



## Evaluation of Sectio Cesaria Response Time to Maternal and Neonatal Outcomes in Severe Preeclampsia - Eclampsia Patients

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### Abstract

This research is finding out an overview of the response time evaluation of Sectio Cesaria in patients with severe Pre-eclampsia - Eclampsia at Sitti Khadijah 1 Muhammadiyah Hospital Makassar Branch. Severe preeclampsia and eclampsia are complications in pregnancy and childbirth that increase maternal and infant morbidity and mortality rates. To prevent the problem of eclampsia, early management of preeclampsia must be carried out properly. Cesarean sections are classified into two categories, namely SC categories 1 and 2. Category 1 Caesarean sections are SCs that must be carried out as soon as possible and most decisions must be taken within 30 minutes, namely in cases that immediately threaten the lives of the mother and baby, such as fetal distress, non-reassuring fetal status, antepartum hemorrhage, and the threat of uterine rupture. While SC category 2 is one that endangers the mother and fetus but not immediately, such as two previous CS, dystocia, hypertension in pregnancy, premature rupture of membranes, breech position, failed induction, bad obstetric history, macrosomia, cephalopelvic disproportion, facial presentation, and most decisions must be taken within 75 minutes. This research method is observational research using a cross sectional approach. The results of this research is maternal outcome most affected by SC response time <75 minutes is postoperative ICU care, and the most influential neonatal outcome is the APGAR Score. Based on the research results, it can be concluded that response time has a significant influence on maternal and neonatal outcomes in patients with severe preeclampsia - eclampsia.

## Introduction

The maternal mortality ratio in developing countries in 2015 was approximately 239 per 100,000 live births. The maternal mortality rate increased to 359 per 100,000 live births in 2012 in Indonesia based on the Central Bureau of Statistics. The mortality rate of pregnant women in South Sulawesi province based on the Central Bureau of Statistics 2015 was 282 cases. The top five causes of maternal mortality are hemorrhage, hypertension in pregnancy (HTN), infection, prolonged partus, and abortion. HDK including preeclampsia is increasing every year to more than 25% in 2013 which causes complications in up to 10% of all pregnancies in the world (Hasibuan et al., 2021; Imelda & Putriana, 2018).

Severe pre-eclampsia and eclampsia are complications of pregnancy and childbirth that increase maternal and infant morbidity and mortality. The increase in symptoms and signs if not treated quickly will jeopardize the condition of the mother and baby. Preeclampsia and eclampsia are the leading causes of mortality and morbidity of mothers and their babies. Preeclampsia accounts for 7-10% of pregnancies and is the second leading cause of maternal death in Indonesia. Preeclampsia can also cause impaired fetal changes and fetal death in the womb. To prevent the occurrence of eclampsia problems, early management of preeclampsia must be carried out properly (Direktorat Kesehatan Keluarga RI, 2020; Fajriah Saraswati et al., 2022).

Sectio Cesaria is surgery performed to deliver the fetus through an incision in the abdominal wall and uterus (artificial labor), so that the fetus is born through the abdomen and abdominal wall so that the child can be born intact (Laksono & Masrie, 2022). Category 1 cesarean section is SC that must be performed as soon as possible and most decisions must be made within 30 minutes, namely in cases that immediately threaten the life of the mother and baby such as fetal distress, non-reassuring fetal status, antepartum hemorrhage, and threat of uterine rupture. While SC category 2 is those that endanger the mother and fetus but not immediately such as 2 times SC scars, dystocia, hypertension in pregnancy, premature rupture of membranes, breech location, failed induction, poor obstetric history, macrosomia, cephalopelvic disproportion, face presentation, and most decisions must be made within 75 minutes (Sutters, 2017; Wibowo et al., 2016; World Health Organization, 2013).

