Factors Related to Preterm Labor at Sleman Hospital 2023

Ari Nur Utami[1], Niken Meilani[1*], Anton Kristijono[1]
[1]Department of Midwifery Poltekkes Kemenkes Yogyakarta and Sleman Hospital, Yogyakarta.
email: niken.meilani@poltekkesjogja.ac.id

ABSTRACT

The infant mortality rate in Indonesia, based on the 2017 Indonesian Demographic and Health Survey (IDHS), was 24 deaths per 1,000 live births, while the under-five mortality rate reached 32 deaths per 1,000 live births, with most infant deaths occurring during the neonatal period. The Infant Mortality Rate (IMR), defined as the number of deaths among infants under one year of age per 1,000 live births in a given year, has shown a national decline from 24 (SDKI, 2017) to 16.85 deaths per 1,000 live births according to the 2020 Long Form Population Census. This study aimed to identify the factors associated with the incidence of preterm birth at Sleman Regional Hospital in 2023. A case-control research design was employed with purposive sampling involving 67 case samples and 67 control samples. Data were analyzed using univariate and bivariate methods with Chi-Square tests, and multivariate analysis using logistic regression. The results revealed significant associations between preterm birth and several factors: education level (p=0.025), maternal age (p=0.018), parity (p=0.002), history of preterm birth (p=0.012), premature rupture of membranes (KPD) (p=0.003), multiple pregnancy (p=0.011), and urinary tract infection (UTI) (p=0.000). Multivariate analysis confirmed these associations, showing that education level, maternal age, parity, history of preterm birth, KPD, multiple pregnancy, and UTI were significant predictors of preterm delivery.

Keywords: Infection, Low birth weight, Maternal age, Parity.

INTRODUCTION

Infant mortality in Indonesia remains a serious public health problem. According to the 2017 Indonesian Demographic and Health Survey (IDHS), the infant mortality rate was 24 deaths per 1,000 live births, while the under-five mortality rate was 32 deaths per 1,000 live births, with the majority of infant deaths occurring during the neonatal period. The 2017 IDHS data also showed that the Infant Mortality Rate (IMR) in the Special Region of Yogyakarta (DIY) reached 17 deaths per 1,000 live births, consisting of a neonatal mortality rate of 15 deaths per 1,000 live births and a post-neonatal mortality rate of 2 deaths per 1,000 live births [1]. The Sustainable Development Goals (SDGs) target related to infant mortality focuses specifically on neonatal deaths, aiming to reduce the Neonatal Mortality Rate (NMR) to at least 12 deaths per 1,000 live births by 2030. Based on infant death cases recorded in the past five years in DIY, Sleman Regency had the highest number of infant deaths in 2023, with a total of 68 cases [2].

Preterm labour is a condition that frequently occurs among pregnant women, defined as labour that takes place between 20 and 37 weeks of gestation

cardiovascular [3]. Preterm birth remains a major health problem and challenge worldwide due to the persistently high rates of neonatal mortality and morbidity. The quality of life of preterm infants also differs significantly from that of full-term infants, as their organs and body systems are not yet fully developed (WHO, 2023).

Globally, preterm birth is the leading cause of death among children under five years old, accounting for approximately 900,000 deaths in 2019. Indonesia ranks fifth among countries with the highest number of preterm births, with around 657,700 cases or 15.5% of 100,000 live births (WHO, 2023). Preterm birth has both short-term and long-term impacts. In the short term, preterm infants may experience death due to severe prematurity, as their organs and body systems are immature. It also increases the risk of low birth weight, asphyxia, sepsis, and other complications. In the long term, preterm birth can affect the quality of life, leading to specific physical disorders such as vision and hearing impairments, chronic lung disease, and cardiovascular conditions [3].

