Prevalence and Distribution of Risk Factors for Preterm Labor in RSUP Dr. Mohammad Hoesin Palembang over a Three-Year Period

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Abstract
Objective: This study aims to determine the prevalence and distribution of risk factors for preterm labor.
Methods: This is a descriptive observational study with a cross-sectional design. The data used in this study were secondary data obtained with the total sampling method from the medical records of Dr. Mohammad Hoesin Palembang Hospital from January 1, 2020 to December 31, 2023.
Results: This study found 1,654 cases of preterm labor from January 1, 2020 to December 31, 2023. The analysis of risk factors among mothers indicated that those within the high-risk age categories (<20 years and >35 years) constituted 31.7%. Multiparous and grand multiparous women represented 41.7%, while multiple pregnancies accounted for 6.6%. A history of premature rupture of membranes was noted in 25.4% of cases, polyhydramnios was observed in 1.3%, and a history of cesarean delivery was found in 25.4%. Furthermore, 33% suffered from hypertension, and 2.5% had diabetes. Anemia was prevalent in 47.9% of the mothers, and infection was reported in 42.8%. A history of preterm delivery was noted in 13.7%, risky gestational distance was found in 10.6%, and 25% had a history of antepartum hemorrhage. Finally, obesity was observed in 14.5% of the mothers.
Conclusion: The number of deliveries continued to decrease, but the prevalence of preterm labor increased from 2020 to 2023. Anemia is the most common risk factor found in mothers with preterm labor.

Keywords: prevalence, preterm labor, risk factors

Prevalensi dan Distribusi Faktor Risiko Persalinan Prematur di RSUP Dr. Mohammad Hoesin Palembang dalam Tiga Tahun

Abstrak
Tujuan: Penelitian ini bertujuan untuk mengetahui prevalensi serta distribusi faktor risiko persalinan prematur.
Metode: Penelitian ini merupakan penelitian deskriptif observasional dengan desain *cross-sectional.* Data yang digunakan dalam penelitian ini merupakan data sekunder dengan metode *total sampling* dari data rekam medik RSUP Dr. Mohammad Hoesin Palembang periode 1 Januari 2020 – 31 Desember 2023.
Hasil: Terdapat 1654 kasus persalinan prematur dengan periode 1 Januari 2020 – 31 Desember 2023. Distribusi faktor risiko didapatkan ibu dengan usia berisiko (<20 tahun dan >35) tahun (31,7%), paritas multipara dan grandemultipara (41,7%), kehamilan multipel (6,6%), riwayat ketuban pecah dini (25,4%), polihidramnion (1,3%), riwayat persalinan sesar (25,4%), hipertensi (33%), diabetes (2,5%), anemia (47,9%), infeksi (42,8%), riwayat persalinan prematur (13,7%), jarak kehamilan berisiko (10,6%), riwayat perdarahan antepartum (25%), obesitas (14,5%).
Kesimpulan: Jumlah persalinan terus mengalami penurunan, namun prevalensi kejadian persalinan prematur terus mengalami peningkatan dari tahun 2020-2023. Anemia menjadi faktor risiko paling banyak yang ditemukan pada ibu dengan persalinan prematur.

Kata kunci: Prevalensi, Persalinan Prematur, Faktor Risiko

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Introduction

Preterm birth is one of the major challenges in perinatology as it can lead to neonatal morbidity and mortality. The World Health Organization (WHO) (2023) defines preterm birth as labor occurring at 20-37 weeks gestation, which is further classified into very early, early, and late preterm. The Association of Fetomaternal Medicine (HKFM) defines it as delivery between 22 and 37 weeks gestation. This condition is a global problem as it causes nearly 1 million deaths each year and is the leading cause of death for children under 5 years of age. Bayar (2020) emphasizes that preterm birth is multi-etiological, with multiple risk factors that can influence its incidence and complications. Risk factors that can lead to preterm labor are short gestation (less than 6 months from the previous delivery), pregnancy with more than 1 fetus (multiple gestation), premature rupture of membranes, antepartum hemorrhage, maternal age and several other conditions.[1-4] The incidence of preterm labor is increasing. In 2017, the prevalence rate of preterm labor in Indonesia was 13.8 per 1,000 live births, and in 2018, it was 19.5 per 1,000 live births. Preterm labor can lead to short-term complications such as organ immaturity, low birth weight, sepsis, and asphyxia, which are fatal. In the long term, premature infants are at risk of impaired hearing and vision, cardiovascular disease, and chronic lung disease. Complications of preterm labor are the leading cause of death for children under 5 years and account for approximately 1 million deaths annually.[5,6] Given its significant impact, serious attention is needed, especially in understanding the prevalence and distribution of risk factors to support early identification and appropriate management. Therefore, this study was conducted to determine the prevalence and distribution of risk factors for preterm labor at Dr. Mohammad Hoesin Hospital Palembang.