An obstetric emergency is an obstetric case that, if not treated immediately, will result in severe pain and even death of the mother and baby. Obstetric emergencies are the direct cause of maternal, fetal and newborn deaths (Cunningham et al., 2012). Response time is the time required to respond to an event. In the decision-making of a cesarean section clinic, the response time for the implementation of cesarean section which is closely related to the emergency level of an obstetric condition is the time from the decision made to the implementation of cesarean section or Decision to Incision Interval (DII). More specifically, DII is the time interval (minutes) from when the DPJP decides to perform a cesarean section until the surgical incision is performed. Response time is often the main contributor that can save mothers and newborns. (Djamhoer et al., 2013; Fouedjio et al., 2016; Leveno et al., 2002).

## Methods

Cross-sectional study design was used in this observational study to determine the effect of response times to emergency Sectio Cesaria in severe preeclampsia and eclampsia complications. The research was carried out at Muhammadiyah 1 Sitti Khadijah Hospital in Makassar, and took place from 2019-2023. The total sampling approach was adopted to mean that all the qualifying cases within the given period were enrolled to increase the Masaba District's representativeness of the population under study. The primary performance indicator used in the study was the DII referred to as the time between the clinical decision to perform a Cesarean section and the actual surgical incision. This DII is especially important in cases of obstetric complications; timely intervention has with a direct bearing on the maternal as well as neonatal mortality. For this reason, the response times were categorized into two groups: those that took less than 75 minutes, those that took between 75 and 100 minutes, and those that took more than 100 minutes to complete following APGAR protocol for emergency Cesarean sections. Information was obtained from medical records which made them secondary data sources, the study was thus able to capture real time hospital responses and their impact on patient outcomes. We extracted key parameters that entailed aspects of maternal and neonatal health with a view of comparing the results in relation to differences in response times. Such an approach allowed for the development of a rich understanding of how the kind of surgical intervention that results in saving the lives of mothers can influence the health and the state of patients who had complications related to preeclampsia or eclampsia.

## Result and Discussion

### Characteristics of Sectio Cesaria Emergency Category II Response Time Study

Research on the Evaluation of Sectio Cesaria Response Time to maternal and neonatal outcomes in patients with Severe Pre-eclampsia - Eclampsia at Sitti Khadijah 1 Hospital Makassar City period 2019-2023 was conducted with observational research methods with cross sectional techniques used is total sampling where the entire population is used as a sample in accordance with the inclusion criteria and exclusion criteria the number of samples obtained in the study was 56 samples. With the following characteristics:

Table 1. Characteristics of Research Samples Emergency Cesarean Section Response Time Category II

Characteristics		Response Time		P-value
		>75 Minutes	<75 Minutes	
Age Group	(Age Years)	33.91 ± 7.94	34.04 ± 6.35	0.860
	<=20 Years	2	1	
	21-25 Years	0	3	
	26-30 Years	0	10	0.134
	31-35 Years	4	10	
	36-40 Years	14	18	
	>40 Years	1	7	
Domicile	Village	0	11	0.98
	Urban	11	34	
Education Level	SD	0	15	0.102
	SMP	3	24	
	HIGH SCHOOL	7	10	
	S1	1	5	
	S2	0	1	
Jobs	Work	2	12	0.711
	Not Working	9	33	

Secondary Data: 019-2023 P<0.05 with Mann Whitney and Chi Square tests

Table 1 shows the average age group of mothers with response time <75 minutes is 34.04 ± 6.35 years while >75 minutes is 33.91 ± 7.94 years. This is in accordance with a retrospective study conducted by Ayle et al who examined the response time of SC emergencies in samples aged 25 - 34 years with a mean age of 27.10 SD ± (4.74) years.

