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Maternal and Neonatal Outcomes in sepsis during pregnancy

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ABSTRACT

Sepsis is one among triad of maternal death. Early detection and proper treatment save the life of women. Maternal sepsis influence outcome and death of the neonate. At Dr. Wahidin Sudirohusodo Hospital Makassar, from January 1, 2013 to December 31, 2015, out of 1048 patients, there were 128 (12.21%) patients with sepsis. Length of stay patients with sepsis was not significantly different (p = .496) with patients without sepsis. Maternal (p = .000) and neonatal (p = .000) deaths due to sepsis and asphyxia neonate (p = .000) was significantly different from the maternal sepsis compared with no sepsis.

Keywords : *sepsis, maternal mortality, neonatal mortality, neonatal asphyxia***.**

BACKGROUND

Millenium Development Goals (2000) wished to reduce the number of mother's mortality as many as three quarters between 1990 and 2015. Most mortality of mother happen in developing countries, of which the main causes are hemorrhage, bacterial sepsis and disorders related with hypertension. They contribute to more than a half of all mortality corresponding to maternity.(1)

In developing countries, post-birth delivery infection is still in the third place among maternal mortality causes, and also is the main cause of maternal complication of birth. Post-birth delivery infection occurs approximately 8% of all births in United States and is the main cause of maternal morbidity and mortality in the whole wide world. Post-birth delivery morbidity is clarified when there is a mother who gives a birth delivery suffered from fever of which the body temperature is 38 degrees of Celsius at two occasions or more in 10 days after birth delivery, not including the first 24-hours. (2)

In western countries, it is reported that maternal morbidity incidents at severe cases due to sepsis are varied from 0.1 to 0.6 of 1000 births. Currently, maternal sepsis only contributes a small number of mother's mortality rate in high-revenue countries. In western countries, it is reported that maternal morbidity incidents at severe cases due to sepsis are varied from 0.1 to 0.6 of 1000 births. The most infecting organisms are streptococcus and anaerobe bacteria. Besides, infections by staphylococcus aureus, gonococcus, coliforms, and clostridia are serious pathogen organisms causing post-birth delivery infection even though it rarely happens. (6)

Factors that may increase infection risks are emergency caesarean-section surgery, emergency delivery of baby, amniotic break for 6 hours or more and low socioeconomic status. Other factors which may also affect infection risk but the correlation is not sufficiently proven are anemia, general anesthetic, poor nutritional status, obesity, and a high frequency of vaginal examination. (4)

Sepsis is an inflammation happening systemically called Systemic Inflammation Response Syndrome (SIRS). By early identification of maternal infection, we are able to decide whether the sepsis can be cured or it will get worsen. This step is needed in order to decide optimal prognosis and procedures of newborn infant outcomes.

In England, the decrease in mortality rate due to this bacterial infection is hard to achieve. From three-yearly data of Centre for Maternal and Child Enquiries (CMACE) in 2006, sepsis became the main cause of 'direct' mortality of mother. Mortality rate corresponding to sepsis were increasing from 0.85 deaths for every 100,000 maternity in

2003 to 1.13 deaths in 2006. The total mortality rate of mother in England are as many as 11.39 for every 100,000 maternity. (1)

Lethal maternal sepsis including fever during postpartum has been explained for more than a century ago, unlimited to genital tract. Sepsis focus may vary according to the stage of maternity including genital tract sepsis which may spread from cervicitis and endometritis through pelvic thrombophlebitis and peritonitis, urosepsis, infection of surgery location, pneumonia, emphiema and mastitis. Most sepsis cases occur within 24-48 hours after birth delivery, abortion or water breaking (amniotic fluid). (3)

Neonatorum sepsis is one of the main cause of morbidity and mortality of a newborn infant. A surviving infant may still have significant neurologic remainder symptoms as a consequence of involvements of central neuron, septic shock or secondary hypoxemia systems to severe lung parenchymal disease. (7)

This research aims to reveal the correlation between maternal sepsis and maternal and neonatal outcomes.Maternal outcomes define as length of stay and maternal death, while neonatal outcomes define as neonatal morbidity and neonatal condition at birth.

