Sectio Caesarean Delivery Claims of National Health Insurance Patients at Advanced Referral Health Facilities in East Java Region

Tika Rahhmatillah Mustofa[1], Andreasta Meliala[2]

[1-2] Gajdah Mada University, *e-mail:* tikarahhmatillahmustofa@mail.ugm.ac.id.

Abstract: WHO (2015) sets the standard for sectio caesarea at 10-15%. The proportion of SC deliveries in East Java was 22.4% in 2018, higher than the national average of 17.6%. The burden of JKN financing on childbirth is increasing and is among the top 10 most CBGs cases nationally. As an effort to control quality and control costs, BPJS Health in coordination with the Quality Control Cost Control Team (TKMKB) issued guidelines and self-assessment instruments for cesarean section (SC) in 2020. This study was conducted to explore the picture of SC before and during the implementation of the SC Self-Assessment Instrument in National Health Insurance patients in East Java. Of the 837,809 study subjects, 247,508 (60.5%) had SC delivery. Sectio Caesarea delivery of National Health Insurance patients at FKRTL in East Java is associated with individual factors, namely age and type of JKN membership and service factors, namely SC Self-Assessment Instrument, class of care, severity level, and hospital type. Implementation of the SC Self-Assessment Instrument has not been optimal in reducing the SC rate. A comprehensive strategy is needed to reduce the rate of sectio caesarean delivery, including interventions for pregnant women and families; health workers, health facilities, and professional organizations.

Keywords: Cesarean section delivery; National Health Insurance; Quality Control; Cost Control; Robson Classification.

INTRODUCTION

Sectio caesarea is an interventional procedure to reduce labor complications in an effort to save the mother and baby when other methods of delivery pose greater risks. However, it carries risks such as maternal infection, bleeding, injury to other organs, transfusion, anesthesia, and psychological complications. There are even studies that report the risk of maternal mortality in sectio caesarea increases 2-4 times compared to vaginal delivery (Khunpradit et al., 2018).

Sectio caesarean deliveries covered by JKN are emergency and elective SCs with medical indications in accordance with applicable service standards. Sectio caesarean delivery ranks first in the number of cases and costs of National Health Insurance (JKN) claims. The cost burden of

cesarean section delivery is more than 70% of the total cost of delivery at FKRTL (Ministry of Health of the Republic of Indonesia, 2021).

The increasing number of sectio caesarean (SC) deliveries has become a global problem. WHO sets the standard for sectio caesarea at around 10-15% (WHO, 2015) and it is predicted that around 6.2 million unnecessary sectio caesareas occur worldwide each year (Hoxha et al., 2019). Based on RISKESDAS data in 2018, sectio caesarean deliveries in Indonesia averaged 17.6% of total births between 2013 and 2018. The proportion in East Java alone was 22.4%, higher than the national average (Indonesian Ministry of Health, 2018).

One of the duties of BPJS Kesehatan as a Health Insurance provider is to ensure that the financing of sectio caesarean delivery runs effectively and efficiently. Efforts that have been made by BPJS Kesehatan include coordinating with the national level Quality Control Cost Control Team (TKMKB) with the results of publishing guidelines and self-assessment instruments for cesarean section (SC) in 2020. The SC Self-Assessment Instrument is a self-monitoring sheet for cesarean section in hospitals to analyze actions in an effort to guarantee the quality and efficiency of health service financing for JKN patients with a system approach through assessing input, process, and output indicators (TKMKB, 2020).

