

The Relationship of Risk Factors with Preterm Labor at Ummi Bogor Hospital in 2022

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Abstract

Preterm labor causes abnormalities in the baby and perinatal death. The exact cause of preterm labor is not yet known, but maternal and pregnancy risk factors can cause it. This study analyzes the relationship between risk factors and preterm labor at Ummi Bogor Hospital Bogor in 2022. The research method uses an observational analytical design of retrospective case-control design. The population is all mothers at Ummi Bogor Hospital Bogor who gave birth prematurely in 2022, as many as 213 people. Bivariate analysis technique using chi-square test. Respondent characteristics were 64.8% of mothers aged 20-30 years, 60% multipara, 86.9% with singleton pregnancies, 82.2% with HAP, 71.4% with KPD, 75.5% with PEB, and 97.7% with fetal distress. The results of bivariate analysis used the square test of age p values ($p = 0.846$), p parity ($p = 0.161$), p game (0.118), p HAP ($p = 0.354$), p KPD ($p = 0.861$), p PEB ($p = 0.404$) and p Fetal distress ($p = 0.252$). In conclusion, there is no relationship between age, parity, gameli, HAP, KPD, PEB, and fetal stress factors for preterm labor at Ummi Bogor Hospital Bogor in 2022.

Keywords: Preterm Labor, Relationship, Risk Factors.

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Introduction

Preterm labor, according to World Health Organization (WHO), is the birth of a baby before 37 weeks of pregnancy and is one of the highest causes of infant mortality in the world. As many as 75% of perinatal deaths are caused by prematurity, especially babies with a gestational age of <32 weeks who cannot survive within the first year. Premature babies are generally caused by pregnancy complications that make the mother's womb in womb weak so that the fetus must be born immediately (Fikawati et al., 2015).

Preterm labor is too early labor, which occurs at more than 20 weeks gestation and before 37 weeks (Simhan, 2020). Globally, the rate of preterm births from 2000 to 2014 increased by 8.5%, amounting to 16% of under-five deaths caused by premature birth and causing newborn deaths by 35% (Chawanpaiboon et al., 2019).

The cause of preterm labor is not known for sure. However, the incidence of early birth is thought to come from the condition of the mother before pregnancy, such as merorok, often exposed to exposure to cigarette smoke, excessive alcohol consumption, or complications experienced by mothers during pregnancy. Factors that affect preterm labor are as follows: Maternal factors are less than twenty years old or over 35 years, the distance between pregnancy and childbirth is too close, chronic maternal diseases such as hypertension, heart, blood vessel disorders (smokers), nutrition during pregnancy is lacking, work factors that are too heavy. Pregnancy factors are premature rupture of membranes (KPD), pregnancy with hydramnios,

multiple pregnancies (game), *Haemorrhagic antepartum/antepartum hemorrhage* (APH), pregnancy complications such as preeclampsia (PE) and eclampsia, history of abortion and premature. Fetal factors are congenital disabilities and infections in the uterus.

The impact of preterm labor is not only on perinatal death but premature babies are often accompanied by abnormalities, both short-term and long-term abnormalities. Short-term abnormalities often occur in *RDS (Respiratory Distress Syndrome)*, *intra/periventricular hemorrhage*, *NEC (Necrotizing Entero Colitis)*, *broncho-pulmonary dysplasia*, *sepsis*, and *ductus arteriosus patent*. Long-term disorders are often *cerebral palsy*, *retinopathy*, mental retardation, *neurobehavioral dysfunction*, and poor school performance. Another side that must be considered in handling preterm babies, especially babies with deficient birth weight (< 1,500 grams), is very expensive and requires much energy.

In 2021, 348 babies were born with low birth weight (BBLR) in Bogor City. The number of BBLR babies in each sub-district is different; the most is found in North Bogor District, which has 83 babies. Then followed by West Bogor District, with 77 babies; South Bogor, with 65 babies; Tanah Cereal, with 58 babies; Central Bogor, with 37 babies; and the least in East Bogor District, with 28 babies. Problems, especially in premature birth, occur due to immaturity of the organ system in the baby.

