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Cost Analysis of Parturition with Sectio Caesarea at PKU Muhammadiyah Yogyakarta, Indonesia Hospital Based on INA-CBG's Tariff in 2023

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Cost analysis;
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Average actual cost;
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BPJS Kesehatan

ABSTRACT

The 2018 Riskesdas results showed that the prevalence of delivery by sectio caesarea in DIY was 23.1%. The high cost of *sectio caesarea* hinders access to public health, so the government implemented the INA-CBG's tariff. This study is the first to evaluate the INA-CBG's tariff based on the Permenkes RI Number 3 of 2023 for inpatient *sectio caesarea* delivery. This study aims to determine the difference between the cost of sectio caesarea delivery and the INA-CBG's tariff based on Permenkes RI Number 3 of 2023. Through this research, hospitals are expected to evaluate their services so that the costs of cesarean sections are under the INA-CBG's tariff. In addition, this research can serve as an evaluation of the INA-CBG's tariff for the government. This study used observational research methods and a cross-sectional approach. Data were obtained retrospectively by tracing medical records and treatment cost data of sectio caesarea patients from January to September 2023. Data were analyzed by descriptive analysis, one-sample t-test and one-sample Wilcoxon methods. The results of this study showed that the average actual cost was greater than the INA-CBG's rate, with significant differences in patients with class I code O-6-10-I, class II codes O-6-10-I and O-6-10-II, and class III code O-6-10-II, so that PKU Muhammadiyah Yogyakarta Hospital suffered losses.

Kata kunci:
Analisis biaya;
Sectio caesarea;
Rata-rata biaya riil;
Tarif INA-CBG's;
BPJS Kesehatan

Hasil Riskesdas 2018 menunjukkan bahwa prevalensi persalinan dengan sectio caesarea di DIY sebesar 23,1%. Tingginya biaya sectio caesarea menghambat akses kesehatan masyarakat, sehingga pemerintah menerapkan tarif INA-CBG's. Penelitian ini merupakan penelitian pertama yang mengevaluasi tarif INA-CBG's berdasarkan Permenkes RI Nomor 3 Tahun 2023 untuk persalinan sectio caesarea rawat inap. Penelitian ini bertujuan untuk mengetahui perbedaan antara rata-rata biaya riil persalinan sectio caesarea dengan tarif INA-CBG's berdasarkan Permenkes RI Nomor 3 Tahun 2023. Melalui penelitian ini diharapkan rumah sakit dapat melakukan evaluasi pelayanan sehingga biaya sectio caesarea sesuai dengan tarif INA-CBG's. Disamping itu, penelitian ini juga dapat menjadi evaluasi tarif INA-CBG's bagi pemerintah. Jenis penelitian ini menggunakan metode penelitian observasional dengan pendekatan cross sectional. Data diperoleh secara retrospektif dengan menelusuri data rekam medis dan data biaya perawatan pasien sectio caesarea pada periode Januari—September 2023. Data dianalisis dengan analisis deskriptif, serta metode one sample t-test dan one sample wilcoxon. Hasil penelitian ini menunjukkan bahwa rata-rata biaya riil lebih besar dari tarif INA-CBG's dengan perbedaan yang signifikan pada pasien kelas I kode O-6-10-I, kelas II kode O-6-10-I dan O-6-10-II, serta kelas III kode O-6-10-II, sehingga Rumah Sakit PKU Muhammadiyah Yogyakarta mengalami kerugian.

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INTRODUCTION

Sectio Caesarea is one of the delivery procedures to extract the baby through an incision in the abdomen (laparotomy) and uterus (hysterotomy) (Zuleikha et al., 2022). In Indonesia, the number of deliveries by sectio caesarea reached 17.6%, while in DIY it was 23.1% (Kemenkes RI, 2018). The prevalence of sectio caesarean delivery in Indonesia is quite high when compared to the ideal standards set by the World Health Organization (WHO), which is around 10-15% (WHO, 2015).

