The Factors on Labor and Delivery Duration Among Births and Hospitalization Records: The Application of Survival Analysis

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Abstract: During labor and delivery has a risk of morbidity and mortality to the mother and the fetus. The length of duration process is one of the causes of maternal and fetal morbidity and mortality. Several cases reported of prolonged labor and delivery duration at Mutiara Bunda hospital, Tulang Bawang Lampung had been increasing in the first quarter of 2014 which caused 66.67% neonatal deaths, indicating 29.61% cesarean section and vacuum extraction. The aim of the study was to find out the factors on labor and delivery duration among births and hospitalization records: The application of survival analysis. A quantitative observational analytic study with a design retrospective cohort, using secondary data from births and hospitalization records: The application of survival analysis. The birth recorded from January to December 2013 and the Sample of 205 medical record taken by Circular Systematic Sampling. The research variables were labor and delivery duration, risk status mother's age, parity, Hemoglobin concentration, blood pressure, uterine contractions, and the baby's weight. Data were analyzed using survival analysis by method the cox proportional hazards regression analysis, consisting of univariate, bivariate, and multivariate analysis. Finding of 66.3% women who experienced spontaneous onset of labor with a median duration of labor of 7.50 hours, the fastest delivery time was 1.08 hours from admission to placental delivery spontaneously with or without curing (the longest 22.75 hours); mother's age without risked status category of 81%; parity of 52.7% multiparous, Hemoglobin concentration of 75.1% had an abnormal, blood pressure of 63.9% had a normal, uterine contractions of 52.2% was adequate, infant weight 55.1% ≤ 3000 grams. There was a relationship factors a parity (p = 0.003, HR = 0.595), uterine contractions (p = 0.013, HR = 0.664) and the labor and delivery duration. Parity was the most dominant variable, and following by uterine contractions, related to labor and delivery duration. The Function model hazard maternity consisted of two variables without effect of interaction variables, parity (p = 0.007, HR = 0.617) and uterine contractions (p = 0.025, HR = 0.672). It is recommended, for hospital management to periodic monitoring and evaluation of midwifery services according to Minimum Service Standards and Standard Operating Procedure, continuous identification of progress in labor and the well-being of mother and fetus, feeling safe and comfortable for patients, increasing patient and family knowledge, increasing preventive promotive efforts, increasing capacity and officer abilities.

Keywords: Labor; Delivery; Duration; Births; Mother's age; Parity; Hemoglobin concentration; Blood pressure; Uterine contractions; Baby's weight

Introduction

Labor and delivery with prolonged duration or long delivery is one of the causes of maternal and fetal death, however data regarding the duration of labor was a few published. The Cases reported of prolonged labor duration at Mutiara Bunda Hospital Lampung, Indonesia had increased in first quarter in 2014 which caused 66.67% neonatal deaths, indicating 29.61% cesarean section and vacuum extraction.

Expertis say that childbirth is a series of processes starting from true labor contractions to the release of the product of conception by the mother. The duration of labor is influenced by the several factors in the labor process, such as power (uterine contractions strength), passenger (fetus and placenta, including location, presentation, attitude, head/ body size, and baby's weight, location of the placenta and placenta release), passage (bone birth canal and soft birth canal), mother's age, parity, interval delivery, hemoglobin concentration, maternal blood pressure, psychology, birth, diseases and disorders in pregnancy, childbirth, and postpartum (Cunningham, Leveno, Bloom, Hauth, Gilstrap, & Wenstrom, 2013; Manuaba, 2012; Mochtar, 2010).

The one of the indicators of the degree of public health is the maternal mortality rate (MMR) and infant mortality rate (IMR). Based on the 2000 MDGs, Indonesia is committed to reducing the MMR to 102 / 100,000 live birth, and the IMR to 23/1000 live birth (Ministry of Health Republic of Indonesia, 2009).

In reality until now, MMR and IMR in Indonesia are still high compared to ASEAN countries. The results of the 2007 Indonesia Demographic and Health Survey, MMR 228 / 100,000 live birth and IMR 34/1000 live birth, meanwhile the results of the 2012 IDHS for IMR actually jumped to 359 / 100,000 live birth and the IMR dropped only two basis points to 32/1000 live birth (Ministry of Health Republic of Indonesia, 2013; Arisandi, Anita, & Abidin, 2016). In 2012 in Lampung province, there were 178 cases of maternal death and 159 cases of infant mortality, with MMR 116 / 100,000 live birth and IMR 30/1000 live birth. In 2013, there were 158 cases of maternal death and 129 cases of infant mortality (Lampung *Local Health Province's Agency*, 2012).

