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## ANALYSIS OF PREDISPOSITION FACTORS ON PREMATURE RUPTURE MEMBRANES IN POSTPARTUM MOTHERS

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### ABSTRACT

**Background:** Early rupture of membranes is one of the most common pregnancy complications. The incidence of premature rupture of membranes ranges from 5-10% of cases. Preterm premature rupture of membrane occurs in 1% of all pregnancies, 70% of cases of premature rupture of the membranes occur in term pregnancy. In West Nusa Tenggara, 45% of maternal deaths occurred due to bleeding, 14% due to preeclampsia, 1% of prolonged labour (old or stalled openings), 4% infections and 36% of other cases.

**Aims:** The purpose of this study is to analyse some predisposition factors of premature rupture membranes in Maternity Room of General Hospital of West Nusa Tenggara Province in 2012.

**Methods:** This study is observational analytic with cross-sectional design. The population in this study were all maternal mothers at West Nusa Tenggara Provincial Hospital in January - December 2012 with 1027 births and the sample used were 576 samples consisting of 288 case samples and 288 control samples, using systematic random sampling technique.

**Results:** From the result, the age group of 20-35 years old as much as 154 samples (53.5%). The most parity 220 sample (76.4%), in work mother of 149 samples (51.7%). The result of multivariate analysis using logistic regression showed that age is the most dominant influence which cause the incidence of early rupture of membrane (wald = 20.209)

**Conclusion:** Multivariate analysis showed that there was one variable that proved to have an effect on the incidence of premature rupture of membrane, i.e. mother age with  $p = 0,000$  with OR = 3.441 mean maternal mother with age <20 and > 35 had 3.44 times risk of premature rupture of membranes. Therefore, it is imperative that women are educated in the risk factors and the signs and symptoms of premature rupture of membranes so that in case of membrane breaks, they can seek for immediate treatment.

**Keywords:** Premature Rupture Membranes, Postpartum, Parity, Ages

### INTRODUCTION

The measure of successful development in a country is maternal mortality (MMR) and infant mortality (IMR). In Indonesia, the maternal mortality rate is 307 per 1000 live births. At the beginning of 2008, the decline in MMR and IMR have become the government's priority, and the government proclaimed the reduction of MMR up to 226 per 100,000 live births. The plan is still far from the figure set by the Millennium Development Goals (MDGs) of 125 per 100,000 live births.[1, 2]

Meanwhile, the maternity room of West Nusa Tenggara Provincial Hospital recorded incidence of premature breakage fever in 2011 consisted of 522 cases from 1517 births, then increased in 2012 to 452

cases of 1027 childbirth. Some factors predispose with premature rupture of membranes incidence are age, parity, occupation, gestational age, history of multiple pregnancies, thin cervix, and bleeding during pregnancy. Furthermore, the hospital recorded 62 cases of maternal deaths which are caused by bleeding (30 cases), hypertension in pregnancy (24 cases), infection (six cases), and amniotic water embolism (two cases).[2-5]

## METHODS

This is observational analytic with cross-sectional design. The population in this study were all maternal mothers at West Nusa Tenggara Provincial Hospital in January - December 2012 with 1,027 births, and the sample used were 576 samples; consisting of 288 case samples and 288 control samples, using systematic random sampling technique [7]. The case samples are maternal mother with premature membranes rupture while the control samples are those who did not have ruptured membranes. The result is then measured by using chi-square test [3, 6].

Sampling method were done in two ways; the sampling method used for the case samples was total sampling, where all 452 incidences of premature membranes breakup were taken as a sample. Meanwhile, for the control group, sampling was done by using systematic random sampling; where sampling of all members of the population is done randomly regardless of the strata present in the population members, with independent variables. In this study, the independent variables are age, parity, and occupation; while the dependent variable is premature rupture of membranes.

## RESULTS

### *Maternal Age Relation with Early Rupture of Membranes*

To know the relationship between maternal age and the incidence of amniotic early rupture can be seen in table 1 below:

Table 1. Maternal age relation with early rupture of membrane inflammation at West Nusa Tenggara Provincial Hospital

Age	The incidence of rupture of membranes early				Total		P-Value
	Premature rupture of membranes		Not Premature rupture of membranes		N	%	
	n	%	n	%			
Group Not at Risk	154	42.0	213	58.0	367	100.0	0.000 OR=2.405
Group Not at Risk	134	64.1	75	35.9	209	100.0	
<b>Total</b>	<b>288</b>	<b>50.0</b>	<b>288</b>	<b>50.0</b>	<b>576</b>	<b>100.0</b>	

From Chi-square statistical test calculation with  $\alpha = 0.05$ , the p value obtained is equal to 0.001. Therefore,  $H_0$  is refused and  $H_a$  is accepted because p value  $< \alpha$ ; meaning that there is a significant relation between mother age with incidence of rupture of membrane early.

