Article Type: Research Paper

Analysis of the cost recovery rate for inpatient services under the national health insurance scheme at hospital X in Yogyakarta

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Abstract

Research aims: This study aims to analyze the cost recovery rate of inpatients under the National Health Insurance (NHI) program at Hospital X in Yogyakarta.

Design/Methodology/Approach: This study employed an explanatory sequential mixed-methods design using a case study approach. The cases to be examined involved NHI inpatient patients in the Respiratory, Cardiology, and Obstetrics-Gynecology departments. Data will be analyzed using the Cost Recovery Rate (CRR) formula.

Research findings: The CRR for inpatient NHI patients at the Respiratory Clinic shows a CRR value of 143%, while the CRR values for the Cardiology, Obstetrics, and Gynecology Clinics are 95% and 80%, respectively. Cross subsidization from clinics with positive CRR values can be implemented to ensure that the hospital's Revenue from Social Security Agency for Health (SSAH) claims remains positive overall.

Theoretical contribution/ Originality: This research has made a valuable contribution to the accounting literature on hospital entities, a field that remains significantly underexplored.

Practitioner/Policy implication: The findings of this research can serve as a valuable asset for hospitals and the government in formulating policies that promote the enhancement of equitable and sustainable healthcare services for stakeholders.

Research limitation/Implication: The limitation of this study is that it only examined the CRR values of inpatient NHI patients in a single hospital, focusing exclusively on inpatients in the NHI Respiratory, Cardiology, and Obstetrics and Gynecology departments.

Keywords: Cost Recovery Rate; Inpatient Services; NHI Patients

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DOI: 10.18196/jai.v26i1.23520

CITATION:
Hafni, D. A., Aji, S. S. B., & Andriani, M. (2025). Analysis of the cost recovery rate for inpatient services under the national health insurance scheme at hospital X in Yogyakarta. *Journal of Accounting and Investment, 26*(1), 71-86.

ARTICLE HISTORY
Received:
06 Aug 2024
Revised:
20 Nov 2024
Accepted:
24 Jan 2025

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JAI Website:

Introduction

One of the fundamental rights of Indonesian citizens that are protected by the state is health. This fundamental right is regulated by Law No. 36 of 2009 concerning Health, which asserts that everyone has an equal right to access health resources and receive safe, quality, and affordable health services. The Indonesian government's responsibility to provide health protection for its citizens is realized through the National Health Insurance (NHI) policy. The government established Law No. 24 of 2011 concerning the Social Security Agency for Health (SSAH) as the administrator of the NHI program.

The President Director of SSAH, Ali Ghufron Mukti, stated that as of September 1, 2023, the number of NHI participants had reached over 262 million, or approximately 94.64% of the total population in Indonesia, and this number is expected to continue to grow (Azizah, 2023) It is indicated that NHI patients represent a significant potential for hospitals to provide health services and serve as a revenue source. The health service system within the NHI program is hierarchically structured, where all patients receive primary care at first-level health facilities, and if necessary, they may be referred to advanced-level facilities. Payment for health services at advanced-level facilities is based on Indonesian-Case Based Groups (INA CBG's) rates.

Several parties have complained about the INA CBGs tariffs, which are perceived as detrimental to hospitals. Research by Kasie et al. (2023) shows that the CRR value for each type of disease, inpatient swamp class, disease severity, length of treatment, and age of the patient is <100%, which means that the income from SSAH claims has not been able to cover the costs incurred by the hospital for the treatment of internal medicine inpatients at Firdaus Hospital. Although Firdaus Hospital is efficient according to CP (*clinical pathway),* the Cost Recovery Rate (CRR) value is still low, and SSAH claims are not able to cover the costs incurred by the hospital.

Research by Arfiani et al. (2020) found that the accumulated CRR in Government Hospitals is only 60%, which means that the INA-CBGs tariff is only able to cover 60% of the costs incurred by hospitals. The study also found differences in claims and INA DRGs/CBGs between patient age, gender, day of treatment, and severity. Cost control in the hospitals studied still uses the aggregate/total cost approach and has not used a case-by-case approach, so the cost control carried out is not optimal. The results of Yusuf et al.'s research (2023) show that the Caesarean Surgery Installation produces a CRR of 106%. Therefore, SSAH claims money can cover the operating costs of surgical installations.

Research by Rahayu et al. (2023) in three Indonesian public hospitals located in Aceh Province, Indonesia this study found that patient gender, age, LOS length of stay, severity, and bed treatment class have a positive significant effect on CRR in inpatient cases. In addition, this study also used questionnaires to elaborate on the perspective of managers and doctors in public hospitals on cost management systems and procedures in their hospitals. The results suggested that the CRR determinants can be used to improve cost management in Indonesian public hospitals through case evaluation and CRR prediction.