BPJS Kesehatan East Java region routinely conducts utilization review (UR) on sectio caesaria cases periodically. Based on BPJS Kesehatan East Java Region data, the proportion of SC deliveries at FKRTL in 2017 was 61%, which increased to 65% in 2021.
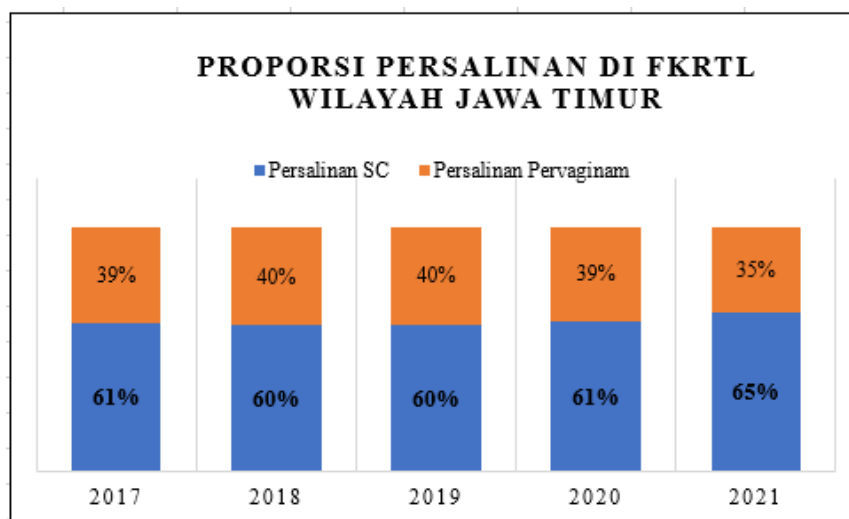
Figure 1. Proportion of deliveries at FKRTL in East Java Region
(Source: *Self Service Business Intelligence* BPJS Kesehatan)

Based on this, this study was conducted to explore the picture of sectio caesarea before and during the implementation of the SC Self-Assessment Instrument in National Health Insurance patients as a quality control and cost control effort..

METHOD

This study used a cross-sectional analytic design using BPJS Health claims data for the East Java region in 2018-2021. The samples in this study were JKN patients with cesarean section at FKRTL in the East Java region in 2018-2021. Inclusion criteria were inpatients with a description of Caesarean section procedures (CBGs Group O-6-10-I, O-6-10-II, O-6-10-III) in the period 2018 to 2021. Exclusion criteria were inpatients with other procedures that changed the CBG description and outpatients. The period before the implementation of the SC Self-Assessment Instrument was 2018-2019, while 2020-2021 was the period after the implementation of the SC Self-Assessment Instrument.

Data cleaning was performed on 844,017 BPJS Health claim data for 2018-2021, including outpatient exclusion data (n = 3,554) and missing data (n = 2,654), resulting in analysis data of n = 837,809. Analysis was carried out using statistical applications in a univariate manner with descriptive statistics to describe the proportion and frequency distribution of each research variable. Then continued with bivariate analysis with the Chi-Square test to determine the significance of the relationship with 95% CI and $p < 0.05$; and multivariate analysis with multiple logistic regression.

