Total	**8.119**	**10.506**	**2.387**	**52.930.603.100**	**67.220.238.200**	**14.289.635.100**

Source: Processed by the author

In 2023, the highest number of patients treated at XYZ Hospital were medical outpatients, totaling 43,046 patients (46.48%), followed by outpatient procedures with 41,219 patients (44.51%). Similar results were observed in 2024, with 74,127 patients (49.21%) as medical outpatients and 65,397 patients (43.41%) as outpatient procedure cases. In 2024, outpatient CBG types saw increases in patient numbers across all case groups, including Outpatient Major Procedures, Significant Procedures, and Medical and Obstetrics and Gynecology, with patient counts ranging from 383 to 31,081. There was a revenue difference of Rp. 2,949,187,800 – Rp. 11,472,168,240. There were no Obstetrics and Gynecology patient group CBG types. There was a decrease in the CBG Outpatient Pediatric type, with one fewer patient and revenue of Rp. 323,000.

Table 5. Comparison of CBG Type for Outpatient Patients with Revenue in 2023 and 2024

CBG TYPE OUTPATIENT	2023	2024	SELISIH KENAIKAN PATIENT	2023	2024	SELISIH KENAIKAN PENDAPATAN
	Jumlah Kasus	Jumlah Kasus		TOTAL PENDAPATAN	TOTAL PENDAPATAN	
Outpatient Major Procedure	210	593	383	804.402.300	3.752.590.100	2.948.187.800
Outpatient Significant Procedure	41.219	65397	24178	18.756.989.400	30.229.157.640	11.472.168.240
Outpatient Medical	43.046	74127	31081	9.024.658.400	15.589.488.400	6.564.830.000
Outpatient O&G			0			-
Outpatient Paediatric	12	11	-1	3.899.100	3.576.100	- 323.000
Total	84.487	140.128	55.641	28.589.949.200	49.574.812.240	20.984.863.040

Source: Processed by the author

Regarding severity distribution, most inpatient episodes in 2023 and 2024 fell into severity level 1, with 6,151 cases (75.76%) and 8,496 cases (80.87%), respectively. The proportions of severity levels 2 and 3 were lower in 2024 than in 2023. The most notable increase occurred in severity level 1, which rose by 2,345 patients and generated additional revenue of IDR 12,356,232,200 out of a total increase of IDR 14,289,635,100.

Table 6. Severity level of XYZ Hospital patients in 2023 and 2024

SEVERITY	2023	2024	SELISIH KENAIKAN PATIENT	2023	2024	SELISIH KENAIKAN PENDAPATAN
	Jumlah Kasus	Jumlah Kasus		TOTAL PENDAPATAN	TOTAL PENDAPATAN	
Severity I	6.151	8.496	2.345	28.860.716.300	41.217.048.500	12.356.332.200
Severity II	1.413	1.500	87	9.903.787.300	11.598.522.000	1.694.734.700
Severity III	555	510	- 45	14.166.099.500	14.404.667.700	238.568.200
Total	**8.119**	**10.506**	2.387	**52.930.603.100**	**67.220.238.200**	14.289.635.100

Source: Processed by the author

The role of hospital management in cost control, operational efficiency, and the sustainability of private hospitals

In-depth interviews and focus group discussions with the Medical Director, medical, nursing, and finance managers, and the head and team of the casemix unit at XYZ Private Hospital confirmed that management plays a central role in balancing service standards with INA-CBGs package tariffs under BPJS Kesehatan's prospective, diagnosis-based payment system. This role is primarily manifested in three core pillars: cost control, operational efficiency, and business sustainability.

