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### Risk Factors for Uterine Atony in Postpartum Hemorrhage Patients at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia

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#### ABSTRACT

**Background:** Uterine atony can be life-threatening for a pregnant woman in labor and bleeding after delivery. It is important to explore the risk factors that can cause uterine atony in order to detect it early and take preventive measures. This study aimed to explore the risk factors for causing uterine atony in postpartum hemorrhage patients at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia. **Methods:** This study was an analytic observational study with a case-control approach. A total of 52 subjects (13 case group subjects and 39 control group subjects) participated in this study. Risk factor analysis was carried out with the help of SPSS version 25 in univariate and bivariate. **Results:** Maternal age at delivery is associated with the risk of uterine atony in postpartum hemorrhage patients. Mothers aged less than 20 years or more than 35 years are at risk of experiencing uterine atony by 5.8 times more at risk than mothers aged 20-35 years. The risk factors for parity, prolonged labor, macrosomia, gemelli, hydramnios, induction of labor, history of postpartum hemorrhage, and type of delivery were not associated with uterine atony in postpartum hemorrhage patients,  $p>0.05$ . **Conclusion:** The age of delivery of mothers who are less than 20 years or more than 35 years is a risk factor for uterine atony in postpartum hemorrhage patients at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia.

#### 1. Introduction

The maternal mortality rate (MMR) is one of the indicators for evaluating maternal health services in a country. Most cases of maternal death occur in developing countries. Maternal death is caused by complications during pregnancy, childbirth, and puerperium. Postpartum hemorrhage is the leading cause of maternal morbidity and mortality worldwide. Uterine atony is caused by anything that interferes with the uterus' ability to contract and retract. Several factors affect uterine atony, namely age, parity, prolonged labor, excessive uterine distention

(macrosomia, gemelli, hydramnios), induction of labor, history of postpartum hemorrhage, and type of delivery. Pregnant women aged <20 years have organ reproduction that has not been worked perfectly, so that at risk for pregnancy complications as well as childbirth, while mothers with age >35 years experience declined function organ reproduction, so that at risk for complications of postpartum hemorrhage. Primiparity and high parity are two risk factors for uterine atony. Uterine muscles in the mother with parity height could undergo stretching, which causes the uterine wall to thin out. This results

in weak uterine contractions, difficult for emphasis vessels blood which open after clearance placenta.<sup>1-5</sup>

Uterine atony can be life-threatening for a pregnant woman in labor and bleeding after delivery. It is important to explore the risk factors that can cause uterine atony in order to detect it early and take preventive measures.<sup>6-9</sup> This study aimed to explore the risk factors for causing uterine atony in postpartum hemorrhage patients at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia

## 2. Methods

This study was an analytic observational study with a case-control approach and used secondary data sourced from medical records at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia. A total of 52 research subjects participated in this study, of which 13 subjects were the case group of uterine atony and 39 subjects were the control group. The inclusion criteria for the case group were term pregnant patients with postpartum hemorrhage who were born vaginally or by cesarean section for the period January 2019 - July 2022 and had complete medical record data. The inclusion criteria for the control group were term pregnant patients without complications of postpartum hemorrhage who were born vaginally or by Caesarean section from January 2019 to July 2022 and had complete medical record data. This study was approved by the medical and health research ethics committee from the Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia (Number: 214-2022).

This study presents data on risk factors such as maternal age at delivery, maternal parity, prolonged labor, macrosomia, gemelli, hydramnios, induction of labor, and type of delivery. Data analysis was carried out with the help of SPSS version 25 in univariate and bivariate ways. Univariate analysis was performed to present the frequency distribution of each test variable. Bivariate analysis was carried out to examine the relationship between various risk factors and the incidence of uterine atony in postpartum hemorrhage

at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia, with a p-value <0.05.

## 3. Results

Table 1 presents the risk factors for uterine atony in postpartum hemorrhage patients. Maternal age at delivery is associated with the risk of uterine atony in postpartum hemorrhage patients. Mothers aged less than 20 years or more than 35 years are at risk of experiencing uterine atony by 5.8 times more at risk than mothers aged 20-35 years. The risk factors for parity, prolonged labor, macrosomia, gemelli, hydramnios, induction of labor, history of postpartum hemorrhage, and type of delivery were not associated with uterine atony in postpartum hemorrhage patients,  $p > 0.05$ .

## 4. Discussion

Uterine atony is one of the causes of postpartum hemorrhage. Uterine atony occurs because the blood vessels in the myometrial muscle fibers are not compressed so that the blood vessels that vascularize the placental implantation site do not stop bleeding after delivery. Age is a risk factor for uterine atony in the incidence of postpartum hemorrhage. Age can affect myometrium and muscle tone. At risk age (> 35 years), myometrium and muscle tone have decreased function or weakened so that it can cause blood vessels at the placental implantation site not to be compressed, resulting in postpartum hemorrhage. The reproductive organs of pregnant women at risk age (<20 years) are not ready to accept the pregnancy and work to support childbirth, so they are at risk of experiencing pregnancy and childbirth complications. Age at risk with anemia can cause uterine atony because the Hb level in the blood is less than <11 gr%. Reduced Hb causes reduced oxygen supply to the uterus. This results in the myometrial muscles not being able to contract adequately, and uterine atony occurs. The safest age for a woman to get pregnant and give birth is between 20-35 years because the mother is in a healthy reproductive phase.<sup>10-15</sup>

Table 1. Risk factors for uterine atony in postpartum hemorrhage patients.

Variable	Uterine atony				p	OR	95% CI
	Case		Control				
	n	%	n	%			
<b>Age</b>							
<20 and >35 years	6	46.2	5	12.8	0.019**	5.829	1.383-24.752
20-35 years	7	53.8	34	87.2			
<b>Parity</b>							
1 and ≥4	6	46.2	13	33.3	0.510**	1.714	0.478-6.151
2-3	7	53.8	26	66.7			
<b>Prolonged labor</b>							
Yes	3	23.1	3	7.7	0.157**	0.278	0.048-1.594
No	10	76.9	36	92.3			
<b>Macrosomia</b>							
Yes	1	7.7	2	5.1	1.000**	0.649	0.054-7.802
No	12	92.3	37	94.9			
<b>Gemelli</b>							
Yes	0	0.0	1	2.6	1.000**	-	-
No	13	100.0	38	97.4			
<b>Hydramnios</b>							
Yes	0	0.0	1	2.6	1.000**	-	-
No	13	100.0	38	97.4			
<b>Induction of labor</b>							
Yes	1	7.7	1	2.6	0.441**	0.316	0.018-5.442
No	12	92.3	38	97.4			
<b>History of postpartum hemorrhage</b>							
Yes	0	0.0	0	0.0	-	-	-
No	13	100.0	39	100.0			
<b>Type of delivery</b>							
Sectio caesarea	9	69.2	27	69.2	1.000**	1.000	0.257-3.896
Vaginam	4	30.8	12	30.8			

The results of this study are supported by other studies, which state that there is a significant relationship between age and the incidence of uterine atony  $p < 0,05$  ( $p = 0.000$ ). The study showed (OR=39.1; 95% CI=17–89.7). In this study, the majority who experienced uterine atony were aged <20 years. Women aged <20 years are at high risk of experiencing uterine atony because biologically aged <20 years is not optimal for giving birth, their emotions tend to be unstable, and they are mentally immature, so they can easily experience shocks that cause nutritional needs during pregnancy to be neglected.<sup>16-21</sup>

## 5. Conclusion

The age of delivery of mothers who are less than 20 years or more than 35 years is a risk factor for uterine atony in postpartum hemorrhage patients at Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia.

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