

# Analysis of the Caesarean Section According to Robson Classification at RSUD Panembahan Senopati Bantul in 2021–2022

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## ABSTRACT

**Background:** The Robson 10-group classification system categorizes pregnant women into ten distinct groups based on specific obstetric characteristics. As caesarean section rates rise globally, this trend has become an important public health concern. Between 2012 and 2015, RSUD Panembahan Senopati Bantul, a regional government hospital in Indonesia, reported caesarean section rates exceeding 30%. The aim of this study is to identify which Robson groups contributed most to the significant increase in cesarean deliveries.

**Objective:** This study aims to determine the rate of change in the trend of caesarean section rates that occurred at Bantul Regional General Hospital during the 2021–2022 period using the Robson Classification.

**Method:** This study used a descriptive analytic design. The study population included all pregnant women who gave birth at RSUD Panembahan Senopati in Bantul from 2021 to 2022. Data were obtained from secondary sources using Case Report Form (CRF) instruments and processed using Robson classification. Additional analyses were conducted to determine the cesarean section rate within each group and identify reasons for cesarean delivery.

**Results:** Of the 2,295 study participants, 906 (39.8%, 95% CI 38.27–41.33) were pregnant women who delivered by C-section during 2021–2022. The C-section rate declined by 1.53% overall over the two-year period (95% CI 1.08–2.12). However, several Robson groups showed rising C-section trends. According to the Robson classification, group 5 represented the largest proportion of the population (25.1%, 95% confidence interval [CI] 23.09–27.12) and accounted for the highest proportion of cesarean deliveries (9.9%), followed by group 4 (6.2%, 95% CI 3.22–8.27). Groups 2, 4, and 7 experienced rising C-section trends from 2021 to 2022, with Group 4 showing the greatest increase (8.5%), followed by Group 2 (4.4%, 95% CI 1.2–6.75). Further evaluation identified failed labor induction as the leading cause of the increased C-section rate (14.6%, 95% CI 12.02–17.9), while fetal compromise/distress also played a significant role (10.6%, 95% CI 8.79–12.5).

**Conclusion:** From 2021 to 2022, the caesarean section rate at RSUD Panembahan Senopati Bantul decreased by 1.53% (95% CI 1.08–2.12), though certain groups still had elevated rates. Groups 2, 4, and 5 accounted for the majority of cesarean deliveries during this period. Targeted interventions, including routine evaluations and improved management, are needed to reduce the overall C-section rate further.

**Keywords:** Robson Classification, caesarean section rate trend, RSUD Panembahan Senopati Bantul

## ABSTRAK

**Latar Belakang:** Sistem klasifikasi 10 kelompok Robson mengelompokkan wanita hamil ke dalam sepuluh kelompok yang berbeda berdasarkan karakteristik obstetri spesifik. Seiring dengan meningkatnya tingkat persalinan caesar secara global, tren ini telah menjadi masalah kesehatan masyarakat yang penting. Antara tahun 2012 dan 2015, RSUD Panembahan Senopati Bantul, sebuah rumah sakit pemerintah daerah di Indonesia, melaporkan tingkat persalinan caesar melebihi 30%. Tujuan studi ini adalah untuk mengidentifikasi kelompok Robson mana yang paling berkontribusi terhadap peningkatan signifikan dalam persalinan caesar.

**Tujuan:** Penelitian ini bertujuan untuk menentukan laju perubahan tren tingkat persalinan caesar yang terjadi di Rumah Sakit Umum Daerah Bantul selama periode 2021–2022 menggunakan Klasifikasi Robson.

**Metode:** Penelitian ini menggunakan desain analitik deskriptif. Populasi penelitian meliputi semua wanita hamil yang melahirkan di RSUD Panembahan Senopati di Bantul dari tahun 2021 hingga 2022. Data diperoleh dari sumber sekunder menggunakan instrumen Formulir Laporan Kasus (CRF) dan diproses menggunakan klasifikasi Robson. Analisis tambahan dilakukan untuk menentukan tingkat persalinan caesar dalam setiap kelompok dan mengidentifikasi alasan persalinan caesar.

