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RISK FACTORS OF PREMATURE LABOR IN BLAMBANGAN REGIONAL PUBLIC HOSPITAL (RSUD) OF BANYUWANGI

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ABSTRACT

Background and Purpose of the Study: Premature labor is a labor induced when the baby is in less than 37 weeks of pregnancy causing perinatal morbidity and mortality. The premature labor in Blambangan Regional Public Hospital (RSUD) of Banyuwangi Regency from 2013 to 2015 was reported to increase during the period. In 2013, the case was 12.5% of 1,314 deliveries. Then, in 2014, the case was reported reaching 14.9% from 948 labors. In the following year, 2015, the percentage of the case increased to 15,8% from the total 965 births. This study is aimed to determine the risk factors affecting premature labor.

Research Method: This study used case control design. The cases were 47 women that had premature labor in 2016 recorded in the medical record register of Blambangan Regional Public Hospital (RSUD) of Banyuwangi Regency. The controls of this study were 104 women who delivered babies in 2016 recorded in the medical record register of Blambangan Regional Public Hospital of Banyuwangi. The data were collected from the secondary data in the form of maternity medical care record data extraction and were analyzed through bivariate and multivariate analysis. **Research**

Result: Cases and controls have been comparable in terms of age and birth spacing. Mothers tend to give birth in town. Factors found to be significantly associated with the premature labor were placenta previa (AOR = 21.24; 95% CI: 4.25-106.1), premature history (AOR = 13.42; 95% CI: 3.54-50, 96), preeclampsia (AOR = 10.3, 95% CI: 3.30-31.01), KPD (AOR = 2.87, 95% CI: 1.09-7.56), and lower education by AOR 3.23 (95% CI: 1.18-8,79). Abortion history has not been shown to be associated with premature birth (AOR = 3.02; 95% CI: 0.66-13.65)

Conclusion: Risk factors that play roles in premature labor are premature history, placenta previa, preeclampsia, and premature rupture of membranes can be detected early in pregnancy by health workers.

Keywords: ***risk factors, premature labor, preeclampsia, premature history***

INTRODUCTION

Infant and toddler mortality is still a global problem. Approximately 6.6 million infants who died in 2012 were largely attributable to preventable factors (Childrens, 2014). Other data say that between 1990 and 2013, about 86 million babies were born in the world with the most

frequent deaths in the neonatal period (UNICEF, 2013). Save The Childrens report entitled Ending Newborn Death mentions that neonatal mortality varies in countries where about 5.9 per 1000 live births (KH) occur in Europe and four to five times in Asia and Africa (Simon Wright with Kirsten Mathieson, Lara Brearley, 2014).

In Indonesia, infant mortality rate (IMR) is still high and at least 80% of children mortalities occur during infancy. Data in 2012 showed an IMR of 34 per 1000 live births), of which 60% of infant mortality occur during the neonatal period and.[4] According to the results of SDG's in 2015, the IMR in Indonesia by 2015 reached 22.23 deaths per 1,000 live births and toddlers mortalities were 40 deaths per 1,000 live births. In addition, the results of Riskesdas 2007 showed the cause of newborns mortalities within the first week of birth in Indonesia is mostly caused by respiratory disorders of 36.9%, followed by 32.4% prematurity, and 50% of premature labors from mothers who are still teenagers. While the cause of infant mortality in the age group 7-28 days most because of neonatal sepsis with an incidence of 20.5%, and premature infants at 12.8% (Kesehatan & Indonesia, 2015).

East Java Province, with an IMR of 25.85 per 1000 live births is already below the national infant mortality rate, but this figure increased in 2014 to 26.66 per 1,000 live births, and stable in 2015 by 25,3per 1000 live births) (Dinkes Jatim, 2015). Banyuwangi regency is one of the districts in East Java which is located at the easternmost tip of Java with an area of 5.782.50 km2 and has a population density of 289 inhabitants per km2. In this region, the IMR is known at 6.82 per 1000 live births for 2015. The 2015 Riskesdas data show several risk factors found in this region where the proportion is 38% premature LBW, followed by 26% asphyxia, congenital abnormalities 16% , infection 15%, others 5% (Banyuwangikab, 2015)

Blambangan Regional Public Hospital is the main referral hospital in Banyuwangi regency. These hospital data show that there has been an increase in the percentage of premature labor from total labor in the last three years, ie, 12.5% (2014), to 14.9% (2015) and 15.8% (2016), respectively. The Increasing of the incidence of premature labor is important to be examined so it can be used as the basis of program development in order to reduce the incidence of premature labor in Blambangan Hospital Banyuwangi.