Research on the cost recovery rate of NHI patients is crucial for the sustainability of the NHI program. Both SSAH and hospitals need to understand whether the funding provided by SSAH is adequate to cover the healthcare service costs incurred by hospitals, ensuring that no party is disadvantaged in executing the NHI program. Studies on cost recovery rates assist hospitals in managing their resources more efficiently (Rahayu et al., 2023). By understanding the extent to which SSAH covers treatment costs, hospitals can better plan their resource use and budgets, reduce waste, and enhance productivity. Research into cost recovery rates can also help identify discrepancies in the quality of services provided to SSAH patients compared to those who pay privately. If a low-cost recovery rate indicates a decline in service quality, this should be addressed by the relevant parties.

Additionally, research on cost recovery can aid in improving policies and practices within hospitals, SSAH, and other related entities, thereby enhancing the efficiency, quality, and accessibility of healthcare services. The findings from cost recovery rate studies can serve as a basis for formulating more effective policy improvements. If there are issues with SSAH financing or implementation, this research can provide the necessary insights for refining the SSAH claims system.

According to the research mentioned above and the urgency of hospital cost recovery rates, the researcher aims to develop and further investigate the cost recovery rate at Hospital X in Sleman Regency, Yogyakarta. Hospital X has been selected as the research subject since 60% of its Revenue comes from NHI patients. Additionally, since 2021, Hospital X has upgraded its status to a Type B hospital. This change will affect the standards for healthcare service tariffs under the NHI program, which Hospital X follows, transitioning from tariffs used for Type C Private Hospitals to those for Type B Private Hospitals. Compared to previous studies, the novelty of this research lies in its focus on inpatient NHI patients in the outpatient department, which has the highest number of patients over one year.

According to previous studies, the highest number of NHI patients at Hospital X are found in the Internal Medicine, Neurology, Pulmonology, Cardiology, Obstetrics and Gynecology, and Surgery departments. This study will focus on NHI inpatient cases in the Respiratory (Pulmonology), Cardiology, and Obstetrics and Gynecology departments. The selection of these three departments is due to the high cost of care for patients in these areas. Additionally, this study employs a mixed methods approach, where the cost recovery rate for NHI inpatients in the Respiratory (Pulmonology), Cardiology, and Obstetrics and Gynecology departments at Hospital X will be further analyzed using qualitative methods to identify underlying issues and develop future strategies. These strategies aim to detect early signs and anticipate potential claim losses to prevent greater financial losses in the future. Therefore, the researcher is interested in investigating the cost recovery rate of NHI patients in inpatient services at Hospital X.

A case study on the cost recovery rate of NHI inpatient services will assist the hospital in managing its resources—such as labor, equipment, and facilities—to optimize the cost of NHI patient care. Additionally, it will help identify areas within the three departments where efficiency can be improved to reduce costs and maximize potential profits. Furthermore, the results of this cost recovery rate study are expected to serve as a basis for formulating more effective improvement policies.

According to the above phenomenon, the research questions (RQ) asked by the researcher are:

RQ$_1$: How is the cost *recovery rate (CRR)* calculated based on the type of case in NHI patients hospitalized at Hospital X?

RQ$_2$: How is the cost *recovery rate (CRR)* calculated based on the characteristics of inpatient NHI patients at Hospital X?

RQ₃: What are the policies and strategies used by Hospital X if there is a financial loss in providing services to inpatients with NHI?

Literature Review

According to Presidential Regulation of the Republic of Indonesia Number 82 of 2018 concerning health insurance, health insurance is a guarantee that provides health protection to ensure that participants receive health maintenance benefits and protection in meeting primary health needs. This guarantee is provided to every individual who has paid the Health Insurance Contribution or whose Health Insurance Contribution is paid by the Central Government or Local Government. Law No. 40 of 2004 concerning the Social Security Agency for Health (SSAH) stipulates, in Articles 2 and 3, that this guarantee aims to ensure that participants receive health maintenance benefits and protection in fulfilling their basic health needs. Article 17 of this Law regulates the funding sources for social security programs, as outlined in point 4, where contributions for social security programs for people experiencing poverty and those who are unable are paid by the government. Article 19 states that health insurance for low-income people is administered nationally based on social insurance principles.

Case-Based groups (CBGs) essentially have the exact definition of Diagnosis-Related Groups (DRGs), both of which are components of case-mix systems. Indonesian Case-Based Groups (INA-CBGs) are CBGs associated with tariffs calculated based on costing data in Indonesia and are implemented using the United Nations University Grouper (UNU-GROUPER). It differs from the previous INADRG system, which employed a commercial grouper from PT. 3M Indonesia. The United Nations University (UNU) is an institution under the United Nations with a priority to assist developing countries in achieving the Millennium Development Goals (MDGs) (Kemenkes RI, 2010). In this system, the cost of care is calculated based on the patient's final diagnosis during inpatient treatment at a hospital. The application of case-based groups for payment is based on the average costs incurred by several hospitals for a specific diagnosis; however, the cost of patient care for a given diagnosis may vary depending on the type of hospital (Pratama et al., 2021).