The cost of a cesarean section delivery in Indonesia ranges from IDR11,000,000 to over IDR50,000,000. This cost depends on the hospital, class chosen, and facilities provided (Yusuf et al., 2022). The high cost of health care creates problems for the community in obtaining health services. One of the government's efforts to address this problem is by implementing the JKN (National Health Insurance) program as an implementation of public health insurance (Kemenkes RI, 2016).

The Indonesian Case Base Groups (INA-CBGs) tariff in the JKN program uses a prospective payment mechanism in which tariffs are set in advance before health services are provided to patients. *BPJS Kesehatan* will reimburse advanced referral health facilities for service packages under the INA-CBG's system. These claims are based on categories of disease diagnoses and procedures that refer to the International Classification of Diseases (ICD) (Kemenkes RI, 2023).

Considering the high prevalence and cost of *partus sectio caesarea* treatment, this study is important. A previous study by Zuryatinnisa (2017) at PKU Muhammadiyah Yogyakarta Hospital found that the average real cost of *partus sectio caesarea* exceeded the INA-CBG tariff set in Permenkes RI Number 59 of 2014. However, since then, the government has revised the INA-CBG tariff through Permenkes RI Number 3 of 2023.

Until now, no studies have evaluated whether this most recent adjustment to the INA-CBG tariff aligns with actual hospital costs in practice, particularly in referral hospitals such as PKU Muhammadiyah Yogyakarta. This creates a gap in the literature regarding the financial adequacy of government health financing schemes in the context of rising healthcare costs. Therefore, this study aims to evaluate the most recent INA-CBG's tariff to determine how much the average real cost of a *partus sectio caesarean section* at PKU Muhammadiyah Yogyakarta Hospital differs from the INA-CBG's 2023 tariff, and to assess what improvements the hospital has achieved under the new regulation.

RESEARCH METHOD

This study was conducted after PKU Muhammadiyah Hospital issued an ethics permit with number 00237/SRIP/KEP-PKU/IX/2023. This study used observational research methods and a cross-sectional approach. Data collection was done using a retrospective method by taking medical record data and detailed data on the cost of treatment of partus sectio caesarea patients registered in January–September 2023.

The sample used in this study was taken by the total sampling method, which included the entire population of partus sectio caesarea patients. The inclusion criteria included partus sectio caesarea patients participating in *BPJS Kesehatan* classes I, II, and III at PKU Muhammadiyah Yogyakarta Hospital with INA-CBG's codes O-6-10-I (mild sectio caesarea), O-6-10-II (moderate sectio caesarea), and O-6-10-III (severe sectio caesarea) in the 2023 period,

patients with complete medical record data that could complete the calculation of the cost component. The exclusion criteria for this study were patients who were declared dead while undergoing partus with sectio caesarea, patients with forced discharge status or at their request, and patients who moved class of care.

The research instruments included medical record documents, cost data documents of *BPJS Kesehatan* participant patients during partus procedures with sectio caesarea, INA-CBG's rates based on Permenkes RI Number 3 of 2023, and logbooks as a means of recording medical records and cost data of partus sectio caesarea patients.

The collected data were then processed and analyzed using descriptive statistics to determine the average cost of partus sectio caesarea for inpatients participating in *BPJS Kesehatan*. Descriptive analysis was also conducted to determine the suitability between the average cost of partus sectio caesarea of inpatients participating in *BPJS Kesehatan* with INA-CBG's tariffs based on Permenkes RI Number 3 of 2023. Meanwhile, to analyze the difference in the average actual cost of partus sectio caesarea of inpatients participating in *BPJS Kesehatan* with INA-CBG's tariffs based on Permenkes RI Number 3 of 2023, using the one-sample t-test method on normally distributed data and using the one-sample Wilcoxon test on non-normally distributed data.

RESULTS AND DISCUSSION

Characteristics of Sectio Caesarea Patients at PKU Muhammadiyah Hospital Yogyakarta

During January to September 2023, 42 patients with cesarean section at PKU Muhammadiyah Yogyakarta Hospital fit the inclusion criteria. The characteristics of cesarean section patients are displayed in Table 1.