Based on data from the Obstetrics Register of Ummi Bogor Hospital (RS), the number of deliveries in 2021 amounted to 2183, consisting of spontaneous labor and delivery with *sectio caesarea* (SC). Of the 2183 deliveries, 197 *preterm* labors or preterm labor were found at Ummi Bogor Hospital and the causes consisted of premature contractions as many as 66 cases (33.5%), premature rupture of membranes (KPD) 46 cases (23%), PEB (Severe preeclampsia) 32 cases (16.24%), gemeli 25 cases (12.6%), *Antepartum Haemorrhagic* (APH) 18 cases (9.13%), eclampsia 5 cases (2.53%), *fetal distress* 5 cases (2.53%). Based on the initial survey above, researchers are interested in researching "The Relationship of Risk Factors with Preterm Labor at Ummi Bogor Hospital in 2022".

Research Methods

This research uses a research design of an analytical survey. This research design is a *case-control* with a *retrospective* approach to determine the relationship between risk factors and preterm labor at Ummi Bogor Hospital Bogor in 2022. The population in this study was all mothers with preterm labor, totaling 213 cases. The sample of this study used total sampling. Total sampling is a technique where the number of samples equals a population of 213 cases. The dependent variable is preterm labor. The independent variables were risk factors consisting of age, parity, gamely, *Haemorrhagic Antepartum* (APH), Early Rupture of Membranes (KPD), Preeclampsia (PE), and *Fetal distress*. The type of instrument used in data collection in this study is an observation sheet of secondary data documentation. Data collection will be done using secondary data obtained from medical record data through *the therapeutic* system. The type of instrument used in data collection in this study is an observation sheet of secondary data documentation. The analysis in this research uses the SPSS application. Data analysis was carried out univariately to obtain the frequency distribution of risk factors, and bivariate analysis was carried out using the Chi-Square test. The Chi Square test itself aims to test the relationship or influence of two other variables. In this study, the chi square test was used to test the relationship between risk factor variables and preterm labor. For example, the significance value is $p < 0.05$. In that case, H_1 is accepted, and H_0 is rejected, which means there is an association between risk

factors and preterm labor. If $p > 0.05$, H_0 is accepted, and H_1 is rejected, meaning there is no association between risk factors and preterm labor.

Results and Discussion

1. Univariate Analysis

This analysis was conducted to obtain the frequency distribution of risk factors: age, parity, gameli, APH, KPD, PE, and *fetal distress* as the independent variable and preterm labor as the dependent variable. After the study was carried out, the following frequency distribution data were obtained:

- a. Risk factors for maternal age in preterm labor at Ummi Bogor Hospital

Table 1. Risk Factors for Maternal Age in Preterm Labor at Ummi Bogor Hospital

Age	Frequency	Percentage
< 20 years		
20 – 35 years	9	4,23%
> 35 years old	138	64,79%
	66	30,99%
Total	213	100,0%

Table 1 above shows that of the 213 respondents, 138 people aged 20-35 years (64.79%), while those aged >35 years, as many as 66 people (30.99%).

- b. Risk factors for parity in preterm labor at Ummi Bogor Hospital.

Table 2. Risk Factors for Parity in Preterm Labor at Ummi Bogor Hospital

Parity	Frequency	Percentage
Primi	61	28,6%
Multi	130	61,0%
Grande	22	10,3%
Total	213	100,0%

Table 2 above shows that of 213 respondents, multipara as many as 130 people (61.0%) and primipara as many as 61 people (28.6%).

- c. Risk factors for preterm labor at Ummi Bogor Hospital.