According to the Minister of Health of the Indonesian Republic Regulation Number 27 (2014) concerning Technical Guidelines for the Indonesian Case Base Groups (INA CBG) System, the categorization within INA-CBGs is based on a coding system derived from final diagnoses and procedures/treatments that constitute the service output, with ICD-10 used for diagnoses and ICD-9-CM for procedures/treatments. The categorization employs an information technology system in the form of the INA-CBG Application, resulting in 1,077 case groups consisting of 789 inpatient case groups and 288 outpatient case groups.

The cost recovery rate (CRR) is an efficiency measurement tool that aims to determine the extent to which hospital revenues are able to cover the costs incurred (Yusuf et al., 2022). Through CRR, it can be known whether the INA-CBG's tariff can cover the costs incurred by hospitals in serving NHI patients. Research by Arfiani et al. (2020) shows that

the accumulated CRR is only 60%, which means that the INA-CBGs tariff is only able to cover 60% of the costs incurred by hospitals. According to PSAK 23, Revenue is defined as the gross inflow of economic benefits arising from the everyday activities of an entity during a period, provided that this inflow results in an increase in equity that is not derived from contributions by equity investors. After subtracting operational costs, the revenue results in the company's profit. In this study, the hospital's Revenue is derived from services provided to NHI patients.

The research conducted by Kasie (2023) indicates that the CRR (Cost Recovery Rate) based on disease type, age, and inpatient care exceeds 100%, implying that SSAH revenue is insufficient to cover the costs incurred by Firdaus Hospital for the inpatient care of internal medicine patients. Research by Arfiani et al. (2020) examined the overall SSAH claim revenue and total costs for SSAH patients, revealing that the CRR was inadequate to cover the expenses incurred by hospitals for patient care. The distinction between this study and previous research lies in the objects and location of the research. This study employs descriptive qualitative analysis and compares diagnosis groups, thus allowing the results to reflect variations in CRR for each case.

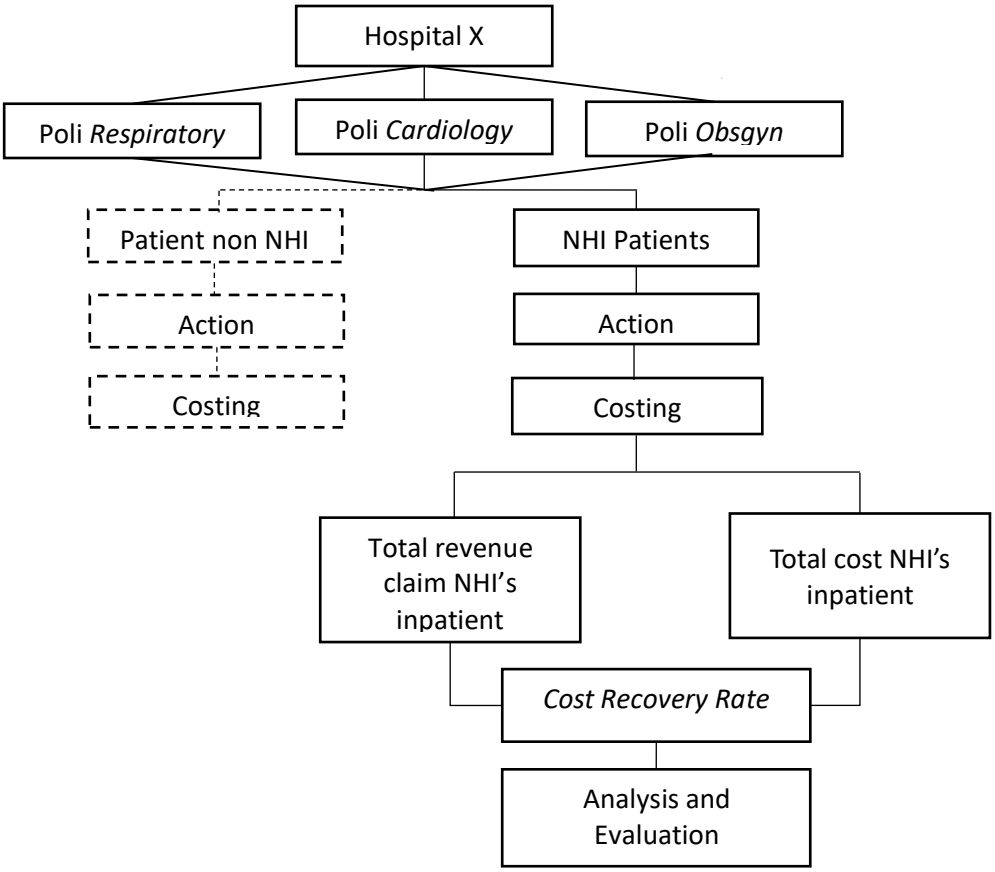

Figure 1 The framework for analyzing the cost recovery rate of inpatient patients