**Hasil:** Dari 2.295 peserta studi, 906 (39,8%, 95% CI 38,27–41,33) adalah wanita hamil yang melahirkan melalui operasi caesar pada periode 2021–2022. Tingkat persalinan caesar secara keseluruhan menurun sebesar 1,53% selama periode dua tahun (95% CI 1,08–2,12). Namun, beberapa kelompok Robson menunjukkan tren peningkatan persalinan caesar. Menurut klasifikasi Robson, kelompok 5 mewakili proporsi terbesar populasi (25,1%, 95% CI 23,09–27,12) dan menyumbang proporsi tertinggi persalinan caesar (9,9%), diikuti oleh kelompok 4 (6,2%, 95% CI 3,22–8,27). Kelompok 2, 4, dan 7 mengalami tren peningkatan persalinan caesar dari 2021 hingga 2022, dengan Kelompok 4 menunjukkan peningkatan terbesar (8,5%), diikuti oleh Kelompok 2 (4,4%, 95% CI 1,2–6,75). Evaluasi lebih lanjut mengidentifikasi kegagalan induksi persalinan sebagai penyebab utama peningkatan tingkat operasi caesar (14,6%, 95% CI 12,02–17,9), sementara gangguan janin/distres juga berperan signifikan (10,6%, 95% CI 8,79–

12,5).

**Kesimpulan:** Dari tahun 2021 hingga 2022, tingkat persalinan caesar di RSUD Panembahan Senopati Bantul menurun sebesar 1,53% (95% CI 1,08–2,12), meskipun beberapa kelompok masih memiliki tingkat yang tinggi. Kelompok 2, 4, dan 5 menyumbang sebagian besar persalinan caesar selama periode ini. Intervensi yang ditargetkan, termasuk evaluasi rutin dan pengelolaan yang lebih baik, diperlukan untuk mengurangi tingkat persalinan caesar secara keseluruhan lebih lanjut.

**Kata kunci:** Klasifikasi Robson, tren tingkat operasi caesar, RSUD Panembahan Senopati Bantul

## INTRODUCTION

Caesarean section rates around the world have increased dramatically. In the early 1970s, the caesarean section rate in developed countries was only about 5% of all births. This number increased to 50% in some countries of the world by the end of 1990. An increase in the number of caesarean deliveries is occurring in Indonesia. According to the results of the Indonesian Demographic and Health Survey, the number of caesarean deliveries in 1997 was about 4.3% of the total number of births. This number increased to 22.8% in 2007<sup>1</sup>.

However, WHO studies show that caesarean sections actually increase maternal morbidity and mortality, require blood transfusions, increase hysterectomy rates, and increase the length of stay in the hospital. Caesarean section also increases neonatal mortality and indirectly increases the premature birth rate<sup>2</sup>.

In 2001, Robson introduced an emerging caesarean section classification system based on obstetric characteristics. This system is intended to facilitate the assessment of risk groups of pregnant women according to their obstetric characteristics. Within this framework, each category has unique characteristics and plays a particular role in affecting the rate of C-sections in a given region. To reduce the number of caesarean sections, it is not necessary to reduce the total number of caesarean sections; only certain groups that are the lowest obstetric risk groups receive caesarean sections<sup>3</sup>.

## METHOD

This research is descriptive analytical research. This study uses a *cross sectional study design*. The population of this study were pregnant women at RSUD Panembahan Senopati from January 2021 to December 2022. Subjects were allocated into two variables, namely Robson Classification variables and external variables. Robson Classification has six basic variables to classify all pregnant women who delivered at RSUD Panembahan Senopati Bantul 2021-2022 into ten groups, namely parity, history of caesarean section, onset of labour, number of fetuses, gestational age, fetal location, and

presentation. While the external variables are age, occupation, financing status, referral.

The inclusion criteria used were caesarean and vaginal deliveries. Meanwhile, the exclusion criteria used were abdominal pregnancy, uterine rupture, and abortion.

The sample taken in this study was a total sample. The samples taken were all deliveries at RSUD Panembahan Senopati Bantul from January 2021 to December 2022.