### Maternal Outcomes in Category II Emergent Sectio Cesario Response Time

Table 2. Maternal Outcomes in Category II Emergency Sectio Cesaria Response Time

Measured Value		DDI		P Value	RR	95% CI	
		>75	<75			Low	Up
Postoperative blood count		283.82± 45.52 (Mean SD)	299.1 ± 79.29 (Mean SD)	0.828	-	-	-
The presence or absence of fever	Yes	6	2	0.000	7.200	2.866	18.086
	No	5	43				
Presence or absence of anemia	Yes	1	0	0.196	5.500	3.140	9.635
	No	1	45				
ICU Post OP	Yes	8	6	0.000	8.000	2.456	26.062
	No	3	39				
Maternal Mortality	Yes	0	0	-	-	-	-
	No	11	45				

Secondary Data: 2019-2023 P<0.05 with Mann Whitney and Chi Square tests

Table 2 shows the maternal outcomes in category II emergency SC response time. It was found that the presence or absence of fever, the need for postoperative care in the ICU had a close relationship with SC emergency response time category II (p<0.05). The number of intraoperative bleeding in the emergency SC response time <75 group was 299.1 ± 79.29 (Mean SD) in the emergency SC response time >75 group was 283.82 ± 45.52 (Mean SD) with a P Value of 0.828.

### Neonatal Outcomes in Category II Emergent Sectio Cesaria Response Time

Table 3. Neonatal Outcomes in Category II Emergency Sectio Cesaria Response Time

Measured Value	DDI		P Value	RR	95% CI		
	>75	<75			Low	Up	
APGAR score (at 1 minute)	7 - 10	5	44	0.000	6.944	3.023	15.950
	4 - 6	6	1				
	0- 3	0	0				
APGAR score (at 2 minutes)	7 - 10	6	44	0.000	6.944	3.023	15.950
	4 - 6	5	1				
	0- 3	0	0				
Whether or not respiratory support is needed (CPAP, Intubation)	Yes	2	0	0.036	6.000	3.305	10.893
	No	9	45				
NICU Post OP	Yes	3	1	0.021	4.875	2.079	11.432
	No	8	44				
Meconium aspiration	Yes	0	1	-	-	-	-
	No	11	45				
Infant Mortality	Yes	0	0	-	-	-	-
	No	11	45				

Secondary Data 2019-2023 P<0.05 with Mann Whitney and Chi Square tests

Table 3 shows neonate outcomes related to APGAR score, the need for respiratory support such as CPAP and intubation, the need for postoperative NICU care, and infant mortality. APGAR score and postoperative NICU care in response time less than 75 minutes were closely associated with category II SC response time.

### Maternal and neonatal outcomes influenced by SC response time Category II

From the regression test, it was found that the maternal outcome that was most influenced by SC time <75 minutes category II was the presence or absence of postoperative ICU care, P value: 0.049 (Table 3). This is also in accordance with research conducted by Cut Meura Yeni et al in 2021 with the title Evaluation of Sectio Emergensis Response Time to Maternal and Neonatal Outcomes where it was found that what was strongly associated with response time on maternal outcomes was the need for postoperative NICU care.

Table 4. Maternal outcomes most affected by SC Response Time Category II

Variables	P Value	OR	95 CI%	
			Lower	Upper
Fever	0.332	4.208	0.231	76.593
ICU Post OP	0.049	14.517	1.008	209.091

Secondary Data 2019-2023 P<0.05 with Logistic regression test

Table 5. Neonatal most affected by SC Response Time Category II

Variables	P Value	OR	95 CI%
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			<b>Lower</b>	<b>Upper</b>
APGAR	0.003	115.925	4.874	2756.979
NICU Post OP	0.082	19.324	0.689	542.167

Secondary Data 2019-2023 P<0.05 with Logistic regression test

The neonatal outcome that is most influenced by SC time <75 minutes is APGAR Score, P value: 0.003 (Table 3.5). 26,27

Based on the results of the research conducted, it was found that the Characteristics of Emergency Sectio Cesaria Category II Response Time Research are in accordance with research conducted by Cut Meura Yeni et al in 2021 with the title Evaluation of Emergency Sectio Response Time to Maternal and Neonatal Outcomes with the Availability of Emergency SC Service Flow at SRUDZA with the Prospective Cohort research method, it was found that the average age group of the mother was (Hercus et al, 2020; Norwitz & Schorge, 2001).