RESULT

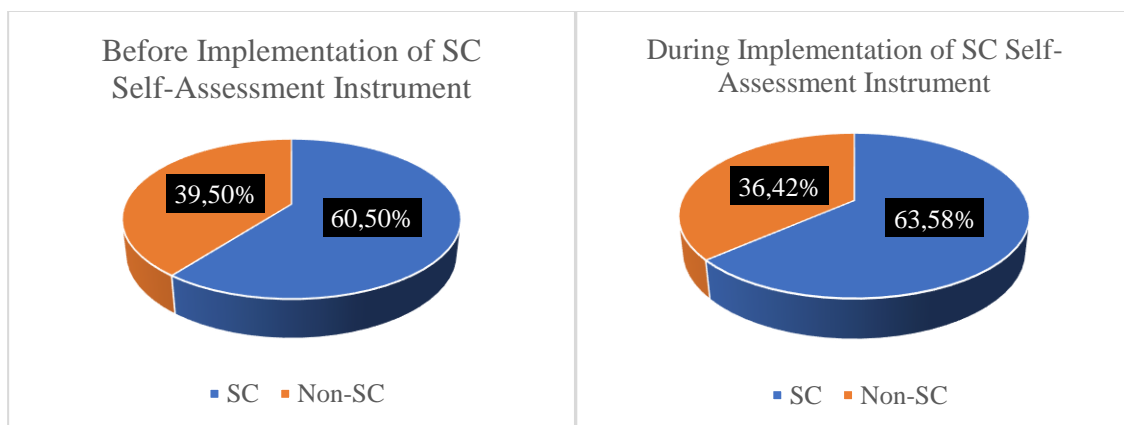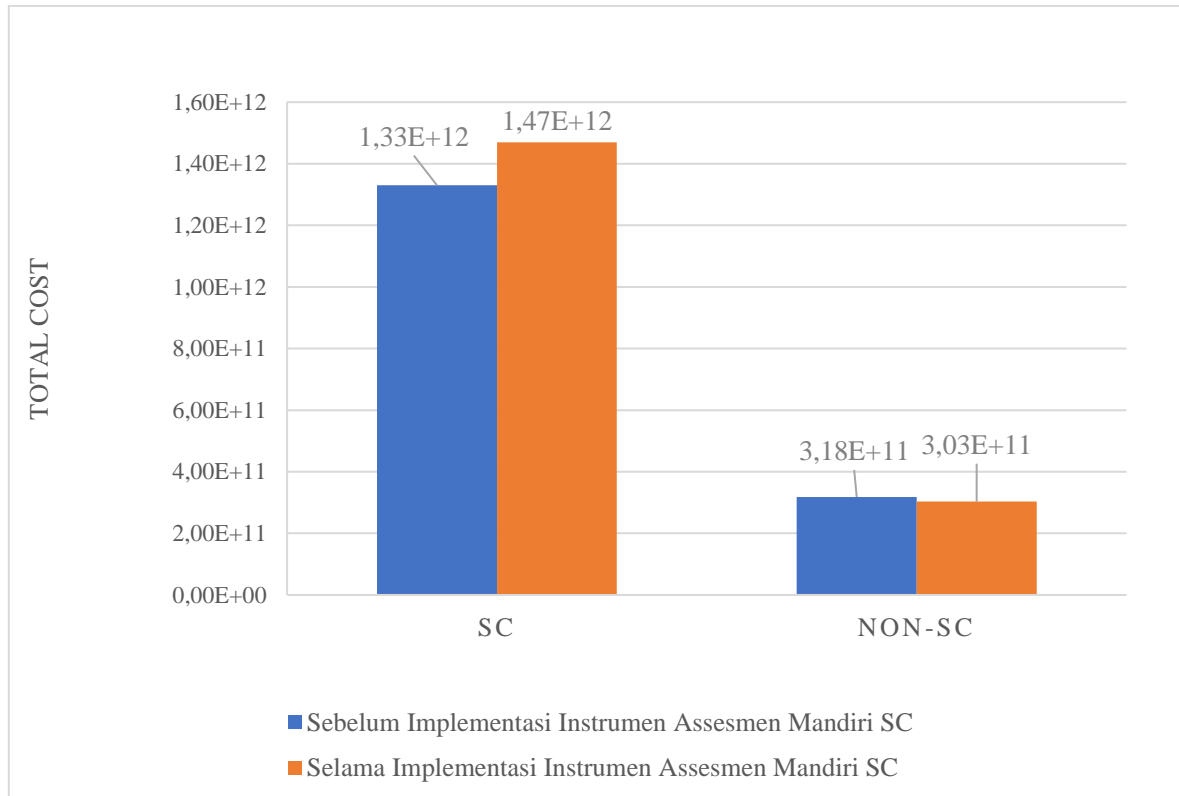**Case Distribution and Total Cost of Delivery**

Figure **2. Proportion of deliveries at FKRTL in East Java Region Before and During Implementation of the SC Self-Assessment Instrument During Implementation of SC Self-Assessment Instrument**

The results showed that in the period before the implementation of the SC Self-Assessment Instrument, the distribution of SC delivery cases in FKRTL in East Java region was 247,508 cases or 60.5% of total deliveries, while in the period after the implementation of the SC Self-Assessment Instrument, the distribution of SC delivery cases in FKRTL in East Java region increased to 272,545 cases or 63.58% of total deliveries..