The results OR = 2.405 indicates maternity mothers with age below 20 years old and more than 35 year olds are 2.40 times more likely to experience premature rupture of membranes compared with mothers aged 20-35 years.

*Relationship Parity with Early Rupture of Membranes*

Parity mother with the incident Early Rupture of membranes can be seen in Table 2. below:

Table 2. Relationship Parity with the incidence of premature rupture of membranes at the West Nusa Tenggara Provincial Hospital in 2012

Parity	The incidence of rupture of membranes early				Total		P-Value
	premature rupture membranes		Not premature rupture membranes				
	N	%	N	%	N	%	
≤3	220	46.6	252	53.4	472	100.0	0.001 OR=1.462
>3	68	65.4	36	34.6	104	100.0	
Total	288	50.0	288	50.0	576	100.0	

From the Chi Square with  $\alpha = 0.05$  got p value equal to 0.001, where p value  $< \alpha$  hence  $H_0$  refused and  $H_a$  accepted, meaning there is significant relation between parity of mother with incidence of rupture of membrane early. From result of OR = 1.462 show mother with parity > 3 times bigger to experience premature rupture of membranes compared with maternal mother with parity ≤3 times.

*Occupational Relations With Early Rupture of Membranes*

To know the relationship of the mother's work with the incident Early Rupture of membranes can be seen in Table 3. below:

Table 3. Occupational Relation With Early Rupture of Fetal Inflammation West Nusa Tenggara Provincial Hospital

Work	The incidence of rupture of membranes early				Total		P-Value
	Not premature rupture of membranes		Not premature rupture of membranes				
	N	%	n	%	N	%	
Work	149	47.8	163	52.2	312	100.0	0.277
Not Work	139	52.7	125	47.3	264	100.0	
Total	288	50.0	288	50.0	576	100.0	

From Chi-square statistical test calculation with  $\alpha = 0.05$ , the p value obtained is equal to 0.277. Therefore,  $H_0$  is accepted and  $H_a$  is rejected because p value  $> \alpha$ ; meaning that there is no significant relation between work with incidence of rupture of membrane early.

Multivariate analysis was performed to determine the most influential variable on the incidence of premature rupture of membranes and determine the best model. Analysis is done by multiple logistic regression test (Multiple Logistic Regression) by using enter method. The two stages of the analysis are the selection of important variables and the determination of the variables for the model.

Assessment criteria in the selection of important variables used to incorporate independent variables into multivariate analysis taking into account the value of  $p < 0.25$ . Independent variables that meet the criteria for inclusion in multivariate analysis are Age and Parity. Eligible variables are included in the multivariate analysis at the critical variable selection stage as in Table 2.

To study the effect of Age and Parity on the occurrence of premature breakup of Fetus can be seen in the final model with logistic regression analysis.

Tabel 4. Variable Logistic Regression Analysis

<b>Dependent Variables</b>	<b>Independent Variables</b>	<b>B</b>	<b>P Value</b>	<b>OR</b>
premature	Age	1.181	0.000	3.441
rupture of membranes	Parity	1.197	0.012	2.558
	Constant	-4.520	0.000	0.181

Based on table 4 above, the incidence of premature rupture of membranes affected by age is as much as 3.441 times and by parity is as much as 2.558 times. Having obtained predictor variables that are important in multiple logistic regression model, the researchers then conducted interaction analysis together to see the possibility of interaction between variables. The best model equations are considered with a significance value of  $p < 0.05$ .

The result of this multivariate analysis shows that the important variables after analyzing together as one variable proved to affect the incidence of premature rupture of membrane; that is the mother's age with  $p = 0.000$  with OR = 3.441 mean maternity with age  $< 20$  and  $> 35$  have 3 . 44 times the risk of premature rupture of membranes.[5, 8]

## DISCUSSION

Identification of Rupture of premature membranes at West Nusa Tenggara Provincial Hospital 2012

From the research, it can be seen that the sample distribution of mother who experienced premature rupture of membranes was 288 samples (50.0%) was the same as those who did not, with 288 samples (50.0%).