Table 1. Age Characteristics of Caesarea Patients

Age Range	Number of patients	%
< 20 years old	0	0
20–35 years old	32	76
> 35 years old	10	24
Total	42	100

Table 1 displays that the highest percentage of patients who underwent sectio caesarea were patients of reproductive age for healthy reproduction between the ages of 20-35, with a percentage of 76%. Pregnancies in old reproductive age at the age of > 35 amounted to 24%, while in young reproductive age or age < 20 years, there were no patients.

The age group of 20-35 years is a safe age to undergo a cesarean section. Still, mothers at that age can also undergo delivery by cesarean section due to other factors, such as factors of maternal health conditions that are not possible at that age, one of which is bleeding during pregnancy and physical or psychological stress that can make mothers finally deliver prematurely and experience labor complications. Complications that may develop throughout pregnancy can also have an impact on how labor progresses, so that *sectio caesarea* is considered the best method for delivering the fetus (Zuryatinnisa, 2017).

The findings align with Juliathi et al. (2021) that most pregnant women who undergo *sectio caesarea* are aged 20-35(Fegita et al., 2022). Amir (2020) also found that the age of the mother who had the most caesarean sections was a low-risk age (20-35 years), the study also

stated that age is not a determining factor for caesarean section but other factors are stronger to influence caesarean section (Juliathi et al., 2021).

From this study, there were several primary diagnoses of caesarean section patients. The primary diagnosis is the final diagnosis determined by the doctor on the last day of treatment, with the criteria of using the most resources or the longest treatment days or causing the patient to receive further examination and treatment (Amir, 2020). The characteristics of the primary diagnosis of cesarean section patients can be seen in Table 2.

Table 2. Characteristics of Primary Diagnosis of Sectio Caesarea Patients

Diagnosis	Number of patients	%
Severe preeclampsia	10	24%
Placenta previa	8	19%
Premature rupture of membranes	8	19%
Transverse and oblique lie	3	7%
Failed trial of labor	3	7%
Elective SC	3	7%
Fetal distress	2	5%
Premature	1	2%
Unspecified maternal hypertension	1	2%
Solusio placenta	1	2%
IUGR (*Intrauterine Growth Restriction)*	1	2%
Oligohydramnios	1	2%
Total	42	100%

Table 2 shows that the highest primary diagnosis of cesarean section was severe Preeclampsia at 24%. Preeclampsia is one of the complications in pregnancy that causes severe pain, long-term disability, as well as maternal, fetal, and neonatal mortality. Pregnancy with pre-eclampsia is classified as a high-risk pregnancy because pre-eclampsia is the cause of 30%-40% of maternal deaths and 30%-50% of perinatal deaths (Zainiyah & Harahap, 2023). Severe preeclampsia is a condition when blood pressure >160/110 mmHg and followed by proteinuria >5 grams within 24 hours. The condition of severe preeclampsia causes the blood vessels to become very narrow so that vaginal delivery cannot be done, because if too much straining during labor will force the narrow blood vessels to widen, increasing the risk of rupture of blood vessels (Siagian et al., 2023).

The second and third highest primary diagnoses of cesarean delivery were placenta previa and premature rupture of membranes at 19% each. Placenta previa is a condition where the placenta is abnormally located in the lower segment of the uterus, which is normally in the upper segment. This condition will cover part or all of the birth canal, complicating the birth process. In the state of placenta previa, pregnant women have indications to perform cesarean delivery, because the abnormal placenta can cause fetal abnormalities in the womb if not handled properly (Kesuma & Yudhi Iqbal, 2024).

Premature membrane rupture is when the amniotic membrane ruptures prematurely without signs of labor (in partu). This situation occurs due to a premature cervix opening, which causes the tissue that supports the amniotic membrane to rupture spontaneously. If this condition is not treated immediately, it can increase maternal perinatal morbidity and mortality which can be caused by infection, where the amniotic membrane which is a barrier

to the entry of germs that cause infection is no longer there so that it can be dangerous for the mother and fetus (Siagian et al., 2023).

Treatment Cost Analysis

Patients were categorized by treatment class and INA-CBG's code to determine the average actual cost of each class in treating partus sectio caesarea patients. This categorization was done to obtain a more detailed and structured picture of the real cost burden per class and to support evaluating the effectiveness and efficiency of the INA-CBG's financing system. Class I, II, and III patients only consisted of O-6-10-I and O-6-10-II codes, as no patients had O-6-10-III codes. A summary of the average cost components of partus sectio caesarea is shown in Table 3.

