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**RESEARCH**

## Difference in Mean Maternal Sodium Potassium Ratio Between Severe Preeclampsia and Eclampsia

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**Abstract**

**Background:** Preeclampsia is a pregnancy-specific syndrome in the form of reduced organ perfusion due to vasospasm and endothelial activation that occurs after 20 weeks of gestational age. eclampsia is the occurrence of seizures in a woman with preeclampsia, Sodium (Na<sup>+</sup>) and Potassium (K<sup>+</sup>) play an important role in preeclampsia and eclampsia.

**Objective:** To see the difference in mean sodium potassium ratio between pregnancy with severe preeclampsia and eclampsia.

**Methods:** The study was analytic descriptive using a cross sectional study design by looking at the medical records of the subjects according to the time and place of the study. Samples are all medical records of pregnant women who suffer from pre-eclampsia and eclampsia in the obstetric and gynecology section of RSUP DR.M.Djamil padang in the period of 15 January 2016 to 31 December 2017, the values of which are sodium, potassium levels and sodium and potassium ratios. Samples were taken from populations that met the inclusion criteria and did not have exclusion criteria. Sampling using a consecutive sampling technique which was taken from the medical records of RSUP DR. M. Djamil Padang Statistical analysis to assess significance using the T-test.

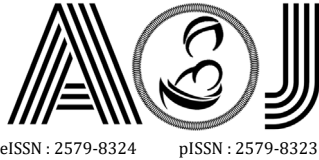
**Results:** In the Severe preeclampsia and Eclampsia groups it was found that multipara parity had the highest respondents. This is in accordance with the literature where the incidence of preeclampsia is more often found at near term gestational age.

**Conclusion:** There is no significant difference in the average sodium potassium ratio between Severe preeclampsia and Eclampsia

**Keywords:** Severe preeclampsia, eclampsia, sodium and potassium

**INTRODUCTION**

Severe preeclampsia and eclampsia are a group of symptoms that can occur during pregnancy and childbirth.<sup>1</sup> Preeclampsia is still the main cause of maternal death compared to bleeding and infection, so it is an important problem in obstetrics. Preeclampsia is a pregnancy-specific syndrome in the form of reduced organ perfusion due to vasospasm and endothelial activation that occurs after 20 weeks of gestation. While eclampsia is the seizures occurrence in a woman with preeclampsia that is not caused by anything else.<sup>2</sup> From the medical records of patients treated at the Obstetrics and Gynecology RS DR. M. Djamil Padang during 2011



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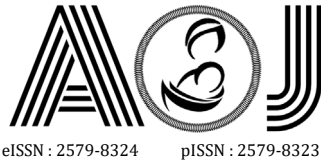
had the incidence of preeclampsia 125 cases (8.31%) out of 1395 deliveries. This figure increases every year, namely 193 cases (11.47%) from 1,682 deliveries during 2012, and 206 cases (12.02%) from 1,714 deliveries during 2013.<sup>3,4,5</sup> Electrolytes such as sodium (Na +) and Potassium (K +) plays an important role in preeclampsia and eclampsia because they contribute significantly to vascular smooth muscle function.<sup>6</sup> Serum Na + levels were found to be significantly increased in preeclamptic patients when compared to normal pregnant women. The exact mechanism of sodium retention in preeclampsia is unclear, although retention may be due to vasoconstriction leading to a reduction in glomerular filtration rate and the stimulating mechanism of renin aldosterone angiotensin. The net effect is a decrease in intracellular fluid and an increase in extracellular fluid volume.<sup>7</sup> Deficit of potassium in the body as a result of inadequate conservation of potassium by the kidneys & gastrointestinal tract, loss of potassium through feces may even outweigh urine loss. No significant differences in sodium and potassium levels were found by Khan & Obembe et al.<sup>8,9</sup> Hypokalemia in preeclampsia may be due to abnormalities in the transport of sodium and potassium across the vascular smooth muscle cell membranes, which are normally responsible for maintenance of blood pressure.<sup>10</sup>

**METHOD**

This research is a comparative observational study with a cross-sectional study design. We conducted the research in the medical records of Dr. M. Djamil Padang started from January 1, 2016 - December 31, 2017, which met the inclusion criteria and did not have any exclusion criteria. Based on the inclusion and exclusion criteria, there were 60 patients as research subjects and controls. We conducted the research in the medical records of Dr. M. Djamil Padang started from January 1, 2016 - December 31, 2017. Sampling was carried out by consecutive sampling on patients in designated hospitals who met the inclusion criteria until the number of samples was met. We analyzed the results of the study data through differences in the characteristics of the ratio scale, tested by T-test.

**RESULTS AND DISCUSSION**

A study was conducted to determine the difference in the mean ratio of calcium and mean serum sodium potassium ratio between severe preeclampsia (Severe preeclampsia) and eclampsia in 60 study subjects comprising people in the severe preeclampsia group and 32 people in the eclampsia group from January 15 2016 to December 31 2017. at RSUP DR. M. Djamil Padang.