CRR can be utilized as a measurement tool to determine the efficiency of how well an organization's Revenue covers its expenses. An organization is considered ideal when the

CRR exceeds 1 or 100%. If the CRR equals 1 or 100%, the organization has not yet achieved a profit, as the Revenue generated equals the costs incurred. The framework for analyzing the cost recovery rate of inpatient patients in this study is as follows Figure 1.

Research Method

According to Creswell and Creswell (2022), mixed-methods research integrates qualitative and quantitative approaches. This study employed an explanatory sequential mixed-methods design with a case study approach. The explanatory sequential mixed-methods design used in this study used two phases. Phase one, the quantitative method, was used to calculate the CRR value in the Respiratory, Cardiology, and Obsgyn polyclinics based on the type of case and the characteristics of patient services. Phase two, the qualitative method, was used to explore information related to policies and strategies used by Hospital X if there was a financial loss in providing services to inpatients with national health insurance.

Furthermore, Creswell and Creswell (2022) explains that a case study is a research design in which the researcher investigates a particular phenomenon (case) within a specific time frame and context (such as a program, event, process, institution, or social group) and collects detailed and in-depth information using various data collection procedures over a certain period.

Hospital X was selected as the research object. The designation of the research object as "Hospital X" was based on a direct request from the institution itself. This measure was taken to maintain the privacy of the research subject and the researcher per research ethics (confidentiality aspect). The research location is situated in Yogyakarta. The case study focuses on inpatient services for NHI patients in 2023, specifically within the Respiratory (lungs), Cardiology (heart), and Obstetrics and Gynecology (reproduction and pregnancy) departments. According to the Case-Mix Main Groups (CMGs), these three departments are categorized under codes J, I, W, and O. The sample criteria used were: 1) NHI patients who did not choose to upgrade their service class, and 2) Patients who are not classified as unclaimed NHI insurance.

This study employed both primary and secondary data. Primary data were collected through interviews with key informants who were involved in or have knowledge related to the activities under investigation. The research subjects included 1) The Financial Manager of the Hospital, as the leader and decision-maker regarding hospital financial management; 2) The Head of Hospital Cost Determination, as the executor of hospital service cost/tariff setting; and 3) The Head of SSAH Claims, as the executor of SSAH claim submissions. Information obtained from these interviews was used to identify the factors determining indirect costs.

Interviews were used as a data collection method in this study. In-depth interviews were conducted following a structured interview guide and protocol. Secondary data were collected from documentation provided by Hospital X, including financial reports, reports

on direct and indirect costs, investment data, summaries of inpatient service costs for NHI patients, and summaries of inpatient service revenues for NHI patients. Using a cost recovery rate approach, these documents identified and analyzed hospital revenue and profit.

The researcher employed triangulation techniques to ensure data validity. Triangulation involves using external sources beyond the primary data for verification or comparison. The triangulation process included comparing interview data with documentary data, interview data between different informants, and documentary data between various sources. The research was conducted in five stages: planning, instrument preparation, data collection, data analysis, and conclusion. This study used an explanatory sequential mixed-method design, where quantitative data was analyzed according to the predetermined design, followed by qualitative data collection and analysis. In data interpretation, the researcher explained how qualitative data analysis elucidates the findings from quantitative research. The stages of data analysis in this study were as follows: 1) The researcher Categorized the total Revenue and total cost data for each case type within the selected Case-Mix Main Groups (CMGs) (J, I, W, O); 2) The researcher Calculated the Cost Recovery Rate (CRR) for each case type within the selected CMGs using the formula:

$$\text{CRR} = \frac{\text{Total Pendapatan}}{\text{Total Pengeluaran}} \text{X } 100\%$$

A case is considered ideal (profitable) if CRR is greater than one (1) or greater than 100%. When CRR equals 1 or 100%, the hospital has not yet achieved a profit, as the Revenue generated equals the costs incurred. Analyze the CRR results for each type of case within the selected Case Mix Groups (CMGs) to identify which case types are profitable or unprofitable for the hospital in each department. Futuremore, analyze the CRR results for each case type within the selected CMGs to determine which case types and departments contribute most to the hospital's profitability or losses.

Qualitative interview data related to the hospital's policy on cost-setting and control for inpatient NHI services and the hospital's Revenue and profits or losses will be analyzed in three stages: data reduction, data presentation, and conclusion drawing.