The research flow consists of three steps, namely :

1. The first step begins with determining the affordable population; in this study, all pregnant women at RSUD Panembahan Senopati in 2021–2022,
2. The second step is to determine the research subject; the sample taken in this study was total sampling. The samples taken were all deliveries at RSUD Panembahan Senopati Bantul from January 2021 to December 2022. Samples were taken from the medical records of patients who gave birth either by caesarean section or vaginally at RSUD Panembahan Senopati Bantul from January 2021 to December 2022.
3. The third step is to evaluate the changes and suitability of OC rate trends based on Robson's classification for 2021–2022.

## RESULTS AND DISCUSSION

### 1. Characteristics of Research Subjects

The research was conducted at RSUD Panembahan Senopati Bantul in the 2021-2022 period by taking data from medical records. Before collecting data, the Case Report Form was prepared. The study began by taking data on obstetric patients during 2021, totalling 2165 visits.

From the total visits, there were 1838 obstetric cases and 527 non-obstetric cases. Furthermore, using CRF enumerators, we took data from 1638 patient visits and obtained 1148 patients giving birth. Furthermore, using CRF enumerators, we took data from 1409 patient visits and obtained 1147 patients giving birth. In this study, patients were mothers, either

nulliparous or multiparous, with or without a previous history of caesarean section, who gave birth to live and/or dead babies weighing 500 grams or 22 weeks of gestation, either vaginally or by caesarean section, during 2021–2022.

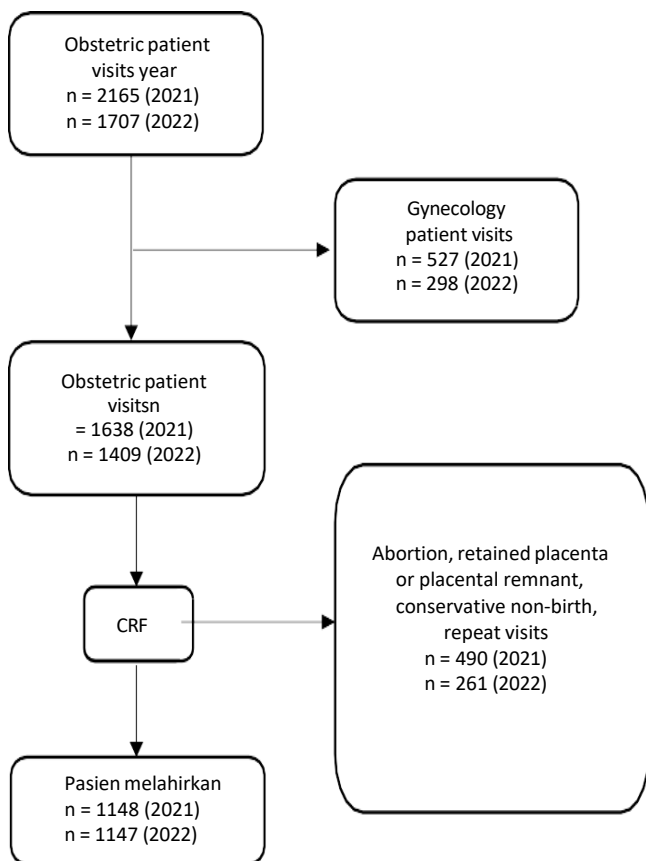


Figure 1. Flow of research subject selection and CRF completion

The study subjects in 2021 were 1148 patients or mothers who gave birth in two groups of birth methods, namely vaginal and caesarean section. From 1148 mothers who gave birth, 685 (59.7%) vaginal births and 462 (40.3%) caesarean section births. From 1147 mothers who gave birth, 703 (61.3%) vaginal births and 444 (38.7%) caesarean section births.

Table 1 shows the characteristics of research subjects in 2021-2022 at RSUD Panembahan Senopati, Bantul. Parity data in 2021 mostly gave birth to the Multipara category as many as 682 (59.4%), while in 2022 the parity of the Nulipara category was 877 (76.4%). Payment status data mostly used BPJS / PBI / KIS / Jampersal / Jamkesda in 2021 as many as 639 (62.4%) and in 2022 as many as 552 (45.5%).