Methods

This is descriptive observational research with cross-sectional research design. This study used secondary data obtained from patients' medical records. The population in this study was patients who gave birth at Dr. Mohammad Hoesin Palembang Hospital from January 1, 2020 to December 31, 2023. This research used the total sampling technique. The variables in this study were maternal age, gestational distance, multiple pregnancies, antepartum hemorrhage, premature rupture of membranes, history of preterm labor, history of cesarean section delivery, parity, hypertension, diabetes, infection, obesity, polyhydramnios, anemia, gestational age, and birth weight. The data obtained were analyzed univariately to determine the prevalence of preterm labor and the frequency distribution of the samples studied.

Results

This study was conducted at the Medical Record Department of Dr. Mohammad Hoesin Hospital Palembang from January 1, 2020 to December 31, 2023. The samples in this study were patients with preterm labor. The total number of patients with preterm labor was 1,654 patients (33.65%) out of 4,914 total deliveries.

Figure 1 shows the number of childbirth at Dr. Mohammad Hoesin Palembang Hospital from 2020 to 2023. The percentage of preterm deliveries increased over the years, with the highest percentage observed in 2023 (36.52%), while the number of deliveries decreased significantly over time. Overall, during the study period, the total number of preterm delivery cases reached 1,654 out of 4,914 of total deliveries, with an average percentage of 33.65%.

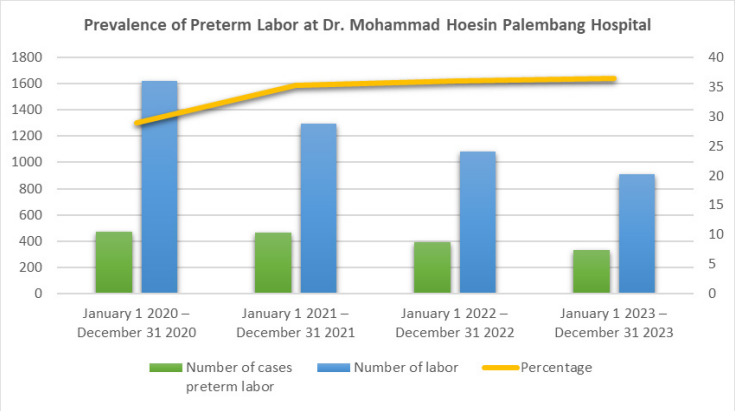

Figure 1 Distribution of Prevalence of Preterm Labor at Dr. Mohammad Hoesin Palembang Hospital from January 1, 2020 to December 31, 2023

Table 1 Distribution of Gestational Age in Preterm Labor

Gestational Age	Total	Percentage
	n	%
Preterm	975	58.9
Very preterm	464	28.1
Extremely preterm	215	13
Total	1,654	100

Table 2 Distribution of Birth Weight in Preterm Labor

Birth Weight	Total	Percentage
	n	%
Low birth weight	788	47.6
Very low birth weight	317	19.2
Extremely low birth weight	228	13.8
Normal	321	19.4
Macrosomia	0	0
Total	1,654	100

The distribution of gestational age in preterm labor (Table 1) shows that the majority of cases occurred within the preterm category, with smaller proportions in the very and extremely preterm categories. This pattern indicates that the majority of preterm deliveries occur at gestational ages closer to aterm, compared to the more extreme prematurity groups. Meanwhile, the distribution of birth weight in preterm infants (Table 2) shows that almost half of the preterm infants had low birth weight, while the rest fell into the categories of very low birth weight and extremely low birth weight. A small proportion of preterm infants weighed within the normal range, with no cases of macrosomia.

Table 3 Distribution of Risk Factors for Preterm Labor Based on History of Current Pregnancy

Distribution of Risk Factors for Preterm Labor	n=1,654	%
Maternal Age		
< 20 years or > 35 years	524	31.7
20 – 35 years	1,130	68.3
Parity		
Primiparity	965	58.3
Multiparity	648	39.2
Grand Multiparity	41	2.5
Multiple Pregnancy		
Yes	109	6.6
No	1,545	93.4
PPROM		
Yes	372	25.4
No	1,282	74.6
Polyhydramnios		
Yes	21	1.3
No	1,633	98.7

History of Cesarean Delivery	420	25.4%
Yes	1,234	74.6%
No		
Hypertension		
PIH	44	2.7
Preeclampsia	48	2.9
Severe preeclampsia	277	16.7
Eclampsia	176	10.6
No	1,109	67
Diabetes		
DM Gestational	11	0.7
DM Type 2	30	1.8
No	1,613	97.5
Total	1,654	100