Result and Discussion

Since 2014, Hospital X has been participating in the SSAH program. The evolution of Hospital X from a Type C to a Type B hospital has significantly impacted its Revenue, particularly from NHI patients. The SSAH claim cycle is conducted in stages to ensure that the claims submitted by the hospital adhere to the regulations. The claim process consists of several phases, including the validation/submission phase, verification phase, and approval phase. Financing for SSAH patients is crucial for the hospital to ensure that Hospital X has sufficient funds to cover operational costs, including those associated with

NHI patients. SSAH claims are disbursed quarterly, which necessitates effective financial management. The medical records department manages the coding and claim submission process at Hospital X. The coding is based on the patient's final diagnosis.

The billing or submission process to SSAH utilizes the predetermined amounts in the e-claim INA-CBGs system. The claim amounts approved by SSAH are those specified in the e-claim INA-CBGs. If the entire claim is approved, SSAH reimburses the hospital for the treatment expenses incurred. However, if any documentation is incomplete, part of the claim is withheld until the hospital provides the necessary documentation, which will be paid in the subsequent billing cycle.

In 2023, the total number of inpatients under the NHI program in the Respiratory, Cardiology, Obstetrics, and Gynecology departments was 4,116. Based on the data above, it can be observed that most inpatients under the NHI scheme were treated in the Respiratory Clinic. Within the INA-CBG's system, there are 50 types of cases for the Respiratory System Groups (code J), 95 types of cases for the Cardiovascular System Groups (code I), 44 types of cases for the Female Reproductive System Groups (code W), and ten types of cases for the Deliveries Groups (code O). The detailed breakdown of patient numbers and the types of cases that occurred at Hospital X during the year 2023 are presented in Table 1.

Table 1 Number and Case Types of Inpatient NHI Patients in 2023 at the Respiratory, Cardiology, and Obstetrics & Gynecology Departments

No	Departments	Patients	Case Type
1	*Respiratory*	2,084	16
2	*Cardiology*	1,534	19
3	*Obsgyn*	498	32
	Total	4,116	67

Hospital revenue is partly derived from SSAH payments for hospital claims. In 2023, the highest income obtained by the Respiratory poly is Rp 23.067.271.800, while the lowest income is obtained by the Obsgyn poly, which is Rp 2.535.384.500. The highest cost is at the Cardiology poly, which is Rp 24.084.205.389. Calculating the Revenue Ratio (CRR) helps assess the ability of SSAH rates received by hospitals to cover the costs of patient treatment as determined by hospital tariffs. A CRR greater than 100% indicates that the hospital will realize a profit (surplus/positive difference) from SSAH payments, as the total hospital claims are less than the total SSAH tariffs. Conversely, a CRR of less than 100% indicates a loss (deficit/negative difference) for the hospital because the total hospital claims exceed the tariffs paid by SSAH. The results of the CRR analysis for Inpatient NHI Patients in 2023 in the Respiratory, Cardiology, Obstetrics, and Gynecology departments can be found in Table 2.

Table 2 CRR Analysis for NHI Inpatient Patients in 2023 at Hospital X in the Respiratory, Cardiology, and Obstetrics & Gynecology Departments

No	Descriptions	Departments		
		Respiratory	*Cardiology*	*Obsgyn*
1	SSAH's Revenue Claim (IDR)	23,067,271,800	22,972,120,000	2,535,384,500
2	Hospital Service Cost (IDR)	16,138,322,553	24,084,205,389	3,173,293,843
3	CRR (%)	143	95	80
4	Number of case types with CRR>100%	10	8	14
5	Number of case types with CRR<100%	6	11	18

Based on Table 2, it can be observed that in 2023, the Respiratory Clinic achieved a profit with a CRR (Cost Recovery Rate) of 143%, indicating a surplus of 43% from the inpatient services for NHI patients at the Respiratory Clinic. Conversely, the Cardiology and Obstetrics and Gynecology (Obsgyn) Clinics experienced losses, with CRR values of 95% and 80%, respectively. The operational losses of 25% incurred by the Cardiology and Obsgyn Clinics can be offset through cross-subsidization with the profits generated by the Respiratory Clinic, resulting in an overall operational profit of 18% across these three clinics. This result aligns with the statement made by Mrs. S, the financial manager of Hospital X:

> "*When we calculate each case individually, we can see which services are profitable and which are not. However, the collective monthly SSAH billing for all types of services remains positive globally. We also provide monthly reports to management on loss-making diagnoses.*"

The reports provided to management are intended for follow-up actions to minimize and evaluate loss-making services. In addition to cross-subsidization among different cases, Revenue is also generated from the difference in costs paid by patients to the hospital. For instance, if an obstetrics patient requests an upgrade in class, the difference in class upgrade will increase the hospital's Revenue.