METHOD

This is a retrospective research with cross sectional approach and non-parametric test.. The samples used in this research are pregnant mothers with sepsis during birth delivery process who delivered their baby at Dr. Wahidin Sudirohusodo Hospital from January 2014 to December 2015. The data employed are secondary data taken from obstetrics patients medical records containing a group of pregnant mothers who may develop sepsis during delivery process. The variable studied categorized according to patients' age. It is divided into two categories, i.e., high-risk patient and low-risk patient, under a condition where for patients in their <20 and >35 years old are included in high-risk patients and age of 20-35 years old are categorized into low-risk patients. We categorized mothers' education into low-educated patients (those who graduates from elementary school to high school) and high-educated patients (Diploma 1 and above). Variable of occupation is divided into unemployed mothers and employed mothers. Length of Stay (LOS) of a mother is divided into treatment with normal delivery direction (NL) who is treated for 3 days and caesarean-section treatment (SC) who is treated for 5 days. Meanwhile, the newborn infants are categorized into newborn infants from mothers with sepsis that also develop sepsis, and newborn infants from mothers with sepsis but do not develop sepsis. Neonatal outcomes occur in the form of death/mortality, asphyxia and non-asphyxia.

Inclusion criteria are pregnant mothers who are about to deliver their babies are suffering from infection in maternal which causing sepsis. Exclusion criteria are pregnant mothers who are about to deliver their babies are not suffering from infection in maternal.

Statistical analysis of this research is utilizing a statistical software SPSS.

RESULTS

Within research period starting from January 2013 to December 2015, as many as 1,048 research samples are obtained. Among that number, 128 patients are developing sepsis. Research samples characteristic shows that according to mother's age, education and occupation, those characteristics are not statistically significant between sepsis group and non-sepsis group, so that research samples according to those characteristics are homogeneous.

Table 1. Samples Characteristics

Characteristics	**Groups**			
	Sepsis		**Not-Sepsis**	
	n	**%**	**n**	**%**
Age				
High Risk	40	3.8	291	27.8
Low Risk	88	8.4	629	60.0
Education				
High	22	2.1	216	20.6
Low	106	10.1	704	67.2
Occupation				
Employed	14	1.3	180	17.2
Unemployed	114	10.9	740	70.6

As maternal outcomes, we evaluated the correlation between sepsis and length of stay of those who go through normal delivery process or caesarean-section and maternal outcomes. (Table 2)

Table 2. Correlation between Maternal Sepsis and Maternal Outcomes

Variables	Groups				P
	Sepsis		Not Sepsis		
	N	%	n	%	
Length of stay					
- Normal Labor	**60**	**5.7**	**406**	**38.7**	**.496**
- Caesarean Section	**68**	**6.5**	**514**	**49.0**	
Maternal Outcomes					
- Deceased	**27**	**2.6**	**18**	**1.7**	**.000**
- Alive	**101**	**9.6**	**901**	**86.1**	

Table 2 shows that length of stay of patients with sepsis with Normal Labor (NL) treatment are 60 days long (5.7%), while those with caesarean section (SC) stay for 68 days (6.5%). In accordance to the statistical test result, it is shown that there is a score of (p=.496) which means that the sepsis does not affect the length of stay according to delivery manner. The table above also exhibits the maternal outcomes showing those who decease are 27 (2.6%) patients and alive maternal are as many as 101 (9.6%) patients. Statistical test result shows the score of (p=.000) which means that maternal mortality provides a bigger possibility to happen to mothers with sepsis.