Table 3. Risk Factors for Gemeli in Preterm Labor at Ummi Bogor Hospital

Gemeli	Frequency	Percentage
Yes	28	13,1%
Not	185	86,9%
Total	213	100,0%

Table 3 above shows that of the 213 respondents who experienced Gemeli pregnancy, as many as 28 people (13.1%), while those who did not experience Gemeli pregnancy, as many as 185 people (86.9%).

- d. Risk Factors for APH in Preterm Labor at Ummi Bogor Hospital.

Table 4. Risk Factors for APH in Preterm Labor at Ummi Bogor Hospital

APH	Frequency	Percentage
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Yes	38	17,8%
Not	175	82,2%
Total	213	100,0%

Table 4 above shows that of the 213 respondents who experienced APH, as many as 38 people (17.8%), while those who did not experience APH, as many as 175 people (82.2%).

- e. Risk factors for KPD in Preterm Labor at Ummi Bogor Hospital.

Table 5. Risk Factors for KPD in Preterm Labor at Ummi Bogor Hospital

KPD	Frequency	Percentage
Yes	61	28,6%
Not	152	71,4%
Total	213	100,0%

Based on table 5 above shows that of the 213 respondents who experienced KPD, 61 people (28.6%) and 152 people (71.4%) did not experience KPD.

- f. Risk Factors for Preeclampsia in Preterm Labor at Ummi Bogor Hospital.

Table 6. Risk Factors for Preeclampsia (PE) in Preterm Labor at Ummi Bogor Hospital

PE	Frequency	Percentage
Exist	52	24,4%
None	161	75,6%
Total	213	100,0%

Table 6 above shows that 213 respondents experienced preeclampsia, as many as 52 people (24.4%), while those who did not experience preeclampsia, as many as 161 people (75.6%).

Table 7. Risk Factors for Fetal Distress in Preterm Labor at Ummi Bogor Hospital

<i>Fetal distress</i>	Frequency	Percentage
Yes	5	2,3%
Not	208	97,7%
Total	213	100,0%

Based on table 7 above shows that of 213 respondents who experienced *fetal distress*, as many as 5 people (2.3%), while those who did not experience *fetal stress*, as many as 208 people (97.7%).

2. Bivariate Analysis

Bivariate analysis was conducted to determine the relationship between risk factors for age, parity, gamely, APH, KPD, Preeclampsia, and fetal distress as independent variables and preterm labor as the dependent variable. After the analysis was carried out, the following results were obtained:

- a. The relationship between maternal age and preterm labor at Ummi Bogor Hospital

Table 8. The Relationship between Maternal Age and Preterm Labor at Ummi Bogor Hospital

Fact or Ris k	Not	Yes	Total	P va lu e
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	n	%	n	%	n	%
Age						0,846
<20 years	8	3,80%	1	0,5%	9	4,2%
20-35 years	12	60,10%	10	4,70%	13	64,8%
>35 years	62	29,1%	4	1,9%	66	31%
Sum	198	93%	15	7%	213	100%

Based on Table 8 above, statistical tests using *chi-square* on the age variable we obtained a correlation coefficient value of 0.846 because of the significance value of $p > 0.05$, then H_0 was accepted, meaning there was no relationship between age and regulatory labor at Ummi Bogor Hospital.

b. Parity relationship with preterm labor at Ummi Bogor Hospital

Table 9. Parity Relationship with Preterm Labor at Ummi Bogor Hospital

Fact or Ris k	Not		Yes		Total		P va lu e
	n	%	n	%	n	%	
Pari ty							0, 16 1
Pri mi	54	25, 4%	7	3,3 %	61	28,6 %	
Mul ti	122	57, 3%	8	3,8 %	130	61%	
Gra nde	22	10, 3%	0	0 %	22	10,3 %	
Su m	198	93 %	15	7 %	213	100 %	

Based on Table 9 above, statistical tests using *chi-square* on the parity variable we obtained a correlation coefficient value of 0.161 because of the significance value of $p > 0.05$, then H_0 was accepted, meaning that there was no relationship between parity and regulatory delivery at Ummi Bogor Hospital.