Method

A quantitative analytic observational with a design retrospective cohort. The population woman who birth from January to December 2013. The sample of 205 medical records taken by using the sample formula for survival analysis and the method circular systematic sampling. The dependent variables: labor and delivery duration and risk status mother's age. The independent variables contain parity, hemoglobin concentration, blood pressure, uterine contractions, and the baby's weight. Data were analyzed using survival analysis by method the cox proportional hazards regression analysis, consisting of univariate, bivariate, and multivariate analysis. Secondary data were collected from patient's medical records according to research variables.

Result and Discussion

Table 1. Descriptive Statistics of Labor and Delivery Duration

Variable	Status	Total		Median		Min – Max
		n	%	Estimate	95% CI	(Event+Censored)
Labor and delivery duration	Event	136	66,3	7.50	6.564 – 8.436	1.08 – 22.75
	Censored	69	33,7			
Total		205	100			

Based on Table 1, it is known that more than half (66.3%) of women who birth experienced spontaneous labor with their own strength from cervical opening 3 cm to placental delivery with a median duration of labor of 7. 50 hours. The fastest delivery time from beginning to the cervical

opening ≤ 3 cm until delivery of the placenta spontaneously or with action was 1.08 hours and the longest delivery time was 22.75 hours.

The results was inconsistent with theory that: About 95% of deliveries are normal and spontaneous (Manuaba, 2012). The median time from beginning to spontaneous fetal delivery was three and a half hours, and 95% delivered within 10.1 hours (Cunningham, et.al, 2013). The difference between the results of this study and the theory occurs because of differences in the determination of the onset of labor. In this study, the onset of labor was determined based on the presence of signs of onset of labor at admission and calculating cervical dilation ≤3 cm. The percentage of spontaneous deliveries from this study is almost the same as the results of related studies which state, normal delivery status is 56.6%. (Rini, 2010).

Table 2. Descriptive Statistics by The Factors on Labor and Delivery Duration

Variable		Total n	n of Event	Censored		Median Durasi Persalinan	
				n	%	Estimate	95% CI
Mother's age	Without the risk status	166	110	56	33.7	7.33	6.37 – 8.29
	Risk status	39	26	13	33.3	8.17	6.22 – 10.12
Parity	Multipara	108	78	30	27.8	6.17	5.38 – 6.96
	Primipara	97	58	39	40.2	9.17	6.90 – 11.43
Hemoglobin concentration	Normal	51	35	16	31.4	7.25	5.89 – 8.61
	Abnormal (Anemia)	154	101	53	34.4	7.67	6.55 – 8.79
Maternal blood pressure	Normal	131	87	44	33,6	7,50	6.06 – 8.94
	Abnormal (Hypertension)	74	49	25	33.8	7.33	6.05 – 8.61
Uterine contractions	Adequate	107	79	28	26.2	6,17	4.75 – 7.59
	Inadequate	98	57	41	41.8	8.92	6.50 – 11.34
Baby's weight	≤ 3000 gr	113	73	40	35.4	6.75	5.17 – 8.33
	> 3000 gr	92	63	29	31.5	8.42	6.89 – 9.95

According to Table 2 known, most (81%) of maternal age in the category without risk and the time median duration of 7.33 hours, and mothers with a risk age of 8.17 hours. The results of this study are inconsistent with theory which states that young age (<19 years) can increase the incidence of placenta previa because the endometrium is not yet perfect, while age> 35 years can increase the incidence of placenta previa because the endometrium is less fertile. Percentage the Category of age mothers who are without risk of this study is higher than the results of related studies which stated that more than half (60%) of the age of the mother gave birth in the category risk (Mail, 2011). There was no significant difference in the percentage of spontaneous deliveries and the median duration of spontaneous delivery in the categories mother's age on risk and without risk. This is made possible by other factors not involve in variable, however, family and community knowledge and awareness about age at risk for pregnancy should be continuously improved.

The parity known that more than half (52.7%) of birth with multiparity and median duration of delivery multiparous of 6.17 hours, while for primiparous birth of 9.17 hours. The results of this

study are consitent with the theory which states that parity affects the duration of labor and the incidence of complications (Rohani, 2014). Differences in the percentage of spontaneous deliveries and the median duration of spontaneous delivery between primiparous and multiparous results of this study suggest that, presumption of parity with respect to duration of labor may be substantiated. However, the existence of this difference does not indicate that labor was abnormal, because the normal sizes of the duration of primiparous and multiparous labor were substantially different.

