

Characteristics of Preterm Labor at Sanglah General Hospital Denpasar from January 1st, 2017- December 31st, 2018

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Abstract: *The incidence rate for preterm labor ranged from 6-10% of all pregnancies, and 75% of them was the highest cause for perinatal mortality and morbidity worldwide. Based on the medical records in 2015, 285 out of 1198 labor were preterm in nature (23.7%). This study aimed to observe the characteristics of preterm labor in Obstetric and Gynecologic Emergency Room from January 1st, 2017 until December 31st, 2018. This descriptive, retrospective study used secondary data based on the medical records of all patients presenting with preterm labor from January 1st, 2017 until December 31st, 2018. During two years of observation, there were 555 (29.5%) preterm labors out of 1.880 total labors. Preterm labor occurred most commonly on mothers of 20-35 years old (70.1%), gestational age of 32 until <37 weeks (moderate preterm) as many as 70.3%, and normal BMI (91.7%). Most cases were spontaneous vaginal delivery (51.9%), primigravida (44.3%), and no prior history of preterm labor (89.7%). The most common comorbidity identified was gestational hypertension (24.9%). Most infants were born in category of 1500 to <2500 g (72.7%), vigorous baby (52.6%), and were admitted to NICU (58.2%).*

Keywords: Preterm labor, preterm pregnancy, characteristic

1. Introduction

The birth of babies in gestational age of less than 37 weeks was the highest cause for mortality for children less than 5 years old worldwide.¹ The incidence of preterm labor ranged from 6-10% of all pregnancies and 75% of them were the cause of perinatal mortality and morbidity without congenital disorders.² Preterm babies were 70 times higher in mortality risk compared to term babies due to their immature organ systems.³ Preterm labor was the most common cause of mortality and congenital malformation of babies born worldwide. Complications that occurred due to preterm labor were the direct and most common cause of neonatal mortality.⁴ The cause of preterm labor is unknown in most cases. It is thought to be related with intra-amniotic infections, utero-placental ischemia, excessive stretching of uterus, endocrinology disorders, and an abnormal immune response from both mother and fetus.⁵

The incidence rate of preterm labor in 2010 worldwide has increased from 7.5% (2 million cases) to 8.6% (2.2 million cases) in 2005, where this rate is highly variable in some countries from 5-25%.⁶ Meanwhile in Indonesia, the incidence rate of preterm labor ranged from 10-20% in 2009, which lead Indonesia to be the fifth country with highest rate of preterm labor.⁴ In 2015, according to the medical records, 285 out of 1198 labors (23.7%) were preterm in nature.⁷

Up until this day, preterm labor is still considered a major problem in many countries, both the developing and developed ones. It has become a serious consideration due to its high incidence rate despite many efforts to reduce it. Based on the description above, we authors are interested to conduct a descriptive study for observing the characteristics of preterm pregnancy and labor at in 2017 – 2018.

2. Methods

This descriptive study was conducted from January 2017 until December 2018. The samples were obtained as secondary data from the medical records of all women presenting with preterm labor at the Delivery Room from January 2017 until December 2018. Data was then analyzed by using both *Microsoft Excel* and SPSS, and then presented in tables and narratives. Data was analyzed descriptively based on mother's age, gestational age, method of delivery, gravidity, previous history of preterm labor, medical conditions, body mass index, birth weight, condition upon birth, and type of care provided after birth. This study has been approved by the Ethical Committee.

3. Results

During the two years of observation from January 1st, 2017 – December 31st, 2018 at the Obstetrics and Gynecology Emergency Room, there were 555 (29.5%) cases of preterm labor out of 1880 total labors, with total infant who born from preterm labor was 608. The characteristics of subjects is described on table 1 and characteristic of infant who born from preterm labor is described on table 2

Table 1: Distribution of Preterm Labor Based on Subject Characteristics

Characteristics	N (%)
Mother's age (years old)	
15 – 19	59 (10.6)
20 – 35	389 (70.1)
36 – 45	107 (19.3)
Gestational Age (weeks)	
Extreme preterm (<28 weeks)	40 (7.2)
Very preterm (28 to < 32 weeks)	125 (22.5)
Moderate preterm (32 to < 37 weeks)	390 (70.3)

Mode of Delivery	
Spontaneous vaginal	288 (51.9)
Operative vaginal	18 (3.2)
Abdominal	249 (44.9)
Gravidity	
Primigravida	246 (44.3)
Gravida 2	142 (25.6)
Gravida 3	94 (17.0)
Gravida ≥ 4	73 (13.1)
Previous History of Preterm Labor	
Once	44 (8.0)
Twice	13 (2.3)
No previous history	498 (89.7)
Medical Condition of Mother	
Gestational hypertension	138 (24.9)
Anemia	14 (2.5)
Thrombocytopenia	2 (0.4)
Diabetes Mellitus	1 (0.2)
Asthma	3 (0.5)
Cardiovascular Disorders	10 (1.8)
Malignancy	4 (0.7)
DHF	1 (0.2)
Urinary Tract Infection	2 (0.4)
HIV	9 (1.6)
No medical condition	371 (66.8)
Body Mass Index of Mother	
<i>Underweight</i>	34 (6.1)
Normal	509 (91.7)
<i>Overweight</i>	4 (0.7)
Grade I obesity	2 (0.3)
Grade II obesity	3 (0.6)
Grade III obesity	3 (0.6)