*Analysis of Relationship Factors Associated with Early Rupture of membranes St West Nusa Tenggara Provincial Hospital 2012*

There was a significant correlation between mother age relationships to premature rupture of membranes. This is because women younger than 20 years of age are considered high-risk pregnancies because the reproductive organ is not quite ready to conceive, thus may adversely affecting the formation of the membranes. Meanwhile, at age of 35 years old there is a decrease in the ability of the reproductive organs. That affect the process of embryogenesis thus the membranes formed are thinner and are easier to break prematurely. This is in accordance with research conducted by Agustina Eli in dr. R. Goeteng Kab. Purbalingga in 2009-2010, which discusses the characteristics of maternal mothers with premature rupture of membranes. Their results indicate that the number of mothers who experience premature rupture of membranes is greater in the age  $< 35$  years compared with age  $\geq 35$  years.[9-11]

There is a significant relationship between parity and premature rupture of membranes. This is probably due to pregnancy that too often will affect the embryogenesis so that the membranes rupture before premature. This is in accordance with Kumala (2011) study which states that parity is at risk for premature rupture of membranes with  $p$  value = 0.04 and OR = 8.16) which means high parity ( $> 3$ ) has an 8.16 times greater risk for Causing premature rupture of membranes compared to  $\leq 3$  parity.[12, 13]

From the results obtained, there is no significant relationship between work and the incidence of premature rupture of membranes. This is probably due to the researchers did not categorize the sample between heavy

and light work; where heavy work categories are more at risk of causing premature rupture of membranes than light work. This is contrary to research conducted by Notoatmojo (2010), which states that the risk of premature rupture of membranes in mothers whose occupations are at high risk is 3.6 times greater than women at low risk on their work. This is one of the weaknesses of this research because there is no distinction in the mother's workload in the sample category [6, 14].

The variable that meets the requirements to be included in the multivariate test is a variable that in bivariate analysis has p-value  $<0.25$ . Furthermore, double logistic regression analysis is done by enter method, which is to enter all independent variables into the model, then one by one independent variable is excluded from the model based on certain criteria of statistical significance. Variables that can be included in the logistic regression model are variables that have p-value  $<0.05$ . Having obtained predictor variables that are important in multiple logistic regression model, the researchers then conducted interaction analysis together to see the possibility of interaction between variables. Multivariate analysis showed that there was one variable that proved to have an effect on to premature rupture of membrane, which was maternal age with  $p = 0.000$  with  $OR = 3.441$  mean maternal mother with age  $<20$  and  $> 35$  had 3.44 times risk of premature rupture of membranes.

## **CONCLUSION**

There is a significant relationship between maternal age with the incidence of premature rupture of membranes in West Nusa Tenggara Provincial Hospital in 2012 ( $p = 0.000$ ;  $OR = 2.405$ ). This is in line In Vidia Atika's research, where there is a significant relationship between age and the early incidence of membranes' rupture [15, 16]. There is a significant relationship between parity of mother with the incidence of premature rupture of membranes at West Nusa Tenggara Provincial Hospital in 2012 ( $p = 0.001$ ;  $OR = 1.462$ ). This supports Manuaba theory (2010), which states that parity (multi / grandemultipara) is a factor causing premature rupture of membranes.

While different from our own results, research conducted by Ery Kartikasari and Henny Juaria in 2013 shows that there is relationship between parity and abnormalities with the incidence of premature rupture of membranes, thus proving the theory of women with multiparity would be more at risk of premature rupture of membranes [17, 18].

There is no correlation between work with the incidence of premature rupture of membranes at West Nusa Tenggara Provincial Hospital in 2012 ( $p = 0.277$ ). This is in line with research by Khusnul Khotimah, Ida Sofiyanti, Yulijaji Siswanto, where results from unrelated research can occur due to socio-factors -economy, one of which is the pattern of work. Maternity patterns of work affect the energy needs. Physical work during pregnancy that is too heavy and with a working period longer than three hours per day can result in fatigue, and in turn leads to weak amniotic chorion causing premature rupture of membranes. Work is an important thing in life, but during pregnancy heavy work and may endanger pregnancy should be avoided to keep the mother and fetus safe [19, 20]

From multivariate logistic regression analysis, the most dominant factor associated with the incidence of premature rupture of membranes is age ( $OR = 3.441$ ).

It is hoped for further researchers to develop this research by exploring other factors related to the incidence of premature rupture of membranes in maternal mothers so that the results can be used as input in an effort to decrease the incidence of premature rupture of membranes.

## **CONFLICT OF INTEREST**

There is no conflict of interest

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