c. The relationship between gambling and preterm labor at Ummi Bogor Hospital

Table 10. Gameli's Relationship with Preterm Labor at Ummi Bogor Hospital

Factor	Not	Yes	Total	P value
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Risk	lu					
	n	%	n	%	n	%
Gemeli						0,118
Not	170	79,8%	15	7%	185	86,9%
Yes	28	13,1%	0	0%	28	13,1%
Sum	198	93%	15	7%	213	100%

Based on Table 10 above, statistical tests using *chi-square* on the Gemelli variable obtained a correlation coefficient value of 0.118 because the significance value of $p > 0.05$, then H_0 was accepted, meaning there was no relationship between Gamely and preterm labor at Umami Bogor Hospital.

- d. The relationship between HAP and preterm labor at Umami Bogor Hospital

Table 11. APH Relationship with Preterm Labor at Umami Bogor Hospital

Factor Risk	Not		Yes		Total		P value
	n	%	n	%	n	%	
HAP							0,354
Not	164	77%	11	5,2%	175	82,2%	
Yes	34	16%	4	1,9%	38	17,8%	
Sum	198	93%	15	7%	213	100%	

Based on Table 11 above, the results of statistical tests using *chi-square* on the APH variable obtained a correlation coefficient value of 0.354 because the significance value of $p > 0.05$, then H_0 was accepted, meaning that there was no relationship between APH and preterm labor at Umami Bogor Hospital.

- e. The relationship between KPD and preterm labor at Umami Bogor Hospital

Table 12. The Relationship between KPD and Preterm Labor at Umami Bogor Hospital

Factor Risk	Not		Yes		Total		P value
	n	%	n	%	n	%	
KPD							0,861

No	14	66	1	5,	15	71,
t	1	,2	1	2	2	4%
		%		%		
Ye		26		1,		
s	57	,8	4	9	61	28,
		%		%		6%
Su	19	93	1	7	21	10
m	8	%	5	%	3	0%

Based on table 12. above, the results of statistical tests using *chi-square* on the KPD variable obtained a correlation coefficient value of 0.861 because the significance value of $p > 0.05$, then H_0 was accepted, meaning there was no relationship between KPD and preterm labor at Ummi Bogor Hospital.

f. The relationship between Preeclampsia (PE) and preterm labor at Ummi Bogor Hospital

Table 13. The Relationship between PE and Preterm Labor at Ummi Bogor Hospital

Factor Risk	Not		Yes		Total		P value
	n	%	n	%	n	%	
PE							0,404
None	151	70,9%	10	4,7%	161	75,6%	
Yes	47	22,1%	5	2,3%	52	24,4%	
Sum	198	93%	15	7%	213	100%	

Based on Table 13 above, the results of the statistical tests used *chi-square*. In the Preeclampsia variable, a correlation coefficient value of 0.404 was obtained because of the significance value of $p > 0.05$, and then H_0 was accepted, meaning that there was no relationship between Preeclampsia and Preterm labor at Ummi Bogor Hospital.

g. The fetal relationship is stressed with premature labor at Ummi Bogor Hospital.

Table 14. Fetal Relationship Stressed with Preterm Labor at Ummi Bogor Hospital

HIS	Not		Yes		Total		P value
	n	%	n	%	n	%	
Fetal distress							0,252
Not	19	91,1%	14	6,6%	208	97%	
Yes	4	1,9%	1	0,5%	5	2,3%	
Sum	198	93%	15	7%	213	100%	

Based on Table 14 above, the results of statistical tests using *chi-square* on the variable *Fetal stress* obtained a correlation coefficient value of 0.252 because the significance value of $p > 0.05$, then H_0 was accepted, meaning that there was no relationship between *Fetal stress* and preterm labor at Ummi Bogor Hospital.