Table 2: Distribution of Infants who born from Preterm Labor

Characteristics	N (%)
Birth Weight	
500 to < 1000 grams	53 (8.7)
1000 to < 1500 grams	113 (18.6)
1500 to < 2500 grams	442 (72.7)
Neonatal Asphyxia	
Vigorous	320 (52.6)
Moderate asphyxia	153 (25.2)
Severe asphyxia	97 (16.0)
Death	38 (6.2)
Type of Care Provided After Birth	
Roomed-in	216 (35.6)
NICU	354 (58.2)
Death	38 (6.2)

4. Discussion

In this study, preterm labor occurred most commonly in age group of 20 to 35 years old, as many as 389 cases (70.1%). This result is different when compared to a study conducted by Fuchs et al. In Canada during 2008-2011, preterm labor occurred most commonly in mothers >40 years old, while those around 20-34 years old were less in number. The increased risk of preterm labor in older women was associated with the prevalence of comorbid such as diabetes and hypertension.

From the results, the gestational age where preterm labor occurred the most was 32 weeks to < 37 weeks (*moderate*

preterm), as many as 390 cases (70.3%). A study by Shapiro et al in 2015 showed that in United States, 6% of preterm labor were extreme preterm (<28 weeks), 10% were very preterm (28 to <32 weeks), and 84% were moderate preterm (32 to <37 weeks) (Shapiro, 2015). This preterm labor, when related to the gestational age, is closely related to the prognosis and risks of the fetus. Younger gestational age was correlated with increased risk of mortality due to immature organ systems.³

From 555 cases of preterm labor in this study, spontaneous vaginal delivery was the most common delivery method as many as 288 cases (51.9%) while operative vaginal (by forceps extraction) and abdominal (by sectio caesarean) delivery method were as many as 18 cases (3.2%) and 249 cases (44.9%), respectively. This finding is similar to a study conducted by Jamal et al in 2017 in India, where the proportion of vaginal, abdominal, and operative vaginal delivery in preterm labor was 75.4%, 23.7% and 0.9%, respectively.⁸

Based on gravidity, preterm labor in Obstetrics and Gynecology Emergency Room was most commonly occurred in primigravida (44.3 %), followed by gravida 2 (25.6%), gravida 3 (17.0%) and gravida ≥ 4 (13.1%). This result is different when compared to the study conducted by Jamal et al (2017) in India, where preterm labor occurred mostly in multigravida (47.5%) compared to primigravida (12.4%).⁸ A similar result was showed by Shannon in 2015, where the number of preterm labors were higher in multigravida (55.2%) compared to primigravida (44.8%). Higher parity is associated with preterm labor due to changes in uterus such as the elasticity of myometrium caused by previous deliveries.⁹ Some mothers with high parity can also have poor obstetrics history due to unidentified factors which may still be present in subsequent pregnancies.¹⁰ A different result which was shown in this study, apart from being influenced by epidemiological factors, where the total number of primigravida patients in the population of this study were indeed higher than multigravida, it can also be related to the fact that nulliparous women have a higher incidence of oligohydramnios, incompetent cervix, gestational hypertension, and eclampsia. These factors can increase the occurrence of preterm labor in nullipara when compared with multiparous women.¹¹

From this study it was found that out 57 (10.3%) women with prior history of preterm labor, 44 of them (8.0%) had one preterm labor and 13 others (2.3%) had experienced preterm labor twice before the current pregnancy. In contrast to a study conducted by Halimi (2015) in Tehran, Iran, 63.6% of women were found to have had experienced preterm labor from their previous pregnancy and 49.2% had never experienced preterm labor before.¹² In a study conducted by Paembonan et al in 2011 - 2012 in Makassar, it was found that the history of preterm labor was a risk factor for preterm labor in current pregnancy with OR = 20.054.¹³ The results of this study are in line with Yung's research (2016), which suggested that mothers with a history of preterm labor are twice as likely to experience preterm labor in subsequent pregnancies.¹⁴ Pregnant women with one history of preterm labor have the higher probability to

deliver preterm babies by 14.3% and increased to 28.1% in women who had experienced preterm labor twice.¹⁵

From this research, several medical conditions that accompany preterm labor were able to be identified. The highest number was 138 (24.9%) cases of gestational hypertension and 14 cases of anemia (2.5%), while the lowest was DHF and Diabetes Mellitus as many as 1 case (0.2%) each. Similar to a study conducted by Jamal (2017) in India, it was found that preterm labor with hypertension was highest (18.6%), followed by anemia (12.6%).⁸ Gestational hypertension is very closely related to the incidence of preterm labor. This might be due to prevalent cases of preeclampsia, leading to termination of pregnancy before term due to the complications caused. Maternal medical conditions such as cardiovascular diseases, diabetes, hypertension was among the causes of preterm labor. Mothers with uncontrolled medical conditions will lead to iatrogenic preterm labor to save the lives of both mother and fetus.