Research Method

The research was conducted in Obstetric and Gynecology Division of Blambangan Regional Public Hospital of

Banyuwangi with case control design. As a regency referral hospital, it has been equipped with facilities such as special room for ultrasound for pregnant women, family polyclinic, Comprehensive Emergency Obstetric and Neonatal Care (CEmONC) service, Emergency Department specifically for maternity patients equipped with an operating room for handling obstetric and gynecological emergency obstetric cases. Cases are mothers who give birth to premature infants and controls are mothers who give birth to term babies. The cases of premature labor and term labor were taken from the medical record of the Blambangan District Hospital between 1 January and 31 December 2016. Sampling methods were as follows: in 2016, there were 965 maternal medical record numbers in the register book, of which 898 were cases of labor. Furthermore, based on the status of premature birth and term, it is known there were152 mothers gave birth prematurely and 746 mothers gave a term birth. Furthermore, taking data with Systematic Random Sampling where each subject has the same opportunity to do data retrieval. Of these, medical records that were found with complete data of 47 in the case group and 104 in the control group.

Data collection on maternal characteristics (education level, treatment class, residence area) and maternal maternity status were collected using a data extraction table. The application of diagnosis was based on existing SOP in RSUD Blambangan. The status of premature labor in this study is in accordance with recorded in register book of labor, called premature labor if delivery occurs during pregnancy <37 weeks. Early rupture of membranes is the membranes rupture before birth and in (Blambangan, 2001). One hour is not accompanied by signs of labor diagnosed by medical personnel and recorded in the medical record. Treatment class is the type of treatment class when the mother gives birth at the hospital recorded in the medical record, which consists of classes I, II, and III. The history of abortion is the history of whether or not the mother experienced a conception outcome with age <20 weeks in pregnancy recorded in the medical record. Parity in this study is the number of live births experienced by mothers recorded in the medical record. History Premature labor in this study was a history of premature delivery of mothers in previous pregnancies recorded in the medical record. Anemia is defined as the hemoglobin of the mother at the time of the last delivery and recorded in the medical record. Twin pregnancy is the mother giving birth with more than one baby recorded in medical record books.

Preeclampsia in this study is a complication that occurs during pregnancy in the form of preeclampsia recorded in the medical record.

The connection between risk factors and premature labors was analyzed bivariate and multivariate. Bivariate analysis used the comparability test and OR crude value, while multivariate analysis used logistic regression with backward LR method. Data is then displayed bivariate and multivariate. This study has obtained ethical eligibility from the Commission of Ethics Faculty of Medicine, University of Jember number: 1149 / H25.11 / KE / 2017, permission from Bakesbangpol East Java and Banyuwangi, and using anonymous principles for the confidentiality of the patient's name.

Research Results

The results of comparability analysis showed that the characteristics of case and control group did not differ in age variables (29.47 years vs. 28.83 years) and birth spacing (49.66 months vs. 46.82 months). Maternal distribution of either cases or controls were more common in the City District (see Table 1).

Table 1. The Comparison of Case and Control Characteristics

Characteristics	Case		Control		P value
	n	%	n	(%)	
Mother age (year), on average ± Elementary School graduate	28.95	6.73	27.73	6.51	0.145
Parities, on average ± Elementary School graduate	2.21	1.196	1.99	1.786	0.125
Address or Domicile					0.038
• Village (City District)	52	50.00	32	68.09	
• Outer City District)			1		
Genteng	1	2.13	1	2.13	
Rogojampi	1	2.13	2	2.13	
Kalipuro	2	2.46	8	2.46	
Licin	8	17.03	2	17.03	
Others	2	4.26		4.26	
Total	104	100	47	100	

Table 2. shows the variables that have a value of ρ <0.25 i.e. residence, working mother, education level ≤ junior high school, premature rupture of membranes, abortion history, placenta previa, anemia, history of premature labor and preeclampsia as variables included in the multivariate test. While the variables of

treatment class, parity, mothers' age, and twin pregnancy were not statistically significant as risk factors for the incidence of premature labor.