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**Website:**<http://jurnalobgin.fk.unand.ac.id/index.php/JOE>**Table 1.** Research Subjects Characteristics

Characteristics		Severe preeclampsia n=38	Eclampsia n=22
Age		30,29 ± 5,55	30,95 ± 5,13
Parity	Nulipara	13 (34 %)	6 (27,3%)
	Multipara	25 (64%)	16 (72,7%)
Gestational Age	Preterm	29(76,3%)	10(45,5%)
	Aterm	9 (23,7%)	12 (54,5%)

Table 1 shows the mean characteristics of the study subjects based on age, parity group and gestational age group. There were similarities in the mean age of severe preeclampsia (Severe preeclampsia)  $30.29 \pm 5.55$  years with eclampsia  $30.95 \pm 5.13$  years. In the Severe preeclampsia and eclampsia groups, it was found that multiparous parity respondents had the highest respondents (64% and 72.7%). Preterm gestational age has a high respondent respondents in the Severe preeclampsia group (76.3%).

**Table 2.** Differences in Mean Maternal Serum Sodium between Severe preeclampsia and Eclampsia

Variable	Mean (s.b)	P Value*	Mean Differences (IK95%)
Severe preeclampsia (n = 38)	137,95 ( 4,59)	0,125	1,99
Eclampsia (n=22)	135,95 (4,84)		(-0,573 – 0,267)

Table 2 shows that the mean maternal serum sodium between severe preeclampsia and eclampsia is not much different (137.95 and 135.95). There was no significant difference between the mean maternal serum sodium ratio between Severe preeclampsia and Eclampsia ( $p > 0.05$ ).

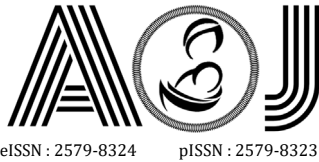
**Table 3.** Differences in Mean Maternal Serum Potassium between Severe preeclampsia and Eclampsia

Variable	Mean (s.b)	P value*	Mean Differences (IK95%)
Severe preeclampsia (n = 38)	3,818 (0,64)	0,529	-0,145 (-0,609-0,319)
Eclampsia (n=22)	3,964 (0,95)		

Table 3 shows the mean maternal serum potassium between severe preeclampsia and eclampsia is not much different (3,818 and 3,964). There was no significant difference between the mean maternal serum potassium ratio between Severe preeclampsia and Eclampsia ( $p > 0.05$ ).

**Table 4.** Difference in Mean Maternal Serum Sodium Ratio between Severe preeclampsia and Eclampsia

Variable	Mean (s.b)	p Value	Mean Differences (IK95%)
Severe preeclampsia (n = 38)	37,218 (6,94)	0,481	1,355 (-2,49-5,19)
Eklamsia	35,864 (7,21)		



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Table 4 shows that the mean maternal serum sodium potassium between severe preeclampsia and eclampsia is not much different (37,218 and 35,864). There was no significant difference between the mean maternal serum sodium potassium ratio between Severe preeclampsia and Eclampsia ( $p > 0.05$ ).

## DISCUSSION

### Characteristics of Research Subjects

The characteristics of the respondents according to the oldest age were 42 years, while the youngest age was 23 years old, which were also found in the Severe preeclampsia group. This differs slightly from the literature which says that the risk factors for preeclampsia are  $\geq 35$  years or under 20 years. In the Severe preeclampsia and Eclampsia groups, we found it that multiparity parity had the highest respondents (64% and 72.7%) in contrast to gestational age in Severe preeclampsia had respondents highest in preterm pregnancy (76.3%). This is under the literature where the incidence of preeclampsia is more often found at a gestational age near term.

### Difference in mean maternal serum sodium potassium ratio between severe preeclampsia and eclampsia

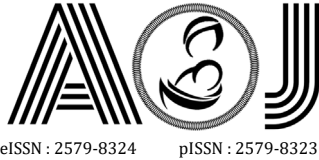
Mean maternal serum sodium levels at Severe preeclampsia 137.95 mmol / L and eclampsia 135.95 mmol / L, with  $p = 0.125$  meaning that there was no significant difference in the mean maternal serum potassium levels between Severe preeclampsia 3.818 mmol / L and eclampsia 3.964 mmol / L, with the value of  $pp = 0.529$  is not significant). The mean maternal serum potassium level in Severe preeclampsia and eclampsia was 0.609 mmol / L which was not significant ( $p > 0.05$ ).

The mean maternal serum sodium potassium ratio in Severe preeclampsia was 37.218 mmol / L, while in eclampsia 35.864 mmol / L, with  $p > 0.005$ , it means that there was no significant difference.

Manjarenka (2012) reports that there is a serum sodium level in preeclampsia compared to normal pregnancy and a decrease in serum potassium levels in preeclampsia compared to normal pregnancy. Thus the ratio of sodium to potassium will increase in preeclampsia.

## CONCLUSION

- 1 There is no difference in the mean ratio of sodium and potassium levels in preeclampsia
- 2 There is no difference in the mean ratio of sodium and potassium levels in eclampsia
- 3 There is no difference in the mean ratio of sodium and potassium levels between Severe preeclampsia pregnancy and eclampsia



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