From this study, it was found that most of the maternal body mass index (BMI) were classified as normal as many as 509 (91.7%), followed by 34 (6.1%) with underweight, and 4 (0.7%) with overweight. This result is in accordance with a study conducted by Parker et al,¹ where among 930 pregnant women, it was found that 5.8% spontaneous preterm labor occurred in women with BMI <19kg/m², followed by 47.7% in the category of normal BMI (19-24.9 kg/m²), 28.9% in BMI of 25-29.9kg/m², and 17.5% in women with BMI of 30-34.9kg/m². This study concluded that no clear causal relationship was found between spontaneous preterm labor and body mass index.¹⁶ A woman's body mass index during pregnancy is influenced by genetic factors as well as the nutritional factor. Women with lower BMI have less capacity for fluid expansion during pregnancy, while increasing body weight will increase stored fat reserves as well as maternal nutrition, growth of uterine and breast tissue, and also influencing the growth of fetus. There are several hypotheses about the etiology and medical complications that can affect weight gain during pregnancy, such as the presence of diseases such as diabetes, hypertension, and polyhydramnios. So, the existence of these abnormalities increases the risk of preterm labor. In addition, a lower BMI also increases neutrophil levels and a higher vaginal pH, both of which also increase the risk of preterm labor.¹⁷

The birth weight of preterm babies is divided into three categories: 500 grams to <1000 grams, 1000 grams to <1500 grams, and 1500 grams to <2500 grams. Based on this study, from a total of 608 deliveries, there were 44 cases of twin deliveries, 3 cases of triplet deliveries and 1 cases of quadruplet, so that the total number of babies born was 614 babies out of 568 deliveries. Most babies fell into the category of 1500 to <2500 grams as many as 442 babies (72.7%), while as many as 113 babies weighed between 1000 to <1500 grams (18.6%) and 53 babies (8.7%) weighed <1000 grams. According to Back and Rosenthal's theory which states that the baby's weight increases according to gestational age, the gestational age affects the incidence of LBW because shorter pregnancy period will lead imperfect growth of body organs, so that it will also affect the baby's

birth weight. In general, premature labor in infants with LBW appropriate for gestational age is related to the nability of the uterus to maintain the fetus, disorders during pregnancy or stimulation that causes uterine contractions before maturation.¹⁸

The American Association of Obstetrics and Gynecology, as well as the American Academy of Pediatrics, stated that asphyxia is: considered when 1. umbilical artery pH <7.0, 2. APGAR score 0-3 in the first 5 minutes, 3. Neonatal manifestations of neurological disorders (convulsions, coma or hypotonia) and, 4. Multi-system organ dysfunction (cardiovascular, gastrointestinal, hematological, pulmonary, or renal). These preterm infants also have a higher risk of developing neonatal mortality due to asphyxia.¹⁹ Based on this study, the incidence of preterm labor was 614 infants, most of which gave vigorous outcomes to as many as 320 babies (52.6%), while moderate asphyxia was 25.2%, severe asphyxia was 16%, and death as many as 38 (6.2 %).

Based on this study, 354 preterm infants were admitted to NICU (58.2%), while the remaining 216 (35.6%) were roomed-in. Nearly all infants treated at the NICU experience respiratory distress syndrome due to early onset sepsis. The incidence of neonatal sepsis in developing countries is still high, as many 1.8-18/1000 births compared to developed countries (1-5/1000 births) with a mortality rate of 5-20%. Mothers of preterm labor were related to higher incidence of neonatal sepsis than non-sepsis (22.8% vs 22.2%). These results are in line with research conducted by Riskawa et al (2012), which suggested that one of the factors that cause neonatal sepsis is preterm gestational age (<37 weeks) because premature infants have imperfect organ maturation, lower serum immunoglobulin levels, skin immaturity which weakens the immune of infants, imperfect function of secretory IgA in the intestinal mucosa which should be the protective layer against intestinal bacterial invasion, and impaired adaptive immune response to various pathogens.^{20,21}

5. Conclusion

During the 2 years of observation from January 1st, 2017 – December 31st, 2018, there were 555 cases of preterm labors. The characteristics of preterm labors most commonly occurred in mothers of 20-35 years old, gestational age of 32 to <37 weeks (*moderate preterm*), normal BMI, primigravida, and in those without any previous history of preterm labor. Spontaneous vaginal delivery was the most common method, and the most common comorbidity was gestational hypertension. The outcome of delivered babies were as follows: most neonates weighed 1500 to <2500 g, *vigorous baby*, and was admitted to NICU.

6. Conflict of interest

None declared

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