When viewed from the place of residence in the SC response time <75 minutes group, 11 patients were from rural areas while 34 patients were from urban areas. In the response time >75 minutes in urban areas, 11 patients and none came from rural areas. Patients from rural areas have access far from the city, which often makes patients lazy to seek treatment so that when they come, they are already accompanied by severe symptoms (Roeshadi, 2007; Satgas PAKI, 2017).

Based on the level of education of the group with response time SC Emergency <75 minutes SD (15 patients), SMP (24 patients), SMA (10), S1 (5 patients), S2 (1 patient). on the response time SC Emergency >75 minutes obtained data SD (0 patients), SMP (3 patients) SMA (7 patients), S1 (1 patient), S2 (0 Patients). This is in accordance with research conducted by Kitaw et al. in Ethiopia who found that the lower the mother's education, the worse the maternal and neonatal outcomes because they consider that health is not so important. This is also in accordance with research conducted by Cut Meura Yeni et al. in 2021 with the title Evaluation of Emergent Sectio Response Time on Maternal and Neonatal Outcomes The educational status of the group with an emergency SC response time <30 minutes consists of high school graduates (4 patients), and strata 1 (6 patients). Whereas in the group with an emergency SC response time >30 minutes, 8 patients graduated from high school and only 1 patient graduated from undergraduate level (ACOG Practice Bulletin, 2020; Arulkumaran & Lightstone, 2013).

When viewed from work in groups with an emergency SC response time <75 who work (12 patients) do not work (33 patients). in response time >75 minutes who work (2 patients) do not work (9 patients). This was also found in a retrospective study by Ayele et al. (2020) who found that the group that underwent the most emergency SC did not have a job totaling 194 people (38%). This is also in accordance with research conducted by Cut Meura Yeni et al. in 2021 with the title Evaluation of Emergency Sectio Response Time on Maternal and Neonatal Outcomes The educational status of the group with an emergency SC response time <30 minutes who worked (4 patients) did not work (6 patients) >30 minutes who worked (0 patients) did not work (9 patients) (Ayele et al., 2021; Pankiewicz et al., 2019; Sesar et al., 2018).

Maternal Outcomes in Category II Emergency Sectio Cesario Response Time Category II emergency SC response time <75 minutes proved that the amount of bleeding caused was less than >75 minutes. A total of 43 patients with a response time of <75 minutes did not have a fever, while at a response time of >75 minutes there were 6 patients who had fever and 5 patients did not have fever (LaMarca et al., 2015; Yeni et al., 2022).

In terms of the need for postoperative care in the ICU, 39 patients did not require postoperative care in the ICU and 6 patients required postoperative ICU care, in patients with a response time <75 minutes. In patients with a response time >75 minutes there were 8 patients requiring

treatment in the ICU and 3 people did not do ICU treatment. There were no maternal deaths in the <75 minute or >75 minute response time groups.

Maternal outcomes in emergency SC performed within 20 minutes can reduce the risk of blood loss, anemia, and fever. Neonatal Outcomes in Category II Emergent Sectio Cesaria Response Time The results of this study are similar to those of Staboulidou et al. who found that emergent SC performed within 20 minutes can reduce the risk of low APGAR scores, reduce the pH of the baby's blood, reduce the need for oxygen and intubation, and minimize the transfer of babies to the NICU (Ayele et al., 2021; Nurrahmadina, 2022; Wardhana et al., 2022).

## Conclusion

Based on the research conducted, the following conclusions were obtained: 1) SC response time <75 minutes has a significant influence on maternal and neonatal outcomes; 2) Maternal outcomes such as the presence or absence of fever, the need for postoperative care in the ICU have a close relationship with the response time of category II emergency SC; 3) Neonatal outcomes such as APGAR score, and postoperative NICU care have a strong association with category II SC response time; 4) The maternal outcome most affected by SC response time < 75 minutes is postoperative ICU care, and the neonatal outcome most affected is APGAR Score. Suggestions for further research should be carried out to collect more complete data and assess more research variables and evaluate the causes of the most influential outcomes such as the presence or absence of fever, ICU care, postoperative NICU care and APGAR score..

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