Table 4 Distribution of Risk Factors Based on History of Previous Pregnancy

Distribution of Risk Factors for Preterm Labor	Total (n=687)	Percentage %
History of Premature Labor	94	13.7
Yes	593	86.3
No		
Interpregnancy		
< 12 months	73	10.6
No	614	89.4
Total	687	100

Table 5 Distribution of Risk Factors Based on Anemia and Infection in Preterm Delivery

Distribution of Risk Factors for Preterm Labor	Total (n = 981)	Percentage %
Anemia		
Yes	470	47.9
No	511	52.1
Infection		
Yes	420	42.8
No	561	57.2
Total	981	100

Table 6 Distribution of Risk Factors for Preterm Labor Based on Antepartum Hemorrhage and Obesity in Preterm Delivery

Distribution of Risk Factors for Preterm Labor	Total (n = 1157)	Percentages %
Antepartum hemorrhage	289	25
Yes	868	75
No		
Obesity		
Yes	168	14.5
No	989	85.5
Total	1,157	100

Most cases of preterm labor in this study occurred in mothers with optimal reproductive age (20-35 years), accounting for 68.3%. Additionally, 58.3% were in first parity, and 93.4% did not have a history of multiple pregnancy or major obstetric complications, such as premature rupture of membranes (74.6%) and polyhydramnios (98.7%). Medical factors such as hypertension and diabetes were only found in a small proportion of the population (Table 3), while the majority of patients had no previous history of preterm labor (86.3%) (Table 4). Sufficient spacing between pregnancies (89.4%) and absence of anemia (52.1%) or infection during pregnancy (57.2%) also appeared to be more dominant in the preterm group (Table 5). In addition, most patients had neither a history of bleeding (75%) nor obesity (85.5%), which may play a role in reducing the risk of preterm labor (Table 6).

Discussion

The percentage of preterm deliveries increased over the years, with the highest

percentage being in 2023 (36.52%). The average within 4 years was 33.65%. By contrast, the number of deliveries decreased significantly over time. The increasing percentage of preterm pregnancies indicates that preterm delivery remains a significant issue in maternal care, especially in national referral hospitals. Variations in the prevalence of preterm labor reported in previous studies, such as by Crump et al. (5.1%), Khezri et al. (9.7%), and Trisa et al. (25.7%), suggest differences in population characteristics and health care systems in different regions. The decrease in the total number of deliveries in type A referral hospitals can be attributed to a more effective referral system. Within this system, uncomplicated deliveries are well managed in type B and C hospitals, whereas more complex cases of preterm labor are often referred to type A hospitals, especially from lower accredited health facilities that may have limitations in the management of such cases. This may contribute to the increased proportion of preterm deliveries observed in this study. In addition, the increased prevalence may also indicate the increased awareness and vigilance of health workers in detecting and referring high-risk cases early, allowing for more optimal interventions in preventing complications of preterm labor.[7-9]

The results of this study showed that the majority of preterm labor cases occurred in the preterm category (58.9%). This finding is in line with the findings of research by Sungkar et al. (67.4%), Umi et al. (73.7%), and Crump et al. (75.1%). The high rate can be attributed to various maternal risk factors, including anemia, infection, as well as environmental and genetic factors. In addition, this study also found that 80.6% of preterm infants were born with low birth weight (LBW), consistent with the findings of Anggraini R. (73.5%) and Muhammad S. (66.7%). Maternal factors such as preeclampsia, placental insufficiency, and short pregnancy spacing contribute to the incidence of LBW. LBW is associated with an increased risk of neonatal morbidity and mortality, including respiratory distress, hypothermia and developmental delay.[1,8,10-13]

Preterm labor in this study occurred mostly in mothers with optimal reproductive age (20-35 years), accounting for 68.3% of the cases. In comparison, mothers in at-risk age groups (<20 years or >35 years) constituted 31.7%. This figure is below the results of studies by Maita L (47.3%), Crump C et al. (20.6%), and Syufal et al. (44%). Maternal age plays a role in healthy pregnancy. Women under the age of 20 face increased risks due to physiological immaturity of the uterus and pelvis. On the other hand, women above 35 years of age are associated with decreased reproductive function and an increased risk of complications, such as hypertension and placental insufficiency that can trigger preterm labor. In addition to age, parity also affects the risk of preterm labor. In this study, primiparity was more dominant (58.3%) compared to multiparity and grand multiparity (41.7%). This result is different from the results of study by Szyszka et al. (47.3% for multiparity and grand multiparity) and Khezri et al. (63.3%). Multiparity and grand multiparity may increase the risk of preterm labor due to repeated cervical trauma and increased maternal stress. However, the high rates of primiparity in this study may be influenced by the downward trend in birth rates in recent years. [1,8,9,14-16]