Discussion

The relationship of maternal age risk factors with preterm labor

Healthy reproductive age for pregnancy ranges from 20-35 years. This is based on the incidence of maternal mortality in pregnant women and childbirth at the age of under 20 years, which is 2 to 5 times higher than maternal mortality at the age of 20 to 35 years, after the age of 35 years, maternal mortality rates increase

Age or age is the length of time lived or since birth. Age greatly determines a mother's health and the mother is said to be at high risk if pregnant women are under 20 years old and over 35 years old. Age helps to anticipate the diagnosis of health problems and the actions taken (Walyani, 2015). In this study, there were 138 respondents (64.79%) pregnant at a healthy reproductive age, namely 20-35 years, 66 respondents (30.99%) pregnant at the age of 35 years, and 9 respondents (4.23%) pregnant at the age of <20 years. Age factors that are prone to pregnancy are ages that are more or less than healthy reproductive age, namely <20 years and >35 years. The age of the mother is <20 years, and the uterus and pelvis are often immature and have not reached adult size, and organs are still in doubt, so pregnant women are at risk of premature labor, and pregnant women aged >35 years have a greater risk than the age of mothers between 20-35 years because older pregnant women, the reproductive function begins to decline and physical strength has also decreased so that it affects the development and growth of the fetus and allows the occurrence of preterm labor.

Based on the theory and research above, researchers argue that the cause of premature labor at the age of <20 years is because a woman's reproductive organs are not mature enough to be fertilized and seen from the mindset of not understanding enough with pregnancy plus the lack of antenatal care and attention from family and husband, causing mothers to know less about the symptoms of danger in pregnancy. At the same time, the cause of premature labor at the age of >35 years is because the female reproductive organs experience the aging process, which can cause difficulties in labor and can cause death to the mother. Judging from the pattern of thinking, mothers will tend to be lazy to check pregnancy because they feel they already have experience in pregnancy and childbirth. In contrast, at the age of >35 years, mothers are advised to check more pregnancies because there is a possibility that other diseases can arise during this pregnancy or diseases that the mother has suffered can become increasingly threatening to the health of the mother and fetus.

In theory, it is stated that pregnant women under the age of < 20 years have psychological and physical conditions, and the fulfillment of nutrition and nutrition is still somewhat lacking. At the age of >35 years often arise diseases such as hypertension or diabetes mellitus, which will result in the inhibition of fetal food entering through the placenta.

The results of bivariate analysis in this study with statistical tests using *Chi Square* In the age variable, the correlation coefficient value $p = 0.846$ was obtained because the significance value of $p > 0.05$, then H_0 was accepted, meaning that there was no relationship between age and preterm labor at Ummi Bogor Hospital. The results of this study contradict the theory and research conducted by Drastita et al. in 2022, which states that maternal age has a statistically significant relationship with premature labor (Drastita et al., 2022). However, the results of this study are by

Rahmawati et al. who show there is no relationship between age and preterm labor because preterm labor is *Multifactorial*, Where each factor has an attachment of one factor to another factor that causes premature labor. This is in line with the research of Mutiara et al., who stated that the test results *for the Contingency Coefficient* Exhibited a moderate relationship between age and preterm labor. The moderate relationship category indicates that other factors can lead to preterm labor apart from the mother's age, including preeclampsia, malnutrition, anemia, and low socioeconomic (Rahmawati et al., 2021).

The association of parity risk factors with preterm labor

Parity is a condition related to the number of children born to the mother. The safest parity regarding health and maternal mortality rate is 2-3 children. Parity >3 has a higher maternal mortality rate. Risks at parity 1 can be managed with good obstetric care. In contrast, family planning can reduce risks at high parity or prevent risks. Most pregnancies at high parity are unplanned (De Dwijasistawati, Ariyani, & Sulaksana, 2023).