Table 2. Crude OR, Mother Characteristics, Labor Obstetric Status in Blambangan Regional Public Hospital of Banyuwangi

Characteristics	Case		Control		Crude OR	P value
	N	%	N	%		
Domicile						
Village	15	31.91	52	50.00	0.468	0.038
Town	32	68.09	52	50.00		
Occupation Status						
Working	5	10.64	4	3.85	2.976	0.103
Not Working	42	89.36	100	96.15		
Education						
> Secondary School	21	44.68	30	28. 85	1.992	0.057
≤ Secondary School	26	55.32	74	75.15		
Treatment Class						
3rd Class	44	93.63	101	97.12	0.435	0.308
1st and 2nd Classes	3	6.38	3	2.88		
Premature Rupture of Membranes						
Yes	21	44.68	31	29.8	1.901	0.075
No	26	55.32	73	70.19		
Paritas						
>2	15	31.91	24	23.08	1.56	0.250
≤2	32	68.09	80	76.92		
Mother Age						
<20 or >35	11	23.40	22	21.15	1.138	0.757
20-35	36	76.60	82	78.85		
Abortion History						
Yes	10	29.79	7	6.73	3.745	0.009
No	37	78.72	97	93.2		
Placenta previa						
Yes	14	29.79	5	4.81	8.4	0.000
No	33	70.21	99	95.19		
Anemia						
Yes	24	51.06	42	40.38	1.540	0.221
No	23	48.94	62	59.62		
Twin Pregnancy						
Yes	4	8.51	2	1.92	0.706	0.753
No	43	91.49	102	98.08		
Preeclampsia						
Yes	20	42.55	16	15.38	4.074	0.000
No	27	57.45	88	84.62		

Multivariate test results showed mothers with early rupture of membranes (adjusted OR 2.87), placenta previa (adjusted OR21, 24), history of premature labor (adjusted OR 13.42), preeclampsia (adjusted OR 10.13), education ≤ Secondary level adjusted OR 3.23) was independently significant as a factor that increased the risk of premature labor (see Table 3).

Table 3. Adjusted OR Determinant of Premature Labor in Blambangan Regional Public Hospital of Banyuwangi

Variable	Adjusted OR	95%CI	P value
Premature rupture of membranes	2.87	1.092-7.56	0.032
Abortion history	3.02	0.66-13.65	0.150
Placenta previa	21.24	4.25-106.1	0.000
Anemia	1.50	0.55-4.11	0.421
Premature history	13.42	3.54-50.96	0.000
Preeclampsia	10.13	3.30-31.01	0.000
Live countryside	0.27	0.09-0.77	0.013
Working mother	1.78	0.21-14.6	0.057
≤ Secondary school graduate	3.23	1.18-8.79	0.000

Discussion

The result of the study showed that there were four obstetric factors that can escalate premature labor rate i.e. premature rupture of membranes, placenta previa, prior premature labor history, and the presence of preeclampsia. In addition, two maternal sociodemographic factors of urban living and education level were also shown to increase premature labor rate. Other maternal factors such as having abortion in the past and anemia had not been shown to be relevant, in addition to the socio-demographic factor of being working mothers.

Women who have placenta previa are 21.24 times at risk of experiencing the incidence of premature labor that is statistically meant that they are having risk in premature delivery with the adjusted OR = 21.24 (95% CI: 4.25-106.1). This result is in accordance with the research with a control case design conducted at Dr. Hasan Sadikin Hospital, Bandung, in 2003 which stated that placenta previa had 3.71 times risk for premature delivery compared with mothers who did not have placenta previa (Tresnasih, 2003). Pregnant women who have placenta previa often experience premature labor due to the stimulation of blood coagulum in the cervix. Moreover, the more placenta tissues are loose the more progesterone level will go down causing his or her contractions to the uterus, the loss of the placenta itself can stimulate initial birth (Mochtar, 1998). The premature labor history increased premature labor risk as much as 13.42 times compared with the risk face by somebody without premature labor history and is statistically significant with adjusted OR = 13.42 (95% CI: 3.54-50.96). Pregnant women with premature labor history have greater risk of having premature delivery at the subsequent births; the result of this study is in accordance with a study conducted in Beijing which concluded that women with history of premature labor are 20.888