Cost control and service efficiency. Because INA-CBGs tariffs are predetermined, management must ensure that actual treatment costs do not exceed these tariffs while maintaining clinical quality. To achieve this, the hospital applies strict clinical pathways and guidelines, sets standard lengths of stay, and prevents unnecessary examinations and procedures not reimbursed under the package. The most common inpatient conditions in 2025, such as gastrointestinal infections, dengue, gastritis, and viral infections, typically have a length of stay of 3–7 days, indicating relatively efficient LOS that could support a higher severity classification if clinical documentation were strengthened. In the outpatient setting, most visits are routine follow-ups for chronic and degenerative diseases, predominantly among female patients aged 40–70 years, a pattern consistent with the 2023–2024 findings.

The substantial gap between the hospital's actual costs and INA-CBGs tariffs indicates significant potential to increase revenue through improved coding accuracy and severity optimization. For inpatient care, key revenue drivers include the number of admissions, optimal LOS, procedure volumes, and utilization of centers of excellence, whereas in outpatient care the main driver is visit volume, which moves in line with activity levels and total costs.

The FGD highlighted several critical issues:

1. Undercoding and incomplete medical records lead to low severity assignment, causing many cases of pneumonia, infection, diabetes mellitus, and gastrointestinal disease to fall into low-value CBGs and reducing revenue by an estimated 20–30%.
2. Lost and pending claims account for around 5–10% of potential revenue due to administrative and coding discrepancies, including claims that exceed BPJS deadlines; this disrupts cash flow and generates revenue leakage as legitimately earned income is not collected or is lost in the process.
3. There is a high reliance on the Emergency Department (ED) as the main source of inpatient admissions, making patient flow and revenue overly reliant on a single entry point for services.
4. Outpatient volume is very high (approximately 149,000 visits), but many cases fall into low-value CBGs, so revenue contributions are not commensurate; value-added procedures and better procedure documentation are required to upgrade grouping (for example, special procedures, special drugs, special investigations, special prostheses, and subacute/chronic categories).
5. Very short LOS may improve bed occupancy rates but, if clinical documentation is incomplete, can depress severity levels; the hospital must balance operational efficiency

with grouping optimisation to ensure that claims reflect clinical complexity while maintaining quality.

Conceptually, operational efficiency refers to the prudent use of LOS, medicines, consumables, diagnostic tests, human resources, and utilities, while still meeting quality and patient safety standards, by avoiding over-treatment, selecting medicines and investigations rationally, and implementing clinical pathways so that unit costs become more cost-effective.

Formulary management and strategic purchasing. The hospital mandates the use of medicines listed in the National Formulary (Fornas) or equivalent standard generic medicines for BPJS patients to ensure full coverage without additional patient charges and to prevent INA-CBGs claim rejection or limitation due to formulary non-compliance. To reduce expenditure, management also applies strategic purchasing by procuring medicines and medical devices in bulk from selected suppliers, thereby securing acceptable quality at more efficient prices.

Quality and cost control (KMKB) based on casemix. To ensure good service delivery and optimal reimbursement, the hospital has strengthened several quality and cost control components. All staff are educated on the JKN scheme, casemix/INA-CBGs concepts, behavioural shifts from fee-for-service to package tariffs, and the importance of research and publication on INA-CBGs as part of capacity building.

Management has established a formal casemix structure consisting of :

1. A steering committee responsible for developing policies, quality control systems, and clinical pathways as cost-control instruments.
2. An operational casemix team covering coding, costing, clinical pathway, and IT functions, tasked with ensuring that clinical and cost data are properly integrated into the casemix system.

Doctors are prepared to secure appropriate claim payments by:

1. Determining a primary diagnosis that is accurate, specific, and represents the greatest resource consumption.
2. Recording all secondary diagnoses, comorbidities, complications, and all principal and additional procedures.
3. Maintaining high-quality medical record documentation, accurate ICD-10 and ICD-9-CM coding, and proper costing and unit cost documentation, as well as supporting the development of the Hospital Information System to ensure data completeness.