In this study, there were 130 multipara respondents (61.0%), 61 primipara (28.6%), and 22 grande-multi people (10.2%). Based on the theory, researchers argue that the health risks of the mother and child increase in the first, fourth, and so on. First, pregnancy and childbirth increase health risks that arise because the mother has never experienced a pregnancy before, where the new birth canal will be tried to pass by the fetus. Conversely, if you give birth too often, the uterus will become weaker because of uterine scarring due to repeated pregnancies, causing an inadequate blood supply to the placenta so that the placenta does not get enough blood flow to channel nutrients to the fetus as a result of which fetal growth is disrupted. Therefore, the mother should plan more pregnancies to avoid risks (Ulfah & Sari, 2019).

In mothers with parity > 3 with a low economic level, it will affect the provision of funds for pregnancy checks because to save these expenses, sometimes mothers cannot check their pregnancies regularly, so they do not get enough information about pregnancy, even though the mother already has experience in childbirth, mothers should anticipate bad possibilities. Pregnant women who do not undergo antenatal care or do little and who have previously experienced preterm labor are at higher risk (Solama, 2019).

The results of bivariate analysis in this study with statistical tests using *Chi Square* In the parity variable, a correlation coefficient value of 0.161 was obtained, because the significance value of $P > 0.05$, then H_0 was accepted, meaning that there was no relationship between parity and regulatory delivery at Ummi Bogor Hospital.

This result is from research conducted by Dwijasistawati et al., which stated that there was no relationship between parity and the incidence of preterm labor with a value of $p = 0.474$. (De Dwijasistawati et al., 2023).

In the study, Hanifah stated there was no relationship between parity or the number of final deliveries in mothers and preterm labor (Hanifah1 & Wahyuningsih, 2017).

This study's results differ from the research conducted by Rahmawati et al., who stated that there was a meaningful relationship of parity to preterm labor with a value of $p = 0.007$.

Parity is the number of deliveries that a mother has experienced, both live and stillbirth. Mothers with a parity of more than three have a high mortality rate due to endometrial disorders. At first, parity is risky because the uterus is the first time it receives the results of conception, and the flexibility of the uterine muscles is still limited for fetal growth.

The association of gamely risk factors with preterm labor

Gemeli pregnancy triggers preterm labor because it causes overdistension, which results in retraction due to earlier uterine muscle tension that triggers the Braxton Hicks process; contractions are more frequent and become labor contractions. In gemel pregnancy, there is also stretching of the uterine muscles, which induces the formation of *Gap junction*, increased regulation of oxytocin receptors, and production of prostaglandins E2 and F2 that will cause uterine contractions and cervical dilation that induce preterm labor.

In the results of this study, respondents with Gemelli as many as 28 people (13.1%) and not Gemelli as many as 185 people (86.9%). The results of bivariate analysis in this study with statistical tests using *Chi Square* In the Gemelli variable, a correlation coefficient value of 0.118 was obtained because the significance value of $p > 0.05$, then H_0 was accepted, meaning that there was no relationship between gameli and preterm labor at Umami Bogor Hospital. This study's results align with Dwijasistawati et al.'s research, which showed no relationship between twin pregnancies and the incidence of preterm labor in UPT. Tembuk I Health Center for 2020-2021 with a value of $p = 0.061$. (De Dwijasistawati et al., 2023).

This study's results align with Kiran's research, which states that the incidence of preterm labor between Gemelli pregnancy and single pregnancy in Kanpur, India ($p = 0.142$) has no significant difference.

In addition, Amini's research states that there is no relationship between twin pregnancies and preterm labor.

This study is different from research conducted by Hanifah, which states that game has a significant relationship with the incidence of preterm labor $p = 0.03$ and 3.3 times more risk of preterm delivery compared to mothers with single pregnancies (Hanifah1 & Wahyuningsih, 2017)

Pregnancy with two or more intrauterine fetuses is called a twin pregnancy, this pregnancy can cause a higher risk of complications, experience hyperemesis gravidarum, hypertension in pregnancy, pregnancy with hydramnios, labor with fewer months, and stunted fetal growth. Pregnancy with two or more intrauterine fetuses is called a twin pregnancy, this pregnancy can cause a higher risk of complications such as hyperemesis gravidarum, hypertension in pregnancy, pregnancy with hydramnios, labor with fewer months, and stunted fetal growth.