times at risk for having premature delivery in the future (Zhang, Y, 2012). The result of this study also supported by the research done in RSIA Siti Fatimah Makasar with case control study which stated that premature labor history is a risk factor of premature labor with OR = 3,413 (Utami, 2009). Pregnant women who once have a history of premature labor have 14,3% bigger probability to give premature delivery and increased to 28.1% in mothers with twice premature labor history (Zhang, Y, 2012). In addition, it was explained that labor process experienced by mothers with labor impeded by malposition and malpresentation of the fetus, premature, cesarean section, stillbirth, prolonged labor, labor with induction and all abnormal maternal deliveries is a high risk factor of subsequent labor (Manuaba, 2010). However, the results of this study are not in line with the research conducted at Budi Kemuliaan Hospital Jakarta that a woman who have a history of abortion is not significant / does not increase the risk factors for premature labor (Irmawati, 2010).

Preeclampsia carries a risk of 10.13 (95% CI: 3.30-31.31) times of premature labor. The results of this study are in line with studies conducted in 22 European states in 2013 which suggested that preeclampsia in pregnant women is 1.25 times the risk of premature birth (Vogel, 2013). A similar study conducted on 30,000 families in Sweden in 2009 also supported the outcome that pregnant women with preeclampsia are 6 times at risk of premature delivery (Svensson & Sandin, 2009). Vasospasm causes constriction vascular on various organs including placenta, blood vascular constriction resistance causing arterial hypertension in placenta. Reduced blood flow to the placenta will cause impaired placental function, whereas placental function is to channel the intake of oxygen and nutrient intake from mother to fetus. If the intake of nutrients and oxygen is disrupted then it can lead to fetal growth disorders so that it causes low birthweight. Preeclampsia can also raise uterine muscle tone and sensitivity to stimuli resulting in prematurus partus (Hanifa, 2012).

In this study, the research subjects with the education level is ≤ junior high school are considered to have low level of education, while they with the education level is > junior high school are categorized as highly educated. The respondents in this study with high education level are 26 people (55.32%), 21 others (44.68%) have low education level. While, for the control group the number of respondents with high education level are as many as 74 people (71.15%) and low education level are as

many as 30 people (28.85%) with adjusted OR value = 3.23 (95% CI: 1.18-8,79), based on the statistic low level education is a risk factor of premature labor. This study is in line with the statement made by Irmawati in 2010 that the higher the education level of pregnant women, the lower the risk of premature delivery they might face. According to Utomo (1984), the education level of women is closely related to their understanding level of health care, hygiene and the need for pregnancy examination (Santiyasa, 2004). The low level of education and the lack of information cause large number of women to be less aware of the importance of prenatal care results in the absence of detectable high risk factors they might experience. The risk sometimes just discovered at the time when it is already too late so it can bring fatal consequences (Maas, 2004). As a result, the lack of awareness of the importance of prenatal care can have an impact on premature labor due to the absence of detectable maternal health problems (Husnina, 2006).

Early rupture of membranes could increase the risk in this study. This is in line with research conducted at the Inner City Hospital of Sub-Saharan Africa, where mothers with premature rupture of membranes during labor may have 3.61 times greater probability to give birth to premature babies than mothers who did not experience premature rupture of membranes (Olusannya, 2009). Yet, the results of this study are not in line with the research conducted at RSUD Dr. Moewardi Surakarta in 2009 stated that there is no relationship between the incidence of premature labor with premature rupture of membranes (Sagitta, 2008).