Table 1. Characteristics of delivery at RSUD Panembahan Senopati

Variabel	RSUD Panembahan Senopati Bantul 2021		RSUD Panembahan Senopati Bantul 2022	
	N=1148	%	N=1147	%
Mother's age (years)	30.28+6.443		31.23 + 6.341	
Parity				
- Nulipara	466	40.6	877	76.4
- Multipara	682	59.4	270	23.5
Referral Status				
- Referral	583	50.8	748	65.2
- Come in person	565	49.2	399	34.8
Payment Status				
- General	67	5.8	78	6.8

- BPJS Non PBI	314	27.4	330	28.8
- BPJS PBI/KIS/ Jampersal/Jamkesda	639	62.4	552	45.5
- KLB	48	4.2	-	-
- Private insurance	3	0.3	-	-
- Others	-	-	217	18.9

## 2. Result of Financing Status

The results of Robson tabulation with BPJS financing status (non-PBI and PBI) seen from the population showed that the highest financing status was for BPJS in Robson 4 with as many as 214 patients (25.1%), while the least donor status was for BPJS in Robson 8 with as many as 5 patients (0.6%). The results of Robson tabulation with overall financing status, BPJS (non-PBI), and other views in the community show that the most financing status is for BPJS in Robson 4, which is 76 patients (8.9%), while the least BPJS donor status in Robson 8 reaches 3 patients (0.4%).

**Table 2. Financing Status for the Period of January 2021– December 2022 at RSUD Panembahan Senopati**

Robson	Non PBI f (%)	PBI f (%)	Total f (%)
1	44 (5.2)	43 (5.0)	87 (10.2)
2	89 (10.4)	103 (12.1)	192 (22.5)
3	39 (4.6)	65 (7.6)	104 (12.2)
4	76 (8.9)	138 (16.2)	214 (25.1)
5	39 (4.6)	54 (6.3)	93 (10.9)
6	4 (0.5)	12 (1.4)	16 (1.9)
7	6 (0.7)	26 (3.1)	32 (3.8)
8	3 (0.4)	2 (0.2)	5 (0.6)
9	12 (1.4)	20 (2.3)	32 (3.8)
10	18 (2.1)	59 (6.9)	77 (9.0)

## 3. Results of OC Analysis of RSUD Panembahan Senopati Bantul 2021-2022

A total of 2295 deliveries were obtained, with 906 caesarean section patients and 1389 vaginal deliveries, in the period 2021–2022, at RSUD Panembahan Senopati Bantul. The number of deliveries at RSUD Panembahan Senopati Bantul itself decreased from 1148 patients in 2021 to 1147 patients in 2022. During the 2-year span, the largest population can be found in Robson Group 5, with 227 patients. Group 5 is also the largest contributor to the caesarean section rate with a percentage and the largest contributor to the

total number of deliveries at RSUD Bantul in 2021–2022, with a percentage of 9.9%. The third largest contributor to the delivery rate was found in group 4. By giving a percentage of the delivery rate at RSUD Bantul in 2021–2022, the Group 4 caesarean section rate obtained a value of 6.2%, 95% CI 3.22–8.27% of total deliveries.

Groups 1, 2, and 5 contributed a rate of 55.2% to all caesarean deliveries, while the remaining groups had a contribution to caesarean deliveries.