Table 3. The Actual Cost Components of Sectio Caesarea

Cost Variable	Average Cost											
	Class I				Class II				Class III			
	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%
	O-6-10-I*)	n (4)	O-6-10-II**)	n (1)	O-6-10-I	n (8)	O-6-10-II	n (12)	O-6-10-I	n (4)	O-6-10-II	n (13)
Non-Surgical Procedures	287.500	3,01	23.000	0,24	359.125	4,42	229.167	2,48	135.000	2,21	199.846	2,99
Surgical Procedures	4.917.975	51,45	5.144.500	53,30	4.167.431	51,28	4.259.617	46,07	2.894.238	47,37	2.938.369	44
Consultation	351.250	3,67	200.000	2,07	303.750	3,74	466.667	5,05	248.125	4,06	336.154	5,03
Nutrition	-	0	-	0	-	0	-	0	-	0	1.923	0,03
Nursing	289.375	3,03	340.000	3,52	257.731	3,17	317.483	3,43	297.600	4,87	360.173	5,39
Support	-	0	-	0	-	0	15.333	0,17	32.000	0,52	3.538	0,05
Radiology	147.998	1,55	49.000	0,51	57.875	0,71	143.415	1,55	185.000	3,03	160.231	2,40
Laboratory	588.500	6,16	748.500	7,76	624.213	7,68	584.467	6,32	620.625	10,16	490.931	7,35
Blood Services	204.750	2,14	234.000	2,42	117.000	1,44	160.042	1,73	117.000	1,91	320.038	4,79
Room	1.264.625	13,23	1.009.500	10,46	782.063	9,62	1.309.083	14,16	478.250	7,83	554.385	8,30
Medicine	1.350.408	14,13	1.489.600	15,43	1.339.438	16,48	1.284.550	13,89	1.027.875	16,82	1.100.554	16,48
BMHP	24.250	0,25	159.000	1,65	64.000	0,79	190.792	2,06	23.750	0,39	117.231	1,76
Equipment Rental	131.550	1,38	254.100	2,63	54.663	0,67	285.375	3,09	50.400	0,82	94.246	1,41
Total	9.558.180	100	9.651.200	100	8.127.288	100	9.245.990	100	6.109.863	100	6.677.619	100

*) O-6-10-I is the code for minor sectio caesarea

**) O-6-10-II is the code for moderate sectio caesarea

The largest costs in class I, II, and III patients with O-6-10-I codes and O-6-10-II codes lie in the components of surgical procedures, laboratories, rooms, and medicines. Surgical procedure costs include several things, such as anesthesia procedures, SC surgical procedures, and procedures involving pediatric specialists, resulting in these high costs. In addition, the indications and complications experienced by patients can also affect laboratory costs, because the more complications, the more laboratory tests will be carried out to determine the patient's condition, which will increase laboratory costs. Likewise, the difference in complaints will impact the actions given to patients because patients will need more medicines, resulting in high medicine costs. The number of complications, severity, and selection of therapy will then affect the hospitalization time and will affect room costs (Mildawati & Faizah, 2020; Saputera et al., 2020).

Differences can influence the amount of medicine costs in conditions or patient complaints. However, there are medicines that all sectio caesarea patients need, namely antibiotics and analgesics. The most widely used type of antibiotic is cephalosporin antibiotics, namely cefazolin (44%). In this hospital, cefazolin is used before surgery to prevent patients

from being infected with bacteria, so the use of cefazolin as a prophylactic antibiotic is under the guidelines for antibiotic use from Permenkes RI Number 28 of 2021 (Kemenkes RI, 2021). The most widely used type of analgesic was ketorolac (26%). According to ACOG (2025), the safe and effective use of pain therapy in post-cesarean section mothers includes acetaminophen and NSAIDs. So the use of analgesics in cesarean section patients at PKU Muhammadiyah Yogyakarta Hospital is under ACOG recommendations (2018) because it uses NSAIDs in the form of ketorolac (ACOG, The American College of Obstetricians and Gynecologists, 2025).