Another obstetric factor was multiple pregnancy, which occurred in 6.6% of mothers with preterm labor. This result is consistent with those of the studies by Wagura et al. (6.8%) and Trisa et al. (8.7%). However, Sungkar et al. found different result (13.3%). Multiple pregnancies increase intrauterine pressure, which can lead to premature rupture of membranes, hypertension, and impaired fetal growth, thus increasing the risk of preterm labor. In addition, premature rupture of membranes was found in 25.4% of cases, lower than those of the studies of Sungkar

et al. (43.7%) and Jiang et al. (35.3%). Premature rupture may result from infection, mechanical stress from repeated contractions, as well as an increase in MMP enzymes that weaken the amniotic membrane collagen. Polyhydramnios in this study was only found in 1.3% of cases, which is consistent with the findings of Sanjaya et al. (1%) and Jiang et al. (1.1%). Polyhydramnios can cause uterine overdistension, triggering the release of prostaglandins that stimulate contractions and increase the risk of preterm labor. Meanwhile, a history of cesarean delivery was found in 25.4% of mothers. This finding is in line with the findings of studies by Woolner et al. (16.9%) and Sungkar et al. (9.6%). Cesarean delivery can cause cervical laxity and changes in placental structure, which increases the risk of premature rupture of membranes and antepartum hemorrhage.[1,7,10,17-20]

Medical factors, such as hypertension and diabetes, were only found in a small proportion of the population. However, hypertension was found in 33% of mothers with preterm labor, a figure which surpasses the percentages reported in findings in studies conducted by An H et al. (12.96%), Crump C et al. (13.4%), and Jiang et al. (13.7%). Hypertension can cause placental insufficiency, endothelial dysfunction, and inflammation that inhibit fetal growth and trigger preterm labor. Diabetes mellitus was also found in 2.5% of cases. This result is in line with those of Crump C et al. (2.8%) and Jiang et al. (5.5%). Diabetes increases the risk of inflammation, insulin resistance, and polyhydramnios, all of which can contribute to preterm labor. The majority of mothers in this study did not have a history of preterm labor (86.3%). This finding accords with those of Maita L (4.9%), Trisa et al. (7.9%), and Wagura et al. (35.3%). A history of preterm labor may increase the risk of recurrent events, especially if accompanied by uncontrolled obstetric conditions. Most mothers had a safe pregnancy spacing (>12 months), with only 10.6% at risk.[7,8,14,18,21]

The majority of mothers in this study had pregnancy spacing of ≥12 months (89.4%), while only 10.6% were at risk. This result is in line with that of Wagura et al. (5.7%), who also reported a small number, but is contrary to that of Trisa et al. (46.5%) and Syufal et al. (62%). Although the proportion is small, previous studies have shown that gestational spacing of <6 months increases the risk of preterm labor of <34 weeks. Therefore, a pregnancy spacing of ≥12 months is recommended. Anemia was found in 47.9% of mothers with preterm labor, higher than the percentage reported by Khezri et al. (16.1%) and Wagura et al. (28%), but lower than that reported by Liva M (54.3%). Anemia in pregnancy can lead to tissue hypoxia, increase CRH levels, and stimulate uterine contractions. Infection was found in 42.8% of mothers with preterm labor, higher than the 9.7% reported by Rao et al. but lower than the percentage reported by Syufal et al. (86%). Pregnancy infections can stimulate the release of inflammatory cytokines and prostaglandins that trigger uterine contractions. Most mothers did not experience antepartum hemorrhage (75%), and this result is in accordance with the result of the study by Rao et al. (3.3%). However, Trisa et al. found lower percentage (49.1%). Bleeding can trigger thrombin activation, which increases the risk of premature rupture of membranes and preterm labor. Obesity was found in 14.5% of mothers with preterm labor. This is in line with data obtained in the research by Crump C (6.2%) and Khezri et al. (22.8%). Obesity increases the risk of preeclampsia, macrosomia, and systemic inflammation that contribute to preterm labor. Overall, anemia and infection were the main risk factors in this study.[1,7-9,14,15,22]

Conclusion

This study has shown that the prevalence of preterm labor from 2020 to 2023 increased,

with anemia being the most dominant risk factor, followed by infection and certain obstetric history. Early detection and appropriate intervention of these factors are needed to reduce the incidence of preterm labor and prevent complications. Further research is needed to analyze the association between risk factors and preterm labor to reinforce more effective prevention and management strategies.

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