**Table 3. Summary of Caesarean section data at RSUD Panembahan Senopati, Bantul**

Robson's Group	2021			2022			Total		
	Ko 2	Ko 4	Ko 6	Ko 2	Ko 4	Ko 6	Ko 2	Ko 4	Ko 6
	N	X	Y	N	X	Y	N	X	Y
1	22	15.4	1.9	23	10.0	2.0	45	5.0	2.0
2	123	18.4	10.7	104	22.8	9.1	227	25.1	9.9
3	7	18.5	0.6	12	12.4	1.0	19	2.1	0.8
4	77	16.3	6.7	66	24.8	5.8	143	15.8	6.2
5	<b>115</b>	<b>11.8</b>	<b>10.0</b>	<b>112</b>	<b>10.5</b>	<b>9.8</b>	<b>227</b>	<b>25.1</b>	<b>9.9</b>
6	19	2.3	1.7	16	1.7	1.4	35	3.9	1.5
7	20	2.3	1.7	28	3.5	2.4	48	5.3	2.1
8	13	1.7	1.1	9	1.4	0.8	22	2.4	1.0
9	12	1.0	1.0	44	3.8	3.7	56	6.2	2.4
10	54	12.4	4.7	30	9.0	2.7	84	9.3	3.7
Total Caesarean Section	462	100	<b>40.24</b>	444	100	<b>38.71</b>	906	100.0	39.48
Total Vaginal Birth	686			703			1389		
Total Giving Birth	1148			1147			2295		
Caesarean section rate (%)	40.24			38.71			39.48		

## 4. Results of the Analysis of Indications for Caesarean Section

In Graph 1 indications of caesarean section, out of 906 cases of indications of caesarean section, the most important indication was having had a previous caesarean section, with 198 cases (21%).

In addition, the next indication was failure to induce labor, which was found in 91 cases (17%). Failure to induce and promote labor in this study was limited to a lack of progress in labor. This situation was most likely to occur in groups 1, 2, 3, and 4.

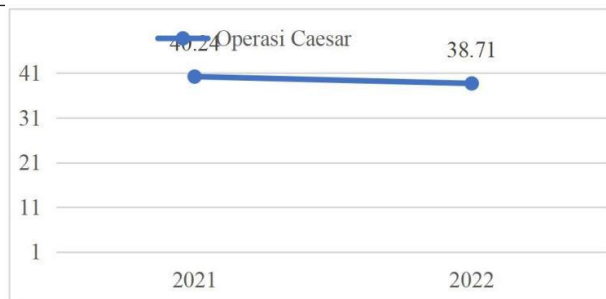
As shown in Table 5, the main reason for caesarean section in 2022 out of 444 cases was a history of caesarean section in 91 cases (20.5%),

mainly in group 5, followed by failure to induce labor in 65 cases (14.6%).

Other causes of caesarean section included in the 12 highest were hypertension at 68 (14.7%), fetal compromise or distress at 54 (11.6%), and failed stimulus at 31 (6.7%). Buttock Presentation as much as 23 (5.0%), DKP as much as 23 (5.0%), Placenta Previa 23 (5.0%), and Marginalis Partus Not Advanced 13 (2.8%), Latitude 11 (2.4%), Covid 19 6 (1.3%), and Gemelli 5 (1.1%).