Each clinic was then examined in greater detail concerning the cases that resulted in profits and losses (see Table 3). At the Respiratory Clinic, 10 out of 16 case types generate profits for Hospital X. In contrast, the Cardiology Clinic has only eight profitable case types, with the remaining 11 representing a financial burden for Hospital X. At the Obsgyn Clinic, most 18 cases incur losses, while 14 cases yield a surplus.

CRR can be calculated based on the characteristics of inpatient services for NHI patients in the respiratory, cardiology, and obstetrics departments. The severity level is a measure of the severity of the illness, influenced by the presence of comorbidities or complications during the treatment period. The severity level is one of the factors that cause variations in INA-CBG claim rates according to the severity level. The class of care utilized by the patient can determine the level of facilities provided. Classes 1, 2, and 3 have different rights and obligations based on the amount of contributions paid. Each class has distinct care facilities, such as room capacity, specialist doctor options, and additional services.

Length of stay refers to the number of days a patient is hospitalized from admission to discharge. The calculation of CRR values based on patient characteristics in each department is presented in Tables 3, 4, and 5.

Table 3 Analysis of CRR Based on the Characteristics of NHI Inpatient Respiratory Service Patients

Characteristic	SSAH Revenue Claim (IDR)	Hospital Service Cost (IDR)	Margin (IDR)	Average Margin (IDR)	CRR (%)
Severity Level					
I (n=1514)	7,159,430,600	6,162,995,897	996,434,703	658,147	116
II(n=250)	15,915,677,200	2,780,119,280	13.135.557.920	52,542,232	572
III(n=230)	12,412,525,700	7,208,364,876	5,204,160,824	22,626,786	172
Average					287
Class					
1 (n=440)	5,784,737,000	4,079,092,749	1,705,644,251	3,876,464	142
2(n=451)	3,881,335,800	2,548,324,087	1,333,011,713	2,955,680	152
3(n=1193)	13,409,035,000	9,524,063,217	3,884,971,783	3,256,473	141
Average					145
LOS					
>5(n=954)	16,376,114,800	11,980,312,361	4,395,802,439	4,607,759	137
<5(n=1130)	6,698,993,000	4,171,167,692	2,527,825,308	2,237,014	161
Average					149

Table 3 shows that severity levels I, II, and III in the Respiratory Clinic all exhibit a CRR value exceeding 100%. Similarly, the CRR values based on inpatient class (Class 1, 2, 3) and length of stay (LOS) greater than 5 days or less than 5 days all exceed 100%. The result indicates that based on service characteristics, the Respiratory Clinic demonstrates strong financial performance, as it can generate optimal profit for the hospital.

Table 4 Analysis of CRR Based on the Characteristics of NHI Inpatient *Cardiology Service* Patients

Characteristic	SSAH Revenue Claim (IDR)	Hospital Service Cost (IDR)	Margin (IDR)	Average Margin (IDR)	CRR (%)
Severity Level					
I (n= 834)	9,069,724,700	11,239,509,851	-2,169,785,151	-2,601,661	81
II (n=356)	6,158,235,100	5,979,430,899	178,804,201	502,259	103
III (n=344)	7,744,160,200	6,865,264,639	878,895,561	2,554,929	113
Average					99
Class					
1 (n=377)	6,443,898,200	6,438,862,588	5,035,612	13,357	100
2 (n=231)	3,466,091,900	3,689,598,343	-223,506,443	-967,560	94
3 (n=926)	13,062,129,900	13,955,744,458	-893,614,558	-965,027	94
Average					96
LOS					
<5 (n=894)	13,013,333,300	13,232,739,480	-219,406,180	-245,421	98
>5 (n=640)	9,958,786,700	10,851,465,909	-892,679,209	-1,394,811	92
Average					95

In the Cardiology Department (see Table 4), it can be observed that only severity levels I and II have a CRR value exceeding 100%. The remaining levels have CRR values below 100%. When examining the average CRR based on each service characteristic, all are

above 90%. This result indicates that the Cardiology Department needs to optimize its service costs further to increase its CRR value to above 100%.

Table 5 Analysis of CRR Based on the Characteristics of NHI Inpatient Obsgyn Service Patients

Characteristic	SSAH Revenue Claim (IDR)	Hospital Service Cost (IDR)	Margin (IDR)	Average Margin (IDR)	CRR (%)
Severity Level					
I (n=252)	980,917,300	1,273,791,770	-292,874,470	-1,162,200	77
II (n=72)	475,733,200	664,087,434	-188,354,234	-2,616,031	72
III (n=26)	72,707,700	65,778,630	6,929,070	1,154,845	111
Average					86
Class					
1 (n=58)	315,627,300	445,406,754	-129,779,454	-2,237,577	71
2 (n=134)	604,286,000	823,651,566	-219,365,566	-1,637,056	73
3 (n=158)	609,444,900	734,599,514	-125,154,614)	-792,118	83
Average					76
LOS					
>5 (n=43)	224,169,800	351,158,414	-126,988,614	-2,953,224	64
<5 (n=307)	1,305,188,400	1,652,499,420	-347,311,020	-1,131,306	79
Average					72