The maternal hemoglobin concentration known that more than three-quarters (75.1%) of the birth had abnormal number. The median duration of 7.25 hours, and mothers with abnormal hemoglobin concentration of 7.67 hours. The results of the study are inconsistent with the theory which states, the effect of anemia during childbirth is a disturbance in uterine contractions strength, when I can last a long time and there is neglected labor, when third stage of labor a long time so it is tiring and often requires obstetric surgery, when third stage of labor can be followed by placental retention, postpartum hemorrhage due to uterine atony. There was no difference in the duration of spontaneous delivery between normal and abnormal hemoglobin concentration, although more than three-quarters birth had an abnormal hemoglobin concentration.

The maternal blood pressure group known that more than half (63.9%) birth with normal blood pressure and median duration delivery in women with normal blood pressure 7.50 hours, and in women with abnormal blood pressure (hypertension) 7.33 hours. Maternal blood pressure is substantially a risk factor for duration of labor. Base on theory by increased high blood pressure is accompanied by proteinuria, edema, and tonic-clonic seizures would like to prolong duration of labor and delivery.

The uterine contractions known that more than half (52.2%) birth with adequate uterine contractions and median duration of delivery of 6.17 hours, and inadequate of 8.92 hours. The results are consistent with the theory which states that uterine contractions become more stable during the latent phase as the frequency, duration and intensity increase (Prawirohardjo, 2015; Varney, Kriebs, & Gegor, 2015). Uterine contractions during the active phase becomes more frequent, of longer duration and of stronger intensity. In the second stage, the blessing of uterine contractions and the pushing force of the fetus is pushed outward until it is born. The third stage of labor, detachment and expulsion of the placenta occurs due to uterine contractions which begins to recur after a brief halt after the birth of the baby. The results of this study are also in line with related research which states that there is a difference in the proportion between uterine contractions adequate and inadequate birth in the second stage of labor (Ardhiyanti, & Susanti, 2016). This is one of the factors at work in the birth process when uterine contractions strength is related to the duration of labor, that uterine contractions adequacy will cause the duration of labor to take place normally. Inadequate uterine contractions resulted in long or even too fast labor duration, both of which can endanger the safety of the mother and the fetus.

The infant weight group known that more than half (55.1%) birth with infant weight ≤ 3000 grams and Median duration with a weight of ≤ 3000 grams of 7.25 hours, and weight> 3000 grams of 8.42 hours. The results of the study are inconsistent with the theory which states, in some cases with large children (macrosomia) in mothers with diabetes mellitus, there may be a possibility of failure of shoulder labor. The common thread that connects all research reports regarding risk factors for shoulder dystocia is an increase in birth weight. The results of the study are inconsistent with related research which states that more than three quarters birth to large babies (Wulandari, & Pramono, 2016). The percentage and median duration of labor are relatively the same between the category of baby weight> 3000 grams with the category of BB baby ≤3000 gram. These conditions include: the proportion between the size of the fetus and the size of the mother's pelvis.

Table 3. Relationship of variable factors on Labor and Delivery Duration

Variable	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for Exp(B)	
							Lower	Upper

Mother's age	-0,187	0,220	0,725	1	0,394	0,829	0,539	1,276
Parity	-0,519	0,177	8,587	1	0,003	0,595	0,421	0,842
Hemoglobin concentration	-0,021	0,201	0,011	1	0,915	0,979	0,660	1,452
Maternal blood pressure	0,051	0,180	0,081	1	0,776	1,052	0,740	1,497
Uterine contractions	-0,441	0,177	6,205	1	0,013	0,644	0,455	0,910
Baby's weight	-0,207	0,173	1,442	1	0,233	0,813	0,579	1,142

Based on Table 3, known that the statistical test results obtained by the value of p = 0.394 is greater than α = 0.05, which means not significant, therefore H0 to be rejected and concluded not significant relationship between maternal age and duration of delivery. Base on theory that young age (<19 years) can increase the incidence of placenta previa because the endometrium is not yet perfect, while the age of more than 35 years. may increase the incidence of placenta previa due to an underdeveloped endometrium. For a woman who becomes pregnant for the first time aged 35 years or older, it is possible that labor may take longer due to cervical stiffness or uterine inertia (Sastrawinata, 2015). Uterine contractions abnormality is mainly found in primigravida, especially older primigravida. In multiparous, Uterine contractions abnormalities were found in the form of uterine inertia (Prawirohardjo, 2015). Based on the results there are high errors in data recording (Non Sampling Error). After further review of the data on the age of the mother in labor, it was found that CV = 4.489% (≤ 20%), which means that the allegation that there is a high error in data recording is not proven. Female sexual life begins at the start of menstruation at puberty between the ages of 11-16 years, then gradually ends when she reaches menopause at the age of 45-50 years (Syaifuddin, 2015). This is a common thread that there is not enough evidence in this study to conclude that the age of the mother is related to the duration of labor, i.e. physiologically the female reproductive organs (including the endometrium) have reached maturity after the age of 16 years and begin to decline after the age of 45 years, and maturity and decline in physiological function is influenced by female reproductive hormones whose production is different for each individual.