Table 3. Correlation between Maternal Sepsis and Neonatal Outcomes

Variable	Groups				P
	Sepsis		Not Sepsis		
	n	%	N	%	
Neonates					
- Sepsis	**57**	**5.4**	**863**	**82.3**	**.000**
- Not-Sepsis	**71**	**6.8**	**57**	**5.4**	
Neonates Condition at birth					
- Deceased	**11**	**1.0**	**20**	**1.9**	
- Asphyxia	**23**	**2.2**	**13**	**1.2**	**.000**
- Not Asphyxia	**94**	**9.0**	**887**	**84.6**	

Table 3 shows that newborn infants who develop sepsis are as many as 57 (5.4%) patients and not sepsis are as many as 71 (6.8%) patients from mothers with sepsis. The statistical test result exhibits a score of (p=.000) which means that maternal sepsis plays a significant role in the occurrence of neonatal sepsis. Newborn infants with sepsis have deceased infants outcomes as many as 11 (1%), Asphyxia as many as 23 (2.2%) and not asphyxia as many as 94 (9%) patients. The statistical test result presents that the score of (p=.000) shows that maternal sepsis does not affect to neonatal mortality, but significantly affects newborn infant's asphyxia.

DISCUSSION

Sepsis is the main cause of 'direct' mortality of mothers. (5) Sepsis incidents are commonly associated with infection complication such as obstetrics sepsis and non-obstetrics sepsis. Obstetrics infection is including urinary tract infection, chorioamnioitis and septic abortion. Meanwhile, some of the causes of non-obstetrics infection are malaria, HIV and pneumonia. (8) In the sufferers of sepsis shock, 40-60% of the incidents are caused by bacteria. The main cause of sepsis is Streptococcus pyogenes. (4)

Sepsis does not affect length of stay according to modeof delivery. Length of stay is affected by patient's condition during admission to the hospital. Sepsis focus may vary according to the stages of maternity. Most sepsis cases occur within 24-48 hours after delivery of birth, abortion or water (amniotic fluid) breaking. Knauss et al. in their study found that 78% variation of length of stay at ICU and 90% variation of mortality rate of hospital is highly depending on the patient's characteristics when they are registered to ICU. (4) Sepsis may cause mother's morbidity and become a reason why the patient should be registered to the intensive care unit. (6) The possibility of maternal mortality is higher to likely happen to mothers with sepsis. Lemmonn's study reported that there are 2.4 cases in every 1,000 births in ICU between 2004 and 2006. (8)

Maternal sepsis plays a big role to the incidents of neonatal sepsis. Neonatorum sepsis is one of the main causes of morbidity and mortality on newborn infants. The surviving infants may still have significant neurologic remainder symptoms as a consequence of involvements of central neuron, septic shock or secondary hypoxemia systems to severe lung parenchymal disease. Sepsis incidents are recorded occurring as many as 1-8 cases in every 1,000 live birth of which the distribution is nearly the same with early onset sepsis and late onset sepsis. (1) Bhutta and Yusuf reported a significant relation between early onset sepsis and ISK maternal and fever.

Maternal sepsis does not affect neonatal mortality, but it does affect newborn infant's asphyxia. Various factors such as mothers, fetus and environments also contribute to the sepsis on neonatal. Some of factors corresponding to mothers are early water (amniotic fluid) breaking, mother's fever in 2 weeks prior to birth delivery, amniotic fluid with meconium, smelly amniotic fluid and the tools and instruments used for birth delivery. Fetus factors are including birth weight, week pregnancy and Apgar score. (2) Prematurity and water (amniotic fluid) breaking for more than 18 hours prior to delivery are the two significant risk factors as reported by Oddie et al. The researchers did not identify the increasing risk of early onset sepsis in the infants born through meconium spotted with amniotic fluid. (1) Neonatorum asphyxia is a condition where the newborn infants experiencing breathing failure spontaneously and regularly right after they are born (Hutchinson, 1967). (3) According to Drage and Berendes (1966) who obtained that the low Apgar score as the manifestation of weight asphyxia on the infants when they are born will exhibits a high rate of mortality.

CONCLUSION

Length of stay based on mode of delivery was not affected by maternal septicemia. Maternal sepsis influence maternal death, neonatal sepsis, and neonatal asphyxia, but not neonatal death.

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