Figure 3. Total Cost of Delivery at FKRTLs in East Java Region Before and During Implementation of the SC Self-Assessment Instrument During Implementation of SC Self-Assessment Instrument

In the period before the implementation of the SC Self-Assessment Instrument, the total cost of SC delivery at FKRTL in East Java was IDR 1.3 trillion, while in the period after the implementation of the SC Self-Assessment Instrument, the total cost was IDR 1.4 trillion.

Distribution of SC Delivery Cases Based on Respondent Characteristics
Tabel 1. Frequency Distribution of Respondent Characteristics

Variable	CS Deliveries		non-CS Deliveries	
	n	%	n	%
Age				
< 20 years	18.118	2,2%	17.927	2,1%
20-35 years	410.855	49,0%	253.923	30,3%
> 35 years	91.080	10,9%	45.906	5,5%
Type of JKN membership				
non-Worker	591	0,1%	288	0,0%
Beneficiaries of Contribution Assistance	205.422	24,5%	156.290	18,7%
Non-wage earners	148.215	17,7%	70.067	8,4%
Wage Earners	165.825	19,8%	91.111	10,9%
Treatment Class				
Class 1	78.138	9,3%	36.402	4,3%
Class 2	131.868	15,7%	73.964	8,8%

Class 3	310.047	37,0%	207.390	24,8%
Severity Level				
I	439.171	52,4%	144.980	17,3%
II	78.902	9,4%	172.146	20,5%
III	1.980	0,2%	630	0,1%
Type of CS Procedure				
Elective	89.073	10,6%	0	0,0%
Emergency	161.117	19,2%	0	0,0%
non-CS	0	0,0%	317.756	37,9%
Not Specific	269.863	32,2%	0	0,0%
Hospital Type				
A	4.645	0,6%	2.584	0,3%
B	81.209	9,7%	75.393	9,0%
C	280.946	33,5%	166.189	19,8%
D	153.253	18,3%	73.590	8,8%

Based on the age of the respondents, the distribution of SC cases was highest in the 20-35 years age range, with 410,855 cases (49%). Based on the type of JKN membership, the highest distribution of SC cases was Beneficiaries of Contribution Assistance membership, with 205,422 cases (24.5%). Based on treatment class, the highest distribution of SC cases was class 3, with 310,047 cases (37.0%). Based on Severity Level, the highest distribution of SC cases was Severity Level I with 439,171 cases (52.4%). Meanwhile, the distribution of SC was highest in the type of unspecified SC actions, namely 269,863 cases (32.2%), and occurred in type C hospitals, namely 280,946 cases (33.5%).

Distribution of Top 10 SC Indications
Table 2: Distribution of the top 10 indications of SC in FKRTL in East Java Region Before Implementation of SC Self-Assessment Instrument

ICD 10 Code	Diagnosis Name	2018-2019	
		n	%
O34.2	*Maternal care due to uterine scar from previous surgery*	42.213	17,06%
O42.0	*Premature rupture of membranes onset of labour within 24 hours*	20.716	8,37%
O41.0	*Olihydramnios*	13.302	5,37%
O63.0	*Prolonged first stage (of labour)*	12.652	5,11%
O14.1	*Severe preeclampsia*	11.365	4,59%
O48	*Prolonged pregnancy*	11.241	4,54%
O33.9	*Maternal care for disproportion unspecified*	10.075	4,07%
O32.1	*Maternal care for breech presentation*	9.645	3,90%
O42.9	*Premature rupture of membranes, unspecified*	8.953	3,62%
O42.1	*Premature rupture of membranes, onset of labour after 24 hours*	7.877	3,18%

The most common SC indication diagnoses at FKRTL in East Java in the period before the implementation of the Self-Assessment Instrument. with the highest percentage being O34.2 Maternal care due to uterine scar from previous surgery totaling 42,213 cases or 17.06% and the lowest being O42.1 Premature rupture of membranes, onset of labor after 24 hours totaling 7,877 cases or 3.18%..