The discrepancy between actual costs and INA-CBG's tariff can be seen from the average costs patients incur during hospitalization. After that, the actual costs are compared with INA-CBG's tariff depending on severity and class. The difference between actual costs and INA-CBG's tariff can be seen in Table 4.

Table 4. Differences Between Average Actual Cost and INA-CBG's Tariff in 2023

INA-CBG's Code	Class	n	Total Cost		Average Cost		Sig (normality)	P (2-tailed)
			Actual Cost (IDR)	INA-CBG's Tariff (IDR)	Actual Cost (IDR)	INA-CBG's Tariff (IDR)		
O-6-10-I	I	4	38.232.720	27.935.600	9.558.180 ± 1.007.605	6.983.900	0,850	0,015
	II	8	65.018.300	48.940.000	8.127.287 ± 2.188.956	6.117.500	0,185	0,036
	III	4	24.439.450	21.004.000	6.109.862 ± 893.535	5.251.000	0,046	0,068
O-6-10-II	I	1	9.651.200	7.569.900	9.651.200	7.569.900	-	-
	II	12	110.951.880	79.569.600	9.245.990 ± 2.789.882	6.630.800	0,005	0,002
	III	13	86.809.050	73.992.100	6.677.619 ± 1.214.207	5.691.700	0,309	0,013
Total Cost			335.102.600	259.011.200				
Difference (+/-)			-76.091.400					

Table 4 illustrates that patients with INA-CBG's code O-6-10-I from class I have an average real cost greater than the INA-CBG's tariff, and there is a significant difference between the average real cost of the hospital and the INA-CBG's tariff, as indicated by the p-value <0.05. Patients with code O-6-10-I class II also have greater actual costs than INA-CBG's tariff, and there is a significant difference between the average actual costs and INA-CBG's tariffs. Meanwhile, patients class III with O-6-10-I codes have an average actual cost higher than the tariff of INA-CBGs, with no significant difference marked by a p value > 0.05.

Patients with INA-CBG's code O-6-10-II from class I showed an average real cost greater than the INA-CBG's rate, but no significance test could be performed because there was only 1 patient. Patients with INA-CBG's O-6-10-II code of class II showed an average real cost greater than the INA-CBG's tariff, and there was a significant difference (p > 0.05). Additionally, there was a substantial difference (p > 0.05) between the average real cost for patients with O-6-10-II code class III and the tariff of the INA-CBGs.

The hospital's total real costs are then compared with the total INA-CBG's tariff to determine whether the hospital is experiencing a loss. The hospital is said to have a loss if it experiences a negative difference or the patient's actual total cost is greater than the total INA-

CBG's tariff; otherwise, the hospital experiences a profit if the difference is positive or the patient's actual total cost is less than the total INA-CBG's tariff. According to Table 4, the hospital's entire real expenditures for 42 sectio caesarean patients came to IDR335.102.600, while the total INA-CBG's tariff was IDR259.011.200. Table 4 also shows that the hospital experienced a negative difference of IDR76,091,400, so the PKU Muhammadiyah Yogyakarta Hospital suffered a loss because the INA-CBG's tariff claimed by *BPJS Kesehatan* could not cover the total real costs incurred by the hospital in the January–September 2023 period.

The difference between actual costs and INA-CBG's tariff can be influenced by several factors, such as the accuracy of writing diagnoses, coding diagnoses, the low standard *BPJS Kesehatan* tariff, and the time patients are treated. The precision of coding the diagnosis will depend on how accurately it is written because if the doctor does not write a complete diagnosis of the disease, and does not refer to ICD-10 and ICD-9-CM, and some doctors only write diagnostic abbreviations, there will be inaccurate diagnosis coding (Heltiani et al., 2023). The accuracy of filling in the diagnosis and medical action codes is closely related to the amount of INA-CBG's tariff that *BPJS Kesehatan* will later claim, because if the hospital is incomplete or incorrect in providing diagnosis and action codes, the costs obtained will not follow the health services provided (Heltiani et al., 2023).