History of abortion was not shown to increase risk for premature delivery in our study. Other studies are in line with our findings. On the contrary, these findings contradict some researches in Indonesia which showed that history of abortion increases the risk of premature labor, based on multivariate analysis abortion history is a protective factor against premature labor with adjusted OR = 3.02 (95% CI : 0.66-13.6). These findings are consistent with the research results of the Sebayang et al (2012) stated that women who had had an abortion in previous pregnancies had a risk of 0.91 times for having premature delivery compared with mothers who did not have miscarriage in previous pregnancies. This is because women who had experienced of miscarriage in pregnancy in the past become more aware of their health. Abortion history in this study is not a risk factor for the incidence of premature labor

with the value of OR <1. This is because the number of respondents with a history of abortion or at risk in the control group (14.8%) was not significantly different from the case group (13.7%). This result is supported by Agustiana's research in 2012, but not in line with Malka's research in 2013 in Bone (Malka, 2013). The difference of those researches was caused by the analysis process conducted by Malka that calculated the risk of abortion history on all 119 respondents regardless of the parity of the respondents. While in this study, the history of abortion is only analyzed in mothers who have given birth before.

The result of the research for working mother status based on multivariate analysis of working mother status was protective factor to the incidence of premature labor with adjusted OR value = 1.82 (95% CI: 0,24-13,77). The kinds of work are socioeconomic and physical activity of pregnant women. The socioeconomic status will affect the limitations in obtaining adequate antenatal services and nutritional fulfillment. Meanwhile, working pregnant women tend to get tired quickly because of the increase of physical activity that has additional activities inside and outside the house. In this study, we found that only a small number of the pregnant women who work. Almost all mothers who become recipients in this study are housewives, working pregnant women have higher education and better knowledge to maintain health during pregnancy and have health insurance that ease the access to health services, so it is not considered as a risk factor for premature delivery. Based on the existing data, the researchers concluded that most respondents did not work and the work they did would not harm the fetus.

Based on the multivariate analysis, anemia gives 1.50 times risk to premature labor that statistically was not significant as a risk factor for premature labor with adjusted OR value = 1.50 (95% CI: 0,55-4,11). The results showed that anemia on pregnant women is a protective factor in the incidence of premature labor. This is consistent with the result of the research conducted by Novhita Paembonan in 2014 which concluded that anemia is not a risk factor for the incidence of premature labor. However, this result is not in accordance with the research done by Yi, Han, & Ohrr (2013) in Korea which resulted that anemia in pregnant women contributes 1.53 times against premature birth. This study is also inconsistent with the research done by Baig et al (2013) in Pakistan which concluded that anemia contributes 43.31 times against premature labor. According to Amiruddin (2006) pregnant women

who experienced anemia 2.375 times more likely to have premature labor than pregnant women who did not suffer from anemia. In this study, anemia is a protective factor for premature labor due to the differences in Hb concentrations measurements of the respondents by using complete blood count at maternal gestational age at TM III when the mothers are going to give birth with hemoglobin (Hb) benchmark level < 11gr%, in other studies the counting used hemoglobin (Hb) benchmark level < 10.5gr%. In this study, the respondents with the Hb level <11 gr% are as many as 66 respondents called as physiological anemia sufferer that happenes because of adequate hemodilution process in pregnant women before delivery. The occurrences of this hemodilution process is useful to adjust the enlargement of the uterus against vascular system hypertrophy so that the metabolic need of the uterus can be fulfilled. Hemodilution provide abundant nutrients and elements, uteroplacental circulation can take place well and the nutritional and oxygen needs of the placenta and fetus can be fulfilled (Varney et al., 2007), this makes anemia in third trimester pregnant women before delivery does not cause occurrence of prematurity.

Based on multivariate analysis status of the domicile of the pregnant women in this study, the domicile background cannot be considered as a risk factor for the incidence of premature labor with adjusted OR value = 0.27 (95% CI: 0,09-0,77). It is because most of them come from city area whereas the Hospital is located in the center of the city. All in all, the results of this study indicated that living in or out of the city would not be a risk factor for the incident of premature labor because the roads in rural areas have been paved. The infrastructure is already good both in terms of spatial and building arrangements in the public service sector including in health services, and the means of transportation is already adequate that close the gap between people living in village or in the city.

Conclusion

This study showed that placenta previa, premature labor history, preeclampsia status, educational background, and premature rupture of membranes are risk factors for premature labor in Blambangan Regional Public Hospital of Banyuwangi.

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