Mother and fetus must get close observation so as to prevent complications, and pregnancy care and antepartum management are needed. Monitoring in gemeli pregnancy should be routinely done, mothers with gemeli pregnancy are recommended to perform sonography examination to assess fetal growth and amniotic fluid once every 4 weeks for monochorionic twin pregnancies and once every 6 weeks in gameli pregnancy.

Association of Antepartum Distribution (APH) risk factors with preterm labor

Based on the research results by Rosenberg et al., APH during pregnancy has a risk of 2.86 times the chance of low birth weight (BBLR). Maternity mothers with APH tend to cause babies to be born with low birth weight (BBLR).

In the results of this study, respondents who experienced APH 38 people (17.8%) and did not experience APH 175 people (82.2%). The results of bivariate analysis in this study with statistical tests using *Chi Square* In the APH variable, a correlation coefficient value of 0.354 was obtained because the significance value of $p > 0.05$, then H_0 was accepted, meaning that there was no relationship between APH and preterm labor at Umami Bogor Hospital.

This study is in line with the research of Olusanya et al., who, after a multivariate analysis of logistic regression, stated that antepartum hemorrhage did not influence the incidence of low weight.

The results of this study are not in line with the research (Oğlak et al., 2022), which states that bleeding during pregnancy increases twice the occurrence of babies with low birth weight (BBLR) (Oğlak et al., 2022).

APH increases the risk of preterm labor, this is due to heavy bleeding in the mother so that the mother and fetus need quick treatment so that the mother does not experience anemia and the fetus does not experience hypoxia. Efforts for this treatment are to give birth to a fetus even though the gestational age is still premature. APH often occurs due to placenta previa totalis, which causes hefty bleeding and treatment by giving birth to a fetus even though the age is still premature (Dewi et al., 2019).

Association of KPD risk factors with preterm labor

Early rupture of membranes (KPD) is the rupture of membranes before signs of labor, waiting one hour before the start of labor signs. Factors that cause rupture of amniotic membranes are the presence of uterine hypermotility that has long occurred before the membranes rupture, amniotic abnormalities, namely amniotic membranes are too thin, predisposing factors such as multipara, malposition, disproportion, cervical incompetence and artificially premature rupture of membranes. The cause of the lack of connective tissue and vascularization in the amniotic membrane is very weak and easily ruptures by removing amniotic fluid (Sari, n.d.).

In the results of this study, respondents who experienced KPD were 61 people (28.6%) and did not experience KPD as many as 152 people (71.4%). The results of bivariate analysis in this study with statistical tests using *Chi Square* In the KPD variable, a correlation coefficient value of 0.861 was obtained, because the significance value of $p > 0.05$, then H_0 was accepted, meaning that there was no relationship between KPD and preterm labor at Ummi Bogor Hospital.

These results are based on Amini's research, which states that the occurrence of preterm labor is not associated with KPD.

The results of this study are not in line with Hanifah's research, which states that there is a relationship between KPD and the incidence of preterm labor (Hanifah1 & Wahyuningsih, 2017).

And research by Drastita et al that KPD has a statistically significant relationship with the occurrence of preterm labor (Drastita et al., 2022).

The difference in research can be caused by the level of regularity of pregnancy checks in pregnant women, where pregnancy checks provide predictions of essential health problems, including disease prevention, screening, and promotion of good health to prevent preterm labor (Akhtar et al., & Afzal, 2018).