Table 3. Distribution of Top 10 SC Indication Diagnoses in FKRTLs in East Java Region During the Implementation of SC Self-Assessment Instrument

ICD 10 Code	Diagnosis Name	2020-2021	
		n	**%**
O34.2	*Maternal care due to uterine scar from previous surgery*	46.811	17,18%
O42.0	*Premature rupture of membranes onset of labour within 24 hours*	24.020	8,81%
O63.0	*Prolonged first stage (of labour)*	17.841	6,55%
O41.0	*Olihydramnios*	14.070	5,16%
O32.1	*Maternal care for breech presentation*	11.061	4,06%
O14.1	*Severe preeclampsia*	10.310	3,78%
O42.1	*Premature rupture of membranes, onset of labour after 24 hours*	9.794	3,59%
O32.2	*Maternal care for transverse and oblique lie*	9.380	3,44%
O48	*Prolonged pregnancy*	9.320	3,42%
O33.9	*Maternal care for disproportion unspecified*	9.107	3,34%

The most common SC indication diagnosis at FKRTL in East Java during the implementation of the SC Self-Assessment Instrument with the highest percentage was O34.2 Maternal care due to uterine scar from previous surgery with 46,811 cases or 17.16% and the lowest was O33.9 Maternal care for unspecified disproportion with 9,107 cases or 3.34%.

Relationship of Sectio Caesarean Delivery Cases with SC Self-Assessment Instrument, Age, JKN Membership Type, Hospitalization Class, Severity Level, SC Type and Hospital

Table 4. Results of Bivariate Analysis of SC Delivery Cases at FKRTL East Java Region 2018-2021

Variable	CS Deliveries		non-CS Deliveries		*p-value*
	n	**%**	**n**	**%**	
SC Self-Assessment Instrument					
Before the Implementation	247.508	60,50	161.609	39,50	0.000
After the Implementation	272.545	63,58	156.147	36,42	
Age					
< 20 years	18.118	50,26	17.927	49,74	
20-35 years	410.855	61,80	253.923	38,20	0.000
> 35 years	91.080	66,49	45.906	33,51	
Type of JKN Membership					
non-Worker	591	67,24	288	32,76	0.000

Beneficiaries of Contribution Assistance	205.422	56,79	156.290	43,21	
Non-wage earners	148.215	67,90	70.067	32,10	
Wage Earners	165.825	64,54	91.111	35,46	
Treatment Class					
Class 1	78.138	68,22	36.402	31,78	
Class 2	131.868	64,07	73.964	35,93	0.000
Class 3	310.047	59,92	207.390	40,08	
Severity Level					
I	439.171	75,18	144.980	24,82	
II	78.902	31,43	172.146	68,57	0.000
III	1.980	75,86	630	24,14	
Type of CS Procedure					
Elective	89.073	100,00	0	0,00	
Emergency	161.117	100,00	0	0,00	0.000
non-CS	0	0,00	317.756	100,00	
Not Specific	269.863	100,00	0	0,00	
Hospital Type					
A	4.645	64,26	2.584	35,74	
B	81.209	51,86	75.393	48,14	0.000
C	280.946	62,83	166.189	37,17	
D	153.253	67,56	73.590	32,44	

Bivariate analysis was performed by correlating each independent variable, namely SC Self-Assessment Instrument, age, type of JKN membership, class of care, severity level, type of SC procedure, and type of hospital, with the dependent variable, namely SC delivery cases. If the results of the bivariate analysis showed a p value <0.05, then there was a significant relationship between the two variables. Conversely, if the results of bivariate analysis show a p value > 0.05, then there is no significant relationship between the two variables.