Some of the causes related to this include: (1) in this study it was known that the youngest age was 17 years old and the oldest was 44 years old, (2) the mother's age variable interacted with other variables not examined in this study, including female reproductive hormones and their relationship with processes that occur in the hypothalamus. This condition minimizes the effect of the relationship between the age group at risk on the duration of labor, so that the duration of delivery between the age group at risk and the age group is not at risk is not significantly different.

Analysis of the relationship between parity and duration of labor known that the p - value= 0.003 smaller than α = 0.05, which means a significant, therefore H0 is rejected and it is concluded that there is a significant relationship between parity and the duration of delivery. The results of statistical tests also obtained a value of HR = 0.595, meaning that parity is a protective factor for the duration of labor and every time the potential duration of spontaneous labor with the mother's own strength is equal to 1 - 0.595 = 0.405 or 40.5% faster in multiparous mothers than primiparous mothers. The results of this study are in line with the theory which states: Parity affects the duration of labor and the incidence of complications. In multiparous, the predominance of the fundus uteri is greater with stronger contractions and the pelvic floor is more relaxed, the baby is easier to pass through the birth canal, thereby reducing the length of labor, A multiparous pelvic floor does not provide much resistance to fetal advancement. A cervix that has had complete opening, in previous labor, provides less resistance.

The results of this study are also in line with several related studies which stated: There is a relationship between parity and prolonged second-stage labor (Murti, 2013). Factors significantly associated with stage III elongation include Primipara (Combs, & Laros, 1991). The length of delivery was significantly different according to the age of the mother in Primipara and Multipara (Greenberg, Cheng, Sullivan, Norton, Hopkins, & Caughey, 2007). The existence of a relationship

between parity and the duration of labor may be related to the physiological function of the birth canal, which differs between primiparous and multiparous, including: differences in flexibility of the pelvic floor muscles, cervix, and differences in Uterine contractions dominance between primiparous and multiparous which causes differences in the duration of labor between the two the parity group. Woman who get pregnant for the first time at the age of being too young or too old, and the mother's absence of experience with childbirth, can increase the risk of complications during childbirth. In multiparous, with a history of previous labor it is easier to identify any complications and plan the appropriate course of action. Several things that need to be considered in this regard are taking preventive measures to prepare a safe and healthy delivery for both mother and baby, both primiparous and multiparous.

The maternal hemoglobin concentration and duration of delivery known obtain CV = 7,950% ($\leq$ 20%), and p-value = 0.915 greater than α = 0.05, which means that the results of statistical calculations are not significant, because H0 failed to be rejected and it was concluded that there was no significant relationship between maternal hemoglobin concentration and duration of delivery. Base on theory which states, the effect of anemia during labor is uterine contractions disturbance and strength of pushing. stage I can last a long time, stage II lasts long so it can be tiring, when urine can be followed by retention of the placenta, postpartum bleeding due to uterine atony. The results of this study are also not in line with related studies which state: There is a relationship between anemia third trimester and prolonged labor (Rini, 2010). One of the risk factors that significantly increase the incidence of prolonged labor is anemia (Djallalluddin, 2004). The relationship between hemoglobin concentration and the duration of labor was associated with maternal fatigue as a result of the effect of anemia on uterine contractions disturbances and pushing strength. Good management, including correction of fluid and electrolyte imbalances, maintaining hydration from the onset of labor, intervention in pushing (pushing) and uterine contractions, and intervention in maternal position, can prevent severe maternal distress.

The maternal blood pressure and duration of labor known obtained of p-value= 0.776 greater than α = 0.05, which means not significant and therefore H0 failed to be rejected and it can be concluded that there is no significant relationship between maternal blood pressure (BP) and the duration of delivery. Base on theory that states: All chronic hypertension disorders predispose to the onset of preeclampsia and eclampsia. If the seizures occur at delivery, the frequency and intensity of Uterine contractions can increase, and the duration of labor may shorten. Hypertension sometimes occurs first in labor and can lead to eclampsia. Hypertension can cause placental abruption. Blood vessels rupture easily, then a retroplacental haematoma which gradually releases the placenta from the uterus (Wulandari, & Pramono, 2016). The results of this study are also not in line with related research which states: One of the factors that influence labor in the ER is blood pressure. Factors that are significantly associated with stage III lengthening include preeclampsia.