Association of risk factors for Preeclampsia (PE) with preterm labor

Hypertension in pregnancy is the cause of maternal and fetal death. Hypertension accompanied by increased urine protein can cause preeclampsia/eclampsia. Preeclampsia-eclampsia can cause the mother to experience more severe complications, this happens because preeclampsia affects the arteries that carry blood to the placenta. Suppose the placenta does not get enough blood. In that case, the fetus will experience a lack of oxygen and nutrients, such as placental abruption, brain hemorrhage, and acute brain failure. Fetuses from mothers who experience preeclampsia increase the risk of premature birth, inhibition of fetal growth in utero

(IUGR), and hypoxia. So, most pregnancies with Preeclampsia and Eclampsia are handled by giving birth to a fetus even though the age is still premature before further complications occur.

In the results of this study respondents with Preeclampsia 52 people (24.4%), and those without Preeclampsia 161 people (75.6%). The results of bivariate analysis in this study with statistical tests using *Chi Square* In the Preeclampsia variable, a correlation coefficient value of 0.404 was obtained because the significance value of $p > 0.05$, then H_0 was accepted, meaning that there was no relationship between Preeclampsia and Preterm labor at Umami Bogor Hospital. This result is by Amini's research, which suggests that) The results of the study value $p = 0.647$ mean that there is significantly no relationship between preeclampsia and preterm labor.

This is in line with Asih's research, which states that no relationship exists between hypertension and the incidence of preterm labor (Asih & Sagita, 2020).

The results of this study are not in line with the research of Carolin et al., which states that there is a significant relationship between preeclampsia and preterm labor (Carolin & Widiastuti, 2019).

According to (Imran, Prawiroharjo, & Mawi, 2016), In mild preeclampsia, it is better to wait until the fetus is almost term, for example, 37 weeks. Conversely, if preeclampsia is severe, according to experts, the chances of life for the fetus are better outside the womb than inside. High blood pressure causes decreased blood flow to the placenta, resulting in impaired function of the placenta, so helpers tend to terminate the pregnancy. This causes the prevalence of preterm labor to increase.

Association of risk factors for fetal distress with preterm labor

Fetal distress refers to conditions when fetal development in the womb is not smooth. This condition, which is also referred to as fetal distress, is often a sign that the supply of oxygen to the baby's brain is inadequate. Suppose the underlying problem that triggers this condition is not treated immediately. In that case, severe brain injury can occur, causing other problems, such as developmental delays or cerebral palsy (Trisetiyaningsih et al., 2018).

In this study, respondents with *Fetal distress* 5 people (2.3%) and did not experience *Fetal distress* 208 people (97.7%).

The results of the bivariate analysis in this study with statistical tests using *Chi-Square* on variables of *Fetal distress* obtained a correlation coefficient value of 0.252; because the significance value of p is 0.05, then H_0 is accepted, meaning that there is no relationship between *Fetal distress* against preterm labor at Umami Bogor Hospital.

The results of this study are not in line with Hasritawati's research, which states that there is a relationship between gestational age factors and the occurrence of *Fetal distress* (Study Program III & Kebayakan, 2017).

According to the theory of pregnancy over time, premature pregnancy is one of the most risky pregnancies. A premature fetus will undoubtedly be smaller, and the poster may be more significant. The gestational age has reached 42 weeks, complete or more, calculated from the first day of the last menstruation. This can cause more significant harm and complications both to the mother and to the fetus she conceived during pregnancy, childbirth, or puerperium. Moreover, in late labor, the mortality and morbidity rates are very high when compared to normal pregnancies.

Conclusion

Based on the results of the research described above, it can be concluded that maternal age, parity, gameli pregnancy, KPD, APH, Preeclampsia, and *Fetal distress* do not have a significant relationship in the incidence of preterm labor.

Advice for midwives and health workers to always detect problems and emergencies in pregnancy care early by paying attention to risk factors for preterm labor as a form of anticipation and preventive action in reducing the incidence of preterm labor.

Advice to be expected to check her pregnancy regularly and regularly to midwives or other health workers so that mothers who have a high risk of preterm labor can be known as early as possible and get education related to factors that can cause preterm labor so that prevention can be done appropriately and quickly.

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