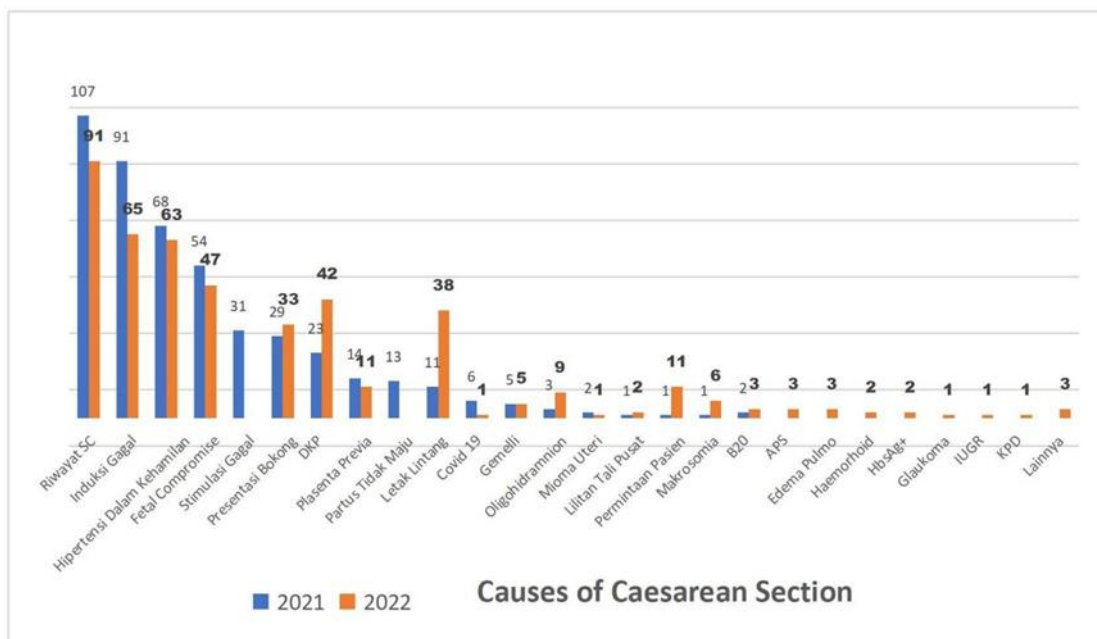
**5. Caesarean section trend analysis**

Groups 1, 2, and 5 contributed a rate of 55.2% to all caesarean deliveries, while the remaining groups contributed a rate of 44.8%.



**Figure 2. Caesarean section trend chart for 2 years (2021-2022)**

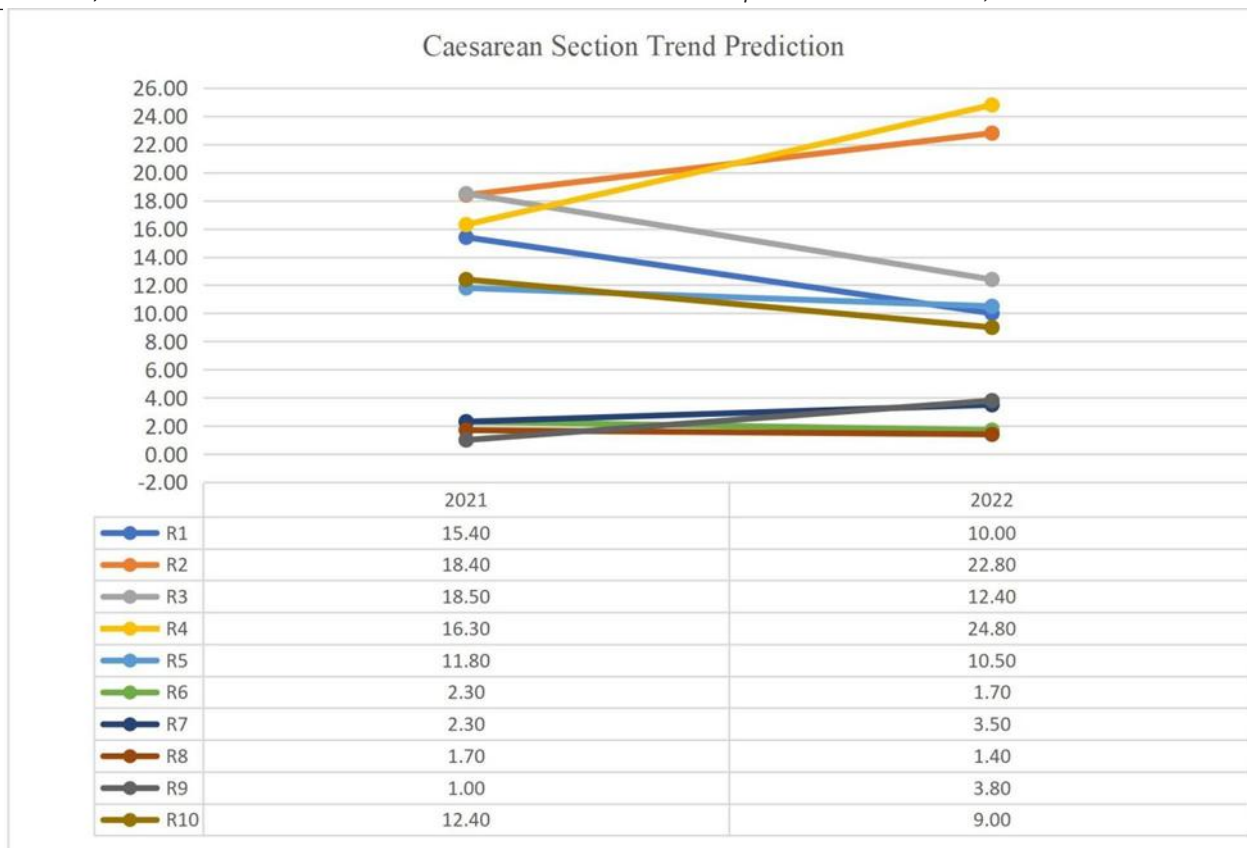
The graph of the trend value of caesarean section in 2021–2022 is consecutive for 2021, at 40.24%, and in 2022, at 38.71%, there is an overall decrease in the caesarean section rate of 1.53%, 95% CI 1.08–2.12 for 2 years. The trend values of OC groups 2, 4, 7, and 9 are increasing (+), and groups 1, 3, 5, 6, 8, and 10 are decreasing (-).