The results of the bivariate analysis in this study showed a significant relationship between the SC Self-Assessment Instrument, age, type of JKN membership, class of care, severity level, type of SC procedure, and type of hospital on SC delivery as indicated by a p value <0.05. Therefore, all variables could be continued for multivariate analysis,

Table 5. Results of Multivariate Analysis of SC Delivery Cases in FKRTL in East Java Region in 2018-2021

Variable	Sig.	OR	95% CI
SC Self-Assessment Instrument			
Before the Implementation	0,000	1	*Reference*
After the Implementation	0,000	1,093	1,082 - 1,104
Age			

< 20 years	0,000	1	*Reference*
20-35 years	0,000	1,427	1,394 - 1,462
> 35 years	0,000	1,960	1,909 - 2,012
Type of JKN Membership			
non-Worker	0,000	1	*Reference*
Beneficiaries of Contribution Assistance	0,001	0,774	0,662 - 0,904
Non-wage earners	0,150	1,121	0,960 - 1,309
Wage Earners	0,042	0,851	0,729 - 0,994
Treatment Class			
Class 1	0,000	1	*Reference*
Class 2	0,000	0,876	0,861 - 0,891
Class 3	0,000	0,827	0,807 - 0,848
Severity Level			
I	0,000	1	*Reference*
II	0,000	0,155	0,154 - 0,157
III	0,001	1,172	1,070 - 1,284
Hospital Type			
A	0,000	1	*Reference*
B	0,000	0,399	0,379 - 0,422
C	0,000	0,527	0,500 - 0,556
D	0,000	0,624	0,591 - 0,658

Multivariate analysis showed that JKN participants who delivered during the implementation of the SC Self-Assessment Instrument had a 1.093 times higher risk of experiencing SC delivery compared to before the implementation of the SC Self-Assessment Instrument. The risk of SC delivery increased with age, with those aged >35 years having a 1.960 times higher chance of SC delivery compared to those aged <20 years. The Beneficiaries of Contribution Assistance group had a 0.774 chance and the Wage Earners group had a 0.851 chance of SC delivery compared to the non-worker group. Class 2 group had a 0.876 chance and class 3 group had a 0.827 chance of SC delivery compared to class 1 group. The highest chance of SC delivery with severity level III was 1.172 times compared to severity level I. Type A hospitals have the highest chance of SC delivery.

DISCUSSION

SC Delivery Claims Based on Influencing Factors

SC Self-Assessment Instrument

mplementation of the SC Self-Assessment Instrument has a 1.093 times greater likelihood of the incidence of sectio caesarean delivery in FKRTL in East Java. This can occur because the

implementation of the SC Self-Assessment Instrument has not been optimized in FKRTL in East Java. In addition, the increase in SC delivery cases in the period 2020-2021, one of which can be influenced by the COVID-19 pandemic in accordance with the Circular Letter of the Directorate General of Health Services number HK.02.02/III/2878/2020 concerning Referral Hospital Preparedness in Handling Maternal and Neonatal Referrals with COVID-19, maternal delivery with suspected or probable cases is carried out at COVID-19 Referral Hospitals. In Indonesia alone, the number of SC procedures is expected to increase by 40% by 2020 (Abdullah, 2022). Further research on data after the end of the pandemic status can be conducted to rule out the possibility of an increase in SC cases due to the COVID-19 pandemic.

Sectio caesarean deliveries covered by JKN are those with medical indications in accordance with applicable service standards. Absolute medical indications for cesarean delivery include absolute disproportion (e.g. CPD), chorioamnionitis, maternal pelvic deformity, eclampsia, HELLP syndrome, fetal asphyxia or acidosis, umbilical cord prolapse, placenta previa, abnormal lie and presentation, and uterine rupture (Mylonas & Friese, 2015).

From the research data, former SC is the first medical indication for SC delivery in FKRTL in East Java. A history of SC delivery allows for normal delivery after SC delivery (VBAC) (Mylonas & Friese, 2015). Therefore, the high medical indication of SC delivery history in the research data is dubious and requires further research.

This is in line with research (Majid et al., 2022) that 56% of SC deliveries out of 3400 births at Jinnah Postgraduate Medical Center, Karachi in the period January-June 2018 were included in Group 5 of the Robson Classification, namely multipara, having a history of uterine injury, single fetus, head presentation, gestational age $\geq$ 37 weeks, born with induction or SC. Another study also mentioned that the probability of recurrent sectio caesaria increases by 25%, so the SC decision in the first delivery is important in determining the next mode of delivery (Ashar & Kusrini, 2020).