Several reasons can be put forward related to uterine contractions, namely the conditions in the study site that can minimize the effect of the relationship between the group of women who gave birth and an abnormal BP (hypertension) on the duration of labor, so that the duration of labor did not differ significantly between the group of women who had an abnormal BP and the group of women who gave birth. who has a normal BP. These conditions include: the role of childbirth assistants, the psychological condition of the mother giving birth, and support system. Several things can also be stated regarding these differences, among others: that physiologically the maternal BP will increase during Uterine contractions progress and gradually return to normal between the duration of Uterine contractions. If BP measurements were taken during Uterine contractions time, it would lead to the misperception that the mother had a high BP. The act of changing the patient's position, provides a sense of comfort and safety that can eliminate patient anxiety and worry, can reduce maternal BP so that in the next few moments the mother's BP returns to normal.

The relationship between uterine contractions and the duration of labor known, obtained of p-value = 0.013 is smaller than α = 0.05, which means that the results of the calculation are

statistically significant, therefore H0 rejected and it was concluded that there was a significant relationship between Uterine contractions and the duration of labor. The results obtained a value of HR = 0.644, which means that uterine contractions is a protective factor for the duration of labor, and every time the potential duration of labor is spontaneous with the strength of herself. It was 1 - 0.644 = 0.356 or 35.6% faster with adequate uterine contractions than inadequate uterine contractions. Base on theory which states, the duration of labor is influenced by the functioning of several factors that play a role in the labor process, one of which is the power (the force that drives the fetus in labor) including Uterine contractions. The results of this study are also in line with related research which states: There is a significant relationship between Uterine contractions abnormalities and prolonged labor. Uterine contractions frequency has an effect on the duration of II is one of the variables that were statistically related to the incidence of prolonged labor was uterine inertia (Soviyati, 2016).

The relationship between the baby's weight and the duration of delivery known obtain of p-value = 0.233 is greater than α = 0.05, and CV = 6.861% ($\leq$ 20%), which means that the results of statistical calculations are not significant, therefore H0 failed to be rejected. and it was concluded that there was no significant relationship between baby's weight and duration of delivery. The results were not in line with the theory that states: Some cases with large children (macrosomia) in mothers with Diabetes Mellitus, the possibility of failure of shoulder labor (Kleinbaum, & Klein, 2020). Several reasons can be stated regarding the results of this study related to the relationship between baby's weight and duration of delivery, These conditions include: the proportion between the size of the baby and the size of the mother's pelvis, the location of the fetus, the presentation of the fetus, and the birth attendant intervention to widen the birth canal by episiotomy.

Table 4. The Cox Proportional Hazards Model and Its Characteristics

Variable	Estimation Results		Assessment Decisions
	Kaplan Meier Curve	*Global Test*	
Mother's Age	Graph of intersectional survival curve	P=0.745	Assumption of PH is not met
Parity	Graph of non-intersecting surviva curve:	P=0.805	Assuming PH is met
Hemoglobin Concentration	Graph of intersectional survival curves	P=0,783	The assumption of PH is not met
Maternal Blood Pressure	Graph of intersectional survival curves	P=0.797	The assumption of PH is not met
Uterine Contractions	Graph of non-intersecting survival curves	P=0.294	Assuming PH is met
Baby's Weight	Graph of intersectional survival curves	P=0.013	The assumption of PH is not met

PH assumption assessment is shown in Table 4. and it is known that, there are two variables that meet the PH assumption and identified as candidate models from all six variables assessed, parity and Uterine contractions. However, based on substantive considerations that the mother's age, hemoglobin level, maternal BP, and baby's weightare very important variables, all of these variables were subjected to bivariate analysis to identify candidate models.

Table 5. Identification of Candidate Models

Variable	p-value	Decisions
Mother's Age	0.394 (> 0.25)	Not a candidate model
Parity	0.003 (< 0.25)	A candidate model
Hemoglobin Concentration	0.915 (> 0.25)	Not a candidate model
Maternal Blood Pressure	0.776 (> 0.25)	Not a candidate model
Uterine Contractions	0.013 (< 0.25)	A candidate model
Baby's Weight	0.233 (< 0.25)	A candidate model

Bivariate analysis of candidate model identification is shown in table 5 and it is known, the results of bivariate analysis only three variables were identified as model candidates with p value <0.25; parity (p = 0.003), Uterine contractions (p = 0.013), and baby's weight (p = 0.233). However,

based on substantial considerations that the variables of mother's age, hemoglobin concentration, and maternal blood pressure are very important variables.