Based on Table 5, Severity Levels II and III in the Obsgyn department show a negative discrepancy between the hospital's charges and the INA-CBG claim rates, resulting in a CRR value of less than 100%. However, Severity Level III exhibits a positive discrepancy, leading to a CRR value of 111%, indicating that the hospital can cover the costs incurred from INA-CBG claim payments. Regarding the characteristics of the care class, LOS (Length of Stay) and Procedures generate a negative discrepancy between the hospital's charges and INA-CBG rates, resulting in a CRR value of less than 100%. Based on these characteristics, it can be stated that the hospital has not yet managed to cover the costs incurred from INA-CBG claim payments.

Hospital charges exceed INA-CBG rates significantly for stays of less than five days and more than one procedure. This situation is compounded by the actions performed and the length of stay. Even with stays of less than five days, there are cases involving surgical procedures, such as cesarean sections, with 127 patients from January to November 2023. As noted by Mrs S, the supervisor of cost and debt management:

> *"Obstetricians determine whether a patient can use SSAH for a cesarean section based on the urgency level. Cesarean section costs are quite high due to the surgical procedure. For example, the cesarean cost is Rp 15,000,000, while SSAH covers only Rp 6,000,000, leaving the patient to cover the difference. Additionally, there are accommodation costs during the treatment. The discrepancy arises due to the low INA-CBGs rate."*

When multiple procedures are performed, the hospital incurs greater costs than those covered by SSAH. The more procedures provided, the higher the costs incurred.

Procedures performed at Hospital X for obstetric patients are based on doctors' orders. As mentioned by Mrs. S:

> *"The hospital does not yet have a clinical pathway, so each procedure is based on doctors' orders. We are currently in the process of developing a clinical pathway, which is challenging and involves all units."*

A clinical pathway is a comprehensive planning concept that outlines every step of patient care based on medical, pharmaceutical, nursing, nutritional, and other healthcare standards, with evidence-based results and measurable outcomes over a specific period during a hospital stay (Directorate General of Nutrition and Maternal and Child Health, 2014). Clinical pathways are multidisciplinary management plans outlining steps in providing care and offering clear guidelines to healthcare providers. The presence of a clinical pathway can predict the length of patient stay and the costs required, thus preventing costs from exceeding SSAH coverage.

Hospital Strategy in Quality and Cost Control in Inpatient NHI Patient Services

Along with the difference in hospital rates with INA-CBGs rates, the management of Hospital X has carried out control and strategies to control SSAH patient financing. In addition to cross-subsidizing, hospitals continue to strive to increase the number of high SSAH claims, evaluate rates gradually, and develop clinical pathways. It is as explained by Mrs. M, the financial manager of Hospital X:

> *"The strategy is to increase cases that have large SSAH claims. If it was referred in the past due to limited facilities, now we can overcome it ourselves with the expectation that the income is higher than that of still type C. The special equipment used has its top-up value or replacement from SSAH apart from hospitalization costs."*

There is special equipment that has its claims, so it is different from the service fee. The special equipment borne by SSAH is the equipment used to assist patients in undergoing treatment. This particular equipment usually has a much more expensive price. Therefore, Hospital X's strategy is to increase cases that have a higher SSAH claim value so that it will help increase the income of SSAH patients.

Hospital X is in the process of revising the tariff. The tariff revision that has been carried out is only for the type of childbirth case. Mrs M again explained it as the financial manager of Hospital X:

> *"Since changing to type B, the hospital has not revised the tariff. The tariff revision is carried out gradually but not simultaneously. Therefore, they only see tariffs that have the potential to cause many losses. Thus, we revise the tariff in accordance with the proposals of the units concerned and based on the costs at other hospitals or according to the market. Rates in childbirth cases have recently changed".*

Based on observations in the field, Hospital X has also not implemented *a clinical* pathway. The availability of a clinical pathway is crucial for coders in encoding SSAH patient costs for obstetric cases. Without a clinical pathway, coders base encoding on the patient's final diagnosis. As reiterated by Mrs. S:

> *"The encoding process is based on the final diagnosis. Coders coordinate with the doctors who provided the service if they encounter difficulties diagnosing the disease."*

Accurate diagnosis coding impacts the precision of INA-CBG rates in the software, thus determining the discrepancy between hospital charges and INA-CBG rates, which will depend on the coding accuracy. The absence of *a clinical pathway* makes Hospital X take action in accordance with the doctor's orders, and this is prone to inefficiency in service costs.