Maintaining the sustainability of private hospital business**.** As a private hospital that does not receive government subsidies for salaries or infrastructure, management must carefully manage its business portfolio. The hospital cannot rely solely on BPJS patients and therefore needs to develop internal cross-subsidy strategies through self-pay patients, commercial insurance, and executive services that provide higher margins to support JKN services. Revenue also needs to be diversified by developing non-inpatient service lines that are not constrained by INA-CBGs tariffs, such as medical check-ups, aesthetic services, and home care. At the same time, because BPJS claim payments are often received in the following month or may be delayed, financial management must maintain an operational cash buffer sufficient for at least three months to ensure that salaries and medicine procurement remain secure even when claims have not yet been paid.

Discussion

Productivity of JKN services and casemix management. The first objective was to assess the productivity of JKN services using CBG, CMG, and severity indicators for inpatient and outpatient care in 2023–2024 as a reflection of how management governs clinical documentation, coding, and the casemix system. The results show a marked increase in JKN case volume across almost all CMG and CBG groups, for both inpatient and outpatient services, particularly in Ear, Nose, Mouth and Throat, digestive, respiratory, infectious–

parasitic, and ambulatory groups, each contributing additional hundreds to tens of thousands of cases per year, accompanied by revenue increases in the order of billions of rupiah per group.

However, more than three-quarters of care episodes in both years remained classified as severity level 1, while severity levels 2 and 3 accounted for only a small proportion, despite the hospital's substantial burden of chronic and catastrophic disease. Interviews indicate that secondary diagnoses and complications are often incompletely documented, and that coding still focuses primarily on the main diagnosis in the absence of a systematic clinical documentation improvement program. Thus, although productivity is high in terms of volume and diversity of CMG/CBG, the casemix structure does not fully reflect clinical complexity, so the quality of productivity from a severity perspective remains suboptimal.

JKN revenue patterns and contribution to hospital finances. The second objective was to describe revenue patterns from JKN services and their contribution to XYZ Hospital's total income. Total JKN revenue increased from approximately IDR 81.52 billion in 2023 to IDR 116.80 billion in 2024, with inpatient revenue growing by about IDR 14.29 billion and outpatient revenue by about IDR 20.98 billion. The share of outpatient services in total JKN revenue rose from 35% to 42.4%. This reflects the success of outpatient service expansion as a key engine of revenue growth. In terms of casemix and severity structure, a "high volume–low yield" pattern emerges: revenue rises mainly from increases in case numbers rather than higher average revenue per episode. Management characterizes this situation as "working much harder" for relatively limited additional margins, leaving the hospital highly dependent on JKN volume and not yet fully exploiting casemix optimization opportunities to enhance value per case.

Management strategies: cost, operational efficiency, and tariff-gap risk mitigation. The third objective was to evaluate management's role in cost containment, operational efficiency, and the mitigation of losses arising from the disparity between INA CBG tariffs and actual costs. The hospital has implemented clinical pathways, Quality and Cost Control (KMKB) programs, length-of-stay management, and strategic purchasing of medicines and medical supplies to reduce unit service costs, indicating an understanding of the financial risks inherent in prospective, casemix-based payment.

Nonetheless, the disparity between actual costs and INA-CBGs tariffs remains substantial; in many case groups, particularly cardiac, cancer, stroke, renal failure, and chronic hematological conditions, real costs are reported to be 25–60% higher than package tariffs. Management acknowledges a dilemma between pursuing efficiency (shortening LOS and conserving resources) and the need to maintain sufficiently robust clinical documentation to avoid locking severity at low levels.(Rahayuningrum et al. 2016)

In addition, structural weaknesses in the claims process—pending and lost claims amounting to around 5–10% of potential value due to administrative errors, delays, and incomplete documentation—cause significant revenue leakage, whereby part of the income already generated by clinical services never reaches the hospital's cash account. Thus, current management strategies are relatively strong in terms of basic cost control and operational efficiency, but remain less effective in addressing financial risks stemming from national tariff gaps and internal weaknesses in casemix and claims governance.