The distribution of SC for elective procedures was 89,073 cases (10.6%); emergency procedures were 161,117 cases (19.2%); and non-specific types of procedures were 269,863 cases (32.3%). The results of this study showed that the type of non-specific SC procedure had the highest percentage. There is a possibility of coding errors by hospital coders or the possibility of unnecessary SC. This contradicts (Andayasari et al., 2015), that the proportion of elective SC (63.9%) was greater than emergency SC (63.9%)..

Age

The odds of SC delivery increased with age. The 20-35 years age group had a 1.427 times chance of SC delivery compared to the <20 years age group. While the age group >35 years had a chance of 1.960 times experiencing SC delivery compared to the age group <20 years.

Research conducted by Nastiti, et al. (2022) explained that sectio caesarean delivery in Indonesia occurs more in women aged 35-47 years, while research conducted by Wyatt et al. (2021) there was an increase in the number of SC deliveries in pregnant women aged> 30 years, from 5.5% in 1998-2022 to 21.03% in 2013-2017. The increase in SC delivery in pregnant women aged> 35 years is related to the risk of maternal morbidity and mortality, besides that mothers over 35 years of age are also more at risk of getting assisted labor because the mother's physical strength such as the strength to strain has decreased (Sihombing et al., 2017).

JKN Membership Type

The Beneficiaries of Contribution Assistance membership type has a 0.774 times chance of experiencing SC delivery compared to the Non-Worker membership type. Meanwhile, the Wage Earners membership type had a 0.851 chance of experiencing SC delivery compared to the Non-Worker membership type.

Non-workers are participants who are employers and informal sector workers. There is research conducted (Satriawan et al., 2021) that informal sector workers who experience health complaints have a tendency to have health insurance 1.447 times greater than informal sector workers who do not experience health complaints. In conditions with pregnancy being a factor that encourages informal sector workers to register as JKN participants to get maternity insurance benefits.

Hospitalization Class

The data showed that the class of care variable had a significant effect on the SC delivery variable for JKN patients at FKRTL in East Java. The class 2 group had a 0.876 times chance of experiencing SC delivery compared to the class 1 group. Meanwhile, the class 3 group had a 0.827 times chance of experiencing SC delivery compared to the class 1 group. This is in line with research (Widjayanti, 2020) that the proportion of JKN Non-class 3 patients was 80.5% of the total SC deliveries at RSP X around Jakarta in 2018.

Severity Level

In this study, the severity level variable had a significant effect on the SC delivery variable for JKN patients. The probability of SC delivery with severity level II is 0.155 times compared with severity level I. While the chance of SC delivery with severity level III is 1.172 times compared to severity level I. This is in line with the results of Andayasari's research (2015) which states that comorbidities are factors associated with the incidence of SC delivery in hospitals, one of these comorbidities is hypertension. People with hypertension have a 3 times greater risk than those

without hypertension. Then mothers with indications of hypertension have a 7 times greater chance of emergency SC delivery compared to mothers without hypertension (Andayasari et al., 2015).

Hospital Type

The distribution of SC delivery cases in FKRTL in East Java region in 2018-2021 in type A hospitals was 4,645 cases or 0.6%; type B hospitals were 81,209 cases or 9.7%; type C hospitals were 280,946 cases or 33.5%; and type D hospitals were 153,253 cases or 18.3%. The data shows that type C hospitals have the highest percentage at 33.5%. The number of hospitals in East Java province in 2021 according to BPS East Java data is 400 hospitals. Meanwhile, hospitals that cooperate with BPJS Health based on BPJS Health data in 2021 in the East Java region are 358 hospitals with details of 5 type A hospitals, 55 type B hospitals, 175 type C hospitals, and 123 type D hospitals, so it is natural that the highest percentage of SC delivery is in type C hospitals because there are the most type C hospitals in East Java.