According to research results, Poly Respiratory has a CRR value of more than 100%. Cardiology and Obsgyn clinics have CRR values below 100%. Therefore, hospitals implement a policy of cross-subsidization of service costs. Severity levels or the degree of severity cause discrepancies between the hospital's charges and INA-CBG claims because severity has a significant impact on potential complications. Healthcare services for a disease must adapt strategies and types of care based on the severity level. Healthcare provision includes medication or rehabilitation services tailored to the disease's severity to achieve optimal outcomes.

This study supports the research conducted by Kasie (2023), which demonstrates differences in the hospital's charges compared to INA-CBGs claim rates based on the severity of the illness. For Severity Levels I and II, the CRR values are negative, while for Severity Level III, the CRR value is positive. The severity level indirectly affects the discrepancy between hospital charges and INA-CBG claim rates.

The characteristics of inpatient care indicate a negative discrepancy with CRR values of less than 100%. This finding aligns with research by Arfiani et al. (2020), identifying the length of stay contributing to discrepancies between INA-CBG rates and hospital charges. The study found that obstetrics services with longer lengths of stay have lower rates, whereas stays of less than five days have higher rates due to more complex procedures.

The absence of a clinical pathway at Hospital X does not help reduce care costs across all types of care. For services in the cardiology and obstetrics departments, the length of stay affects the costs incurred by the hospital. Longer patient stays result in higher accommodation costs, including room and medication expenses. Research by Fitria et al. (2021) revealed that the implementation of *clinical pathways* has proven to be effective in improving service quality and patient satisfaction. It can minimize the length of care and actual hospital expenses for cesarean section patients, resulting in more efficient utilization of clinical pathways. A similar study was conducted by (Prandyantara et al., 2023), which concluded that the implementation of clinical *pathways* leads to the certainty of a plan for patient management.

The implication of this research is that hospitals really need to develop clinical pathways for each patient service. The use of *clinical pathways* can improve efficiency and quality, control health service costs, and reduce complications and length of hospitalization. Hospitals also need to evaluate service rates periodically and adjust them to the INA-CBG rates. In addition, CRR analysis also needs to be carried out by hospitals periodically to measure the effectiveness of service rates

Conclusion

This study aims to analyze the cost recovery rate of inpatients under the National Health Insurance (NHI) program at Hospital X in Yogyakarta. According to the research findings, it can be concluded that the Cost Recovery Rate (CRR) for NHI inpatient patients in the Respiratory Clinic shows an overall CRR of 143%. In contrast, the CRR values for the Cardiology, Obstetrics, and Gynecology (Obsgyn) Clinics are 95% and 80%, respectively. Cross-subsidization from other clinics with positive or profitable CRR values can be implemented to ensure that the hospital's Revenue from SSAH claims remains positive overall. The operational losses in the Cardiology and Obsgyn Clinics, amounting to 25%, can be offset by the profits generated by the Respiratory Clinic, resulting in an overall operational profit of 18% for the three clinics.

The CRR for NHI inpatient patients in the Respiratory Clinic exceeds 100%, indicating that this clinic performs well financially, maximizing profitability for the hospital. This performance is attributed to severity level, class of care, and length of stay (LOS). It contrasts with the CRR values for the Cardiology and Obsgyn Clinics, which are below 100%, suggesting that these clinics need to enhance their cost-efficiency to achieve a CRR exceeding 100%. The severity level impacts complications and associated costs, while the class of care affects costs due to the absence of a clinical pathway that controls expenses according to the class. LOS, or the duration of stay, affects accommodation costs.

The cost control strategies implemented by Hospital X are not yet fully effective. Hospital X's strategy involves increasing cases with higher INA-CBG claim values. Specialized equipment in Hospital X incurs additional costs or replacements from the INA-CBGs rates. Cross-subsidization among case types is conducted to ensure that cases with positive cost differences cover those with negative differences. Hospital X is revising its rates gradually as part of its cost control efforts. The ongoing cost control strategy involves developing a clinical pathway, with specialists and medical personnel preparing it. A clinical pathway is crucial for the hospital as a cost-control tool.

Hospital X should maximize the revision of tariff calculations to enhance the effectiveness and efficiency of financial management, as it has only revised one service, delivery packages, since its upgrade from type C to type B Hospital. Hospital X should also develop and implement clinical pathways for all services across each clinic, particularly in the Cardiology and Obsgyn Clinics, where CRR values are below 100%. The limitations of this research are that it only has one hospital and focuses on NHI inpatient patients in the Respiratory, Cardiology, and Obsgyn Clinics, so that the results of the study cannot be

generalized to other hospitals. Future research should be expanded to more hospitals and clinics, especially those that already have clinical pathways, to compare the effectiveness and efficiency of NHI patient services.

Acknowledgments

Acknowledgments are extended to all parties who have assisted and supported the smooth execution of this research, particularly to the Majelis Pendidikan Tinggi PP Muhammadiyah through the RisetMu program as the research grant provider

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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