Table 6. The Analysis of Model Selection and Interaction Test

Steps	Variabel Dalam Model	p-value	Note
1	Hemoglobin Concentration	0.828	Excluded
2	Maternal Blood Pressure	0.738	Excluded
3	Mother's Age	0.219	Excluded
4	Baby's Weight	0.144	Excluded
5	Parity	0.007	Last Model
	Uterine contractions	0.025	Last Model

Omnibus Tests of Model Coefficients[t] at step 1 : df 6, Sig.=0.007

The analysis of model selection is shown in Table 6 and it is known that the results of the Omnibus Test of Model Coefficients in the first step have p-value = 0.007 smaller than α = 0.05 so that it is concluded that there is at least one independent variable. in a model related to the duration of delivery. The next step is to remove insignificant variables (p> α = 0.05), one by one, starting from the variable with the highest p value until the simplest significant final model is obtained. The model selection is completed in the fifth step with the final model consisting of two variables, Parity (p = 0.007) and Uterine contractions (p = 0.025). This model is the final model which has statistical significance, but cannot be concluded as the best model because the variable interaction test has not been carried out in the model. Model selection is followed by interaction test. Based on the substance consideration, 4 interaction variables were identified, between uterine contractions and parity, the interaction between Parity and Mother's Age, the interaction between Uterine contractions and Maternal Blood Pressure, and the interaction between Hemoglobin Concentration and Uterine contractions.

Table 7. Interaction Test of Variables in Models

Interaction	Variables in Models	p-value	Note
1	Uterine contractions*Parity	0.921	Excluded
2	Parity* Mother's Age	0.903	Excluded
3	Uterine contractions* Maternal Blood Pressure	0.480	Excluded
4	Hemoglobin Concentration *Uterine contractions	0.107	Excluded
Without Variable Interaction	Parity	0.007	The best Models
	Uterine contractions	0.025	

The results of the interaction test are shown in Table 7. After entering the interaction variables one by one into the model, it is final known that all interaction variables are not significant (p> α = 0.05) so that the interaction variables are excluded from the model. Based on the results of the interaction test, it can be concluded that, 8 there is no interaction variable in the model and the best model the function hazard consists of two variables without variables interaction, Parity (p = 0.007) and Uterine contractions (p = 0.025)

Table 7. Model-Predicted Hazard Functions

Variables	B	SE	Wald	df	Sig.	Exp(B)	95% CI

						Lower	Upper
Parity	-0,483	0,178	7,392	1	0,007	0,617	0,435	0,874
Uterine contractions	-0,398	0,178	5,013	1	0,025	0,672	0,474	0,952
Omnibus tests : Sig.=0,001								

Making The best model after all analysis steps is shown in Table 7. and it is known that the best model for predicting the function *hazard* of maternity patients is a model consisting of two variables without interaction variables, Parity (p = 0.007, HR = 0.617) and Uterine contractions (p = 0.025, HR = 0.672), with parity being the most dominant and then Uterine contractions.

The best model, is:

$$H(t, X) = H_0(t)e^{-0,483\,(Paritas)\,-0,398\,(His)}$$

Table 8. The Survival Probability at Any Particular Time

Summary of Cumulative Baseline Hazard			Summary of Baseline Survivor	
Time	Mean		Time	Mean
1,08	0,00703297		1,08	0, 99297651
1,42	0,01409638		1,42	0, 98597702
1,50	0,02118092		1,50	0, 97899203
....	....		....	....
21,17	3, 8043485		21,17	0, 01911221
22,33	5.0114552		22,33	0, 00358559
22,75	7.4256685		22,75	0

Function model *Hazard* obtained from the overall analysis can be applied to predict the *Hazard* with certain characteristics. The following is an example of the application of the model:

a) The *hazard of a* patient giving birth at 1.08 hours, Multipara, and Uterine contractions Adekuat, are: *H (1.08,X1(0),X2(0))*= 0.00703x2.7182-0.483 (0) -0.398 (0) = 0.00703 x 2.7182 ^0 = 0.00703 So, *Hazard* in Multiparous and Uterine contractions maternity patients is adequate at 1.08 hour of 0.00703. This means that the chance of spontaneous labor from opening of the cervix 3 cm to the delivery of the placenta for mothers who give birth to Multipara and Uterine contractions adequate delivery at 1.08 hour is 0.00703.

b) The *hazard of* patients giving birth at 1.08 hours, Primipara, and Uterine contractions Inadequate, are: *H (1.08,X1(1),X2(1))*= 0.00703x2.7182-0.483 (1) -0.398 (1) = 0.00703 x 2.7182 ^ -0.881 = 0.00703 x 0.41438 = 0.00291

So, the *Hazard* of Primipara and Uterine contractions maternity patients is inadequate at 1.08 hours is 0.00291. This means that the chance of spontaneous labor from opening of the cervix 3 cm to the birth of the placenta of Primipara and Uterine contractions mothers inadequate at 1.08 hour is 0.00291. Furthermore, it can be proven that HR is constant, by applying the model to each variable in the model. Table 9 is a summary of the calculation of HR for a certain period of time with the Parity variable, and table 10 is a summary of the calculation of HR for a certain period of time for uterine contractions variables.