**Figure 3. Caesarean section indication chart for 2 years (2021-2022)**

This study found a decrease in the value of caesarean section rates over the past 2 years. The application of the Robson Classification algorithm has an effect on reducing the value of caesarean section rates; this can be seen by a decrease in the

caesarean section rates of Robson Groups 1 and 5. Globally, the value of caesarean sections is found to increase, but with varying numbers in each region; this can be seen from several studies, such as those in India (37.65%) and Spain (10.00%)<sup>4</sup>.



**Figure 4. Graph of the Robson Group Caesarean Section Trend for 2 years (2021-2022)**

The trend of the caesarean section rate in Group 1 was found to decrease by 5.5%. Meanwhile, the caesarean section rate in Group 2 showed an increasing trend of 4.4%, 95% CI 1.2–6.75%. The high and increasing trend of caesarean section rates in Group 2 is due to the large number of failed inductions (14.6%, 95% CI 12.02–17.9%); of course, it is necessary to review the management of induction of labor in caesarean mothers with full-term pregnancy, the caesarean fetus, head presentation, and onset of induction of labor, and conduct an caesarean evaluation<sup>5</sup>.

Indications for induction of labor should be evaluated to see if the patient is being induced for the right indication. Indications for caesarean section must be evaluated for the presence of complications or ballast in this group of patients before surgery is performed<sup>4,6</sup>.

In Group 5, there was a decrease in the trend of caesarean section rates by 1.3%, but in Group 5, there was still a fairly high caesarean section rate in 2022, which was 93.3%, above the average of 50–60%, despite having good maternal and perinatal outcomes. The value in this group exceeds that in some hospitals or countries, such as RSCM at 71.6%, Palestine at 73.5%, Sri Lanka at 81.8%, and India at 100%<sup>7,8</sup>. The high and large value of group 5 according to Robson's guidelines

can be due to the policy of performing planned caesarean sections on caesarean section women without trying TOLAC (Trial of Labor after Caesarean)<sup>5</sup>.

Robson's 10-group classification system is the most effective method for evaluating caesarean section rates. Groups 2, 4, and 5 are the biggest contributors to the caesarean section rate at Bantul Hospital in 2021–2022. Follow-up should be done by focusing routine evaluation and follow-up on these three groups to reduce the caesarean section rate. Follow-up in groups 2 and 4 can be done by evaluating the high failure rate of induction by evaluating indications for induction and the area of induction of labor<sup>9</sup>. Follow-up in group 5 can be done by evaluating policies for performing the TOLAC procedure and reducing the number of routine caesarean sections in group 5<sup>10</sup>.

**CONCLUSION**

The trend of caesarean sections in RSUD Bantul in 2021–2022 has decreased by 1.53% for 2 years, but in some groups there are still high values. Groups 2, 4, and 5 are the biggest contributors to the caesarean section rate at RSUD Bantul in 2021–2022. Follow-up must be carried out by focusing routine evaluation and follow-up on these three groups to reduce the caesarean section rate. Follow-up in the form of evaluating

the causes of high induction failure rates by evaluating indications for induction and labor induction protocols Follow-up in group 5 can be done by evaluating the policy for performing TOLAC procedures and reducing routine caesarean sections in group 5.

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