Managerial implications and recommendations for financial sustainability and quality. The fourth objective was to formulate managerial recommendations to strengthen financial sustainability and service quality in the JKN era, synthesizing the relationships between managerial roles, casemix productivity, operational efficiency, claims effectiveness, and JKN revenue. The integration of quantitative findings and interview data underlines that increasing volume and reducing costs alone are insufficient; without robust casemix governance, efficiency can become a trap: LOS decreases but severity remains low, investigations and

medicines are curtailed but documentation does not support higher tariffs, and a portion of submitted claims is lost along the administrative chain.

Consequently, casemix management and coding systems must be elevated from technical back-office functions to strategic concerns of top management. The casemix unit should be given the mandate and resources to conduct systematic medical record audits and coding supervision, using indicators such as casemix index, severity distribution, and claim rejection rates as measures of both clinical and managerial performance. The claims process needs to be redesigned so that the flow from clinical service delivery to claim submission functions as a single integrated cycle, supported by information systems that enable real-time monitoring of pending and lost claims.

At the same time, operational efficiency must be defined as efficiency aligned with quality and tariff structures: clinical pathways for priority cases should be developed jointly with casemix and finance teams to ensure that cost savings do not compromise the completeness of clinical evidence required by INA CBGs algorithms. The hospital should also develop more diversified revenue strategies based on casemix data—for example, identifying services suitable for packaging as executive programs or bundling with supplementary insurance—without undermining its commitment to access and quality for JKN patients.

Taken together, the discussion demonstrates that XYZ Private Hospital's core strength lies in its ability to generate high JKN service volumes at relatively efficient baseline costs. However, achieving financial sustainability and quality requires a transformation of governance in which clinical documentation, coding, casemix, and claims are treated as strategic instruments for converting productivity and efficiency into fair and sustainable revenue within the INA-CBGs framework.

CONCLUSIONS

1. Hospital management has clearly increased JKN service productivity but has not yet optimized casemix quality. The 2023–2024 case study of XYZ Private Hospital shows a surge in JKN inpatient and outpatient volume across almost all CMG and CBG groups, establishing the hospital as a major JKN provider with high service productivity. However, casemix composition remains dominated by medical cases at severity level 1, indicating that clinical documentation and coding accuracy do not fully capture case complexity and resource use, thereby limiting the potential for casemix-based revenue enhancement.
2. JKN revenue has risen significantly, but the financial performance pattern remains high volume–low yield and is vulnerable to volume fluctuations. Revenue growth is driven mainly by expansion in case numbers rather than increased average revenue per episode or a Strengthened casemix structure, leaving the hospital structurally dependent on volume stability and highly sensitive to regulatory and tariff changes.
3. The disparity between actual costs and INA-CBGs tariffs, along with weaknesses in claims governance, creates systemic financial pressure. The study confirms a consistent gap between actual service costs and INA-CBGs tariffs, particularly for chronic and catastrophic diseases, in line with national evidence that real hospital tariffs often exceed package tariffs by 25–60%. This gap is compounded by under-coding, incomplete medical records, and pending or lost claims, resulting in revenue leakage that undermines the financial sustainability of JKN-based private hospitals.
4. Existing managerial interventions are stronger on basic operational efficiency than on integrating casemix and claims as strategic revenue instruments. Measures such as clinical pathways, adherence to the National Formulary, quality and cost control programs, and strategic purchasing reflect a strong commitment to cost efficiency and resource control, but have not yet been fully integrated with strengthened casemix management, coding accuracy, and redesigned claims processes into a data-driven revenue-mix strategy capable

of maximizing income without compromising quality. As a result, the relationships among productivity, efficiency, and revenue remain only partially synergistic.

5. The financial sustainability of JKN-based private hospitals requires transformation in casemix, claims, and business model governance. Fundamentally, this study concludes that the survival of XYZ Private Hospital in the JKN era can no longer rely solely on increased patient volume and cost control but demands precise casemix and claims governance, operational efficiency aligned with INA-CBGs algorithms, and business model innovation that balances JKN's social mission with the financial sustainability needs of private hospitals

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