Table 9. Number of Hazard and HR Over Time Variable of Maternal Parity

Variable	Times	*Hazard*	*Hazard Rasio (HR)*

		Primipara	Multipara	
Parity	1,08	0,00434	0,00703	0,00434 / 0,00703 = 0,617
	1,42	0,00869	0,01409	0,00869 / 0,01409 = 0,617
	1,50	0,01307	0,02118	0,01307 / 0,02118 = 0,617
	1,92	0,01750	0,02837	0,01750 / 0,02837 = 0,617
	Ect.	....	....	....

Based on Table 9, it is known that the HR value of the Parity variable at the 1.08 hour is 0.617, as well as the HR value of the Parity variable at the 1.42 hour, 1.50 hour, and 1.92 hour is 0.617. If the HR value of the Parity variable is calculated at the next hour until the 22.75 hour, a constant value will be obtained, namely 0.617. This proves that the HR of the Parity variable is constant at 0.617.

Table 10. Number of Hazard And HR Over Time Variable of Uterine Contractions

Variable	Times	*Hazard*		*Hazard Rasio (HR)*
		Inadequate	Adequate	
Uterine contractions	1,08	0,00473	0,00703	0,00473 / 0,00703 = 0,672
	1,42	0,00947	0,01409	0,00947 / 0,01409 = 0,672
	1,50	0,01423	0,02118	0,01423 / 0,02118 = 0,672
	1,92	0,01906	0,02837	0,01906 / 0,02837 = 0,672
	Ect	....	....	....

Based on Table 10, it is known that, the HR value of Uterine contractions variable at the 1.08 hour is 0.672, as well as the HR value of uterine contractions variable at the 1.42 hour, 1.50 hour, and 1.92 hour is 0.672. If the HR value of Uterine contractions variable is calculated, then until the hour of 22.75 a constant value will be obtained, namely 0.672. This proves that the HR of Uterine contractions variable is constant at 0.672. The results of this study show the order of the strength of the relationship of the variables related to the duration of labor, the most dominant order is Parity (HR = 0.617), and the order next is uterine contractions (0.672).

Preventive measures to minimize labor complications related to parity is to identify primigravida or multigravida pregnancies. Identification of parity in women in labor (on admission to hospital) to determine the estimated duration of normal delivery for the mother to assess the progress of labor.

It is very important to thoroughly and continuously assess the progress of labor and the well-being of the mother and baby. The existence of a deviation from the normal time of labor duration based on parity is not the only sign of a worsening prognosis of labor as long as there is uterine contractions effectiveness and strength of pushing as indicated by the progress of labor and the assurance of the welfare of the mother and baby.

Another factor that needs to be considered is Uterine contractions and the strength of the push which will determine whether labor can take place in a normal time according to mother's parity. Maternal age can also increase the risk of parity with the duration of labor.

The risk will increase in primiparous mothers who are too young or too old because it can cause Uterine contractions dysfunction which is triggered, among others, by physiological factors of the mother's reproductive organs.

Several efforts can be made to minimize the risk of parity and its risk of deviating from the normal time of delivery, can be done before pregnancy with the first pregnancy plan at a risk-free age, during pregnancy by providing *antenatal care*, and after delivery with pregnancy planning and subsequent delivery.

The Best Model for Predicting the Hazard Function of Maternity Patients

The best model of function *hazard* obtained from the overall analysis is known, the chance at a certain time for spontaneous labor from cervical opening 3 cm to placental delivery, is equal to *Baseline Hazard* at the time multiplied by e to the sum power of -0.483 (Parity) -0.398 (Uterine contractions). The application of the model shows that, the chances of spontaneous labor occurring with the strength of the mother alone at any time are greater in multiparous and Uterine contractions birth mothers are adequate than those of primiparous and Uterine contractions inadequate delivery.