The low standard *BPJS Kesehatan* underwriting rate is also not comparable to the cost of a caesarean section, which requires a high cost; therefore, it can affect the difference between actual costs and INA-CBG's tariff. The duration (length of time) of the patient's treatment can have an impact on the negative tariff differential and the financial burden on sectio caesarea patients, since the hospital's length of stay rate is determined daily, the longer a patient receives treatment, the greater the necessary expenditure for health services, while the length of stay at the INA-CBG's tariff is following the diagnosis and procedure code (Monica et al., 2021). In addition, the number of procedures performed on the patient also affects the real cost of the hospital, because the more actions taken for the patient, the more doctors who handle it, causing the costs paid to be more and higher (Heltiani et al., 2023).

Hospitals can control real costs by maximizing service standardization to reduce variations in patient care. One way hospitals can control expenses is to standardize services so that hospital charges become more efficient and there is no higher real hospital tariff than INA-CBG's tariff. The objectives of cost control with service standardization include reducing service variation so that costs are easier to predict, ensuring more standardized services, and improving service quality (Nisa, 2020).

In previous research also conducted at PKU Muhammadiyah Yogyakarta Hospital by Zuryatinnisa (2017) in the 2015 period, using the INA-CBG's tariff based on Permenkes RI Number 59 of 2014, showed that the INA-CBG's tariff claimed by *BPJS Kesehatan* could not cover the total real costs. The hospital suffered a loss with a negative difference of IDR323,680,000. In the January–September 2023 period, using Permenkes RI Number 3 of 2023, the losses experienced by the hospital have decreased compared to the 2015 period using Permenkes RI Number 59 of 2014, namely from IDR323.680.000 to IDR76.091.400. It can be influenced by the government-imposed increase in INA-CBG's tariff for patients having a *sectio caesarea* under Permenkes RI Number 3 of 2023.

By comparing the results of this research with the results of Zuryatinnisa (2017), it can be seen that the largest cost components in both studies are still the same. However, the surgical

procedure component has decreased in cost, while the drug and laboratory components have increased in cost compared to the previous study. It can also affect the decrease in hospital losses in January–September 2023 compared to losses in 2015.

The results also aligned with Monica's research (2021) that the real cost of hospitals for inpatients with sectio caesarean delivery cases exceeds the INA-CBG's tariff, and hospitals experience losses of up to 94.80%. Pradnyantara (2023) also concluded a negative tariff difference between the actual tariff and the INA-CBG's tariff in cases of delivery with section caesarean assistance, where the hospital suffered losses since its tariff was 36.66% greater than the INA-CBG's tariff (Rahayu & Setiawan, 2022).

With this research, the PKU Muhammadiyah Yogyakarta Hospital can evaluate hospital services, so that the cost of partus sectio caesarea can follow the INA-CBG's tariff, and the hospital does not experience losses. In addition, the government is expected to use this study as material to assess the financing of partus sectio caesarea treatment at the latest INA-CBG's tariff.

CONCLUSION

The findings of this study indicate a significant difference between the actual cost of *partus sectio caesarea* services and the INA-CBG's tariff based on Permenkes RI Number 3 of 2023. On average, the actual cost incurred by the hospital is higher than the INA-CBG's reimbursement rate, resulting in financial losses for the hospital. This discrepancy demonstrates that the current INA-CBG's tariff is not yet adequate to cover the real cost of cesarean section services in the case study hospital.

Therefore, it is recommended that hospitals regularly evaluate and improve the efficiency of their health service delivery to ensure that treatment costs can be managed effectively and remain within the scope of INA-CBG's tariffs. The hospital management should also consider cost-control strategies such as clinical pathway optimization, resource utilization reviews, and service standardization to enhance financial sustainability.

Furthermore, it is advised that the government—particularly BPJS Kesehatan and the Ministry of Health—reassess the INA-CBG's tariff structure by taking into account the latest data on real costs from various types of hospitals. This will help ensure that the tariff policy reflects actual service costs and supports the quality and sustainability of maternal health services nationwide.

Future research should also involve broader samples from different hospital classifications and regions to provide a more comprehensive analysis of the compatibility between INA-CBG's tariffs and actual hospital costs in Indonesia.

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