Based on the results of multivariate analysis, the odds of SC delivery in type B hospitals is 0.399 times compared to type A hospitals. The odds of SC delivery in type C hospitals is 0.527 times compared to type A hospitals. Meanwhile, the odds of SC delivery in type D hospitals is 0.624 compared to type A hospitals. Type A hospitals have the highest probability of SC delivery, which is in line with the principle of tiered referral, i.e. cases in type A hospitals are terminal cases with high severity that cannot be handled in hospitals with lower types.

SC Delivery Rate Control Strategy

Controlling the SC rate is not enough by applying Robson's classification but must be accompanied by a comprehensive strategy involving various parties. Based on research (Mylonas & Friese, 2015); there was an increase in SC deliveries in Germany from 15.3% in 1991 to 31.7% in 2012 and 10% of the SC delivery cases had no medical indication. The first step to deal with this problem is to identify the medical indications that cause SC delivery based on the guidelines of the German Association of Scientific Medical Societies (AWMF) regarding absolute and relative indications related to SC delivery. Absolute indications account for only 10% of all medical indications for SC delivery in Germany. The decision of SC delivery in relative medical indications should be based on risk assessment through thorough discussion by the health professionals involved with the pregnant woman and her family to assess the risk profile of the pregnant woman.

Research in Canada (Monari et al., 2022) suggests that the real challenge in reducing SC delivery rates is the implementation of clinical practice guidelines. The results showed that a multifaceted strategy consisting of audit and feedback and continuous quality improvement was

effective in reducing SC delivery rates, and the key to success was identifying barriers to change in the clinical environment. Opinion leaders also have a major influence in reducing SC delivery rates.

Research conducted by Kunphradit, et al, (2018) on non-clinical interventions for pregnant women and families, clinical personnel, and professional organizations and health facilities showed that the results of interventions that affect the reduction of SC include:

1. Intervention for pregnant women and families in the form of individualized prenatal education to psychologically prepare pregnant women in preparation for the delivery process provides good results in decision making on the mode of delivery compared to education through workshops or brochures.

2. Interventions for health workers that influence the reduction of SC rates are the implementation of clinical practice guidelines with mandatory second opinion combined with routine ANC, education of health workers by opinion leaders, audit and feedback using the Robson classification.

3. Interventions for professional organizations and health facilities through financial interventions in financing delivery and staff modeling strategies at health facilities.

A statement from WHO in 2015 regarding the increase in SC delivery rates emphasized that the Robson classification is the global standard for assessment and monitoring of SC deliveries in health facilities. WHO hopes that the implementation of Robson's classification in health facilities can optimize SC delivery by identifying, analyzing and intervening focusing on relevant specification groups in each health facility; can develop effective strategies and optimize SC delivery targets; can improve service quality through continuous improvement of clinical management; and improve the quality of service data through increased staff awareness of the importance of data and its utilization..

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CONCLUSION

Sectio Caesarea delivery of National Health Insurance patients at FKRTL in East Java is associated with individual factors, namely age and type of JKN membership, as well as service factors, namely SC Self-Assessment Instrument, class of care, severity level, and hospital type.

Implementation of the SC Self-Assessment Instrument has not been optimal in reducing SC delivery rates, so collaboration between BPJS Kesehatan; the government; and all stakeholders is needed to develop a more comprehensive strategy. Evaluation of the SC Self-Assessment Instrument is needed to obtain a more accurate instrument.

Professional organizations should also develop more comprehensive clinical practice guidelines to provide clear boundaries regarding medical indications for SC delivery. Further study is needed on the integration of SC delivery rates in performance-based financing indicators at

FKRTL with the aim of encouraging improved quality of delivery services, providing incentives for health facilities for spontaneous deliveries, and considering other financing models for delivery..

Equally important is community involvement in preparation for childbirth by forming small prenatal education groups that not only provide knowledge related to maternal and infant health but also provide psychological support to pregnant women facing childbirth.

In addition, continuous monitoring of SC case trends, both regionally and nationally, can provide information on which to base more effective policy making. Cross-sectoral collaboration between the government, health facilities, professional organizations, and the community can strengthen efforts to control SC rates through information exchange, development of health program cooperation, and increasing public awareness of the importance of maternal health..

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