Several variables were not found to have sufficient evidence, either bivariate or multivariate, to conclude that these variables are related to the duration of labor. The best model of the results of uterine contractions study can be concluded in line with several theories which state that the criteria for normal delivery duration are differentiated based on parity, where the duration of normal primiparous labor is longer than multiparous. In addition to uterine contractions, the duration of labor is influenced by the functioning of several factors that simultaneously play a role in the delivery process, including *power,* namely the force that drives the fetus into labor, consisting of Uterine contractions and the pushing reflex.

The results of uterine contractions study are not in line with related research which states: Risk factors increase the incidence of prolonged labor, namely anemia, delivery distance, abnormalities in presentation, referrals, family income, and maternal education. The variables associated with the incidence of prolonged labor were CDP, illness suffered by the mother, fetal location abnormalities, twin fetuses, premature rupture of membranes, uterine inertia.

The course of labor is determined by the results of the power struggle that pushes the baby out, namely Uterine contractions and the force of the push, and the force that gives resistance to the baby's discharge, namely the resistance of the cervix to the spreading and opening, the resistance of the pelvic bones, and the resistance of the pelvic floor. These two forces, the force that pushes the baby out and the force that holds the baby out of control, are largely determined by the mother's parity.

Differences in parity account for differences in resistance strength due to differences in flexibility of the pelvic floor muscles, cervix, and soft birth canal. The experience of giving birth had an impact on Uterine contractions coordination and the pushing strength of multiparous mothers. Uterine contractions in multiparous, predominantly from the uterine fundus with stronger contractions, more relaxed pelvic floor, the baby is easier to pass through the birth canal, so as to shorten the duration of labor.

One of the two variables in the model, namely Parity is a fixed component, meaning that in the concept of midwifery it cannot be processed to be able to smooth the labor process. Another variable in the model, namely Uterine contractions, is a dynamic component that changes its adequacy at any time, and is a dynamic component that can be managed in the event of Uterine contractions dysfunction. Effective uterine contractions will result in the progress of labor, namely the leveling of the lower birth segment, cervical dilation, and reduction of the lowest part of the fetus. Measuring the progress of labor by checking for enrollment, dilatation, and decline, is the most accurate way to assess Uterine contractions effectiveness and identify the presence of Uterine contractions dysfunction. If Uterine contractions dysfunction occurs, there are several treatment options that can be used alone or in combination to treat Uterine contractions dysfunction. Uterine contractions usually followed by a pushing reflex. Maternity mothers need to be taught how to push and when to push properly. The wrong way to push, and when you push the wrong way, can cause fatigue in the mother. The right time for the mother to push is when labor enters stage II (complete opening) and when Uterine contractions is taking place. There are a number of techniques that can increase the mother's pushing efforts.

To improve the quality of hospital services in providing childbirth care, minimum service standards (MSS) and standard operating procedures (SOPs) for delivery assistance need to be socialized to officers, and periodically monitoring and evaluating their implementation with an emphasis on the safety and welfare of mothers and their babies. not rigid application of policies.

The identification and continuous facilitation of labor progress and the well-being of mother and fetus 11 based on MSS and SOP, is the most important act of childbirth care, which requires the knowledge and skills of staff in every condition that occurs during the delivery process. Therefore, the capacity and capability of officers must be continuously improved.

Increasing the capacity and ability of officers is the responsibility of hospital management in order to improve the quality of services to the community, and in the end it will increase public confidence in the quality of hospital services so that it becomes the main choice for people in need. The results of all these processes are expected to reduce complications in the duration of labor for mothers and babies, and can significantly reduce maternal and neonatal morbidity and mortality associated with childbirth.

Conclusion

As many as 66.3% experienced spontaneous labor with a median duration of labor of 7.50 hours, the fastest delivery time was 1.08 hours from admission to placental delivery spontaneously or with action and the longest 22.75 hours, the mother's age was 81% not at risk, parity. 52.7% multiparous, Hb level 75.1% abnormal, blood pressure 63.9% normal, uterine contractions 52.2% adequate, infant weight 55.1% ≤ 3000 grams. There was no relationship between maternal mother's age (p = 0.394), hemoglobin concentration (p = 0.915), BP (p = 0.776), baby's weight (p = 0.233) with duration of labor. There was a relationship between parity (p = 0.003, HR = 0.595), Uterine contractions (p = 0.013, HR = 0.664) and the duration of labor. Parity was the most dominant variable, and uterine contractions next order related to duration of labor. The function model *hazard* for maternity patients consisted of two variables without interaction variables, Parity (p = 0.007, HR = 0.617) and Uterine contractions (p = 0.025, HR = 0.672). The model:

$$H(t, X) = H_0(t)e^{-0,483\ (Paritas)\ -0,398\ (His)}$$

Acknowledgements

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