Preterm birth continues to occur frequently in both developed and developing countries, with varying prevalence rates, and requires special attention to improve maternal and infant morbidity and mortality outcomes [5]. Several factors contribute to preterm labour, including idiopathic causes, which are unknown or uncertain. Any disease with an unclear aetiology can be classified as idiopathic. In addition to idiopathic causes, preterm birth can result from fetal factors (such as intrauterine growth restriction [IUGR], fetal distress, and multiple pregnancies), sociodemographic factors (including psychosocial and demographic influences), and maternal factors (such as premature rupture of membranes [PROM], history of abortion, short interpregnancy interval, parity, preeclampsia, and urinary tract infection (UTI) [6].

Pregnancies occurring in women under 20 years old are at higher risk due to the smaller size and immaturity of the pelvis and uterus, while in women over 35 years old, reproductive function begins to decline compared to those aged 20–35 years, increasing the likelihood of complications and preterm delivery (Solama, Kurniawaty, & Adeisna, 2024). Preterm birth may occur spontaneously or be medically induced due to complications such as infections or other pregnancy-related conditions requiring early labour induction or cesarean delivery (WHO, 2023).

The impact of preterm birth includes the potential for organ function disorders in the new born, often requiring intensive care to survive (Siska et al., 2021). Growth and developmental disorders in preterm infants are generally caused by immature

organ systems, asphyxia, or birth trauma. During labour, infants undergo a physiological hypoxia phase due to reduced fetoplacental blood circulation during contractions or maternal pushing efforts. This condition is more severe in preterm infants because of their incomplete lung development, blood circulation, regulatory systems, and metabolic functions [8].

Preterm birth, defined as delivery before 37 weeks of gestation, remains a major global health concern and is the leading cause of neonatal morbidity and mortality. Advances in perinatal and neonatal care over recent decades have significantly increased the survival rates of extremely preterm infants. However, this improvement has also increased the risk of long-term health consequences. Evidence shows that individuals born preterm have a greater likelihood of developing non-communicable diseases (NCDs) later in life, such as cardiovascular disease, hypertension, diabetes, and chronic lung disorders. This link highlights that preterm birth is not only an acute perinatal issue but also a determinant of lifelong health, emphasising the importance of preventive strategies and early interventions to reduce both neonatal mortality and the long-term burden of NCDs [9]. The goals of this study were to identify the factors associated with the incidence of preterm birth at Sleman Regional Hospital in 2023.

MATERIAL AND METHOD

This study employed a quantitative research design using a case-control approach. The research was conducted at Sleman Regional General Hospital (RSUD Sleman), located on the main Yogyakarta–Magelang road, Bhayangkara Street No. 48, Murangan, Triharjo, Sleman, Yogyakarta. The study was carried out from March 24 to April 12, 2025. The population consisted of all mothers who delivered at RSUD Sleman in 2023, totalling 680 delivery cases, including 611 full-term deliveries and 69 preterm deliveries. The case group comprised mothers who experienced preterm birth, while the control group included mothers who had full-term (at-term) deliveries, with 67 respondents in each group. The sampling technique applied in this research was purposive sampling, selected based on specific inclusion criteria relevant to the study objectives.

The variables examined in this study consisted of independent and dependent variables. The independent variables included education level, maternal age, parity, pregnancy interval, history of preterm birth, premature rupture of membranes (PROM), multiple pregnancy (twin pregnancy), and urinary tract infection (UTI). Meanwhile, the

dependent variable in this study was the incidence of preterm birth. These variables were selected to identify the factors that might influence the occurrence of preterm labour among mothers who gave birth at Sleman Regional General Hospital in 2023. This design was chosen to identify and analyse the factors associated with preterm birth by comparing characteristics between mothers in both groups. or ethical clearance from Sleman Regional General Hospital with letter number 180/0928.10, issued on March 3, 2025.

Data analysis in this study consisted of univariate, bivariate, and multivariate analyses. The univariate analysis aimed to describe the characteristics of each variable, including maternal age, education level, parity, pregnancy interval, history of preterm birth, premature rupture of membranes (PROM), multiple pregnancy, and urinary tract infection (UTI), presented in the form of frequency and percentage using computer software. Bivariate analysis was conducted to assess the association between independent variables and the incidence of preterm birth using the Chi-square test at the 95% confidence level. The interpretation was based on the p-value, where $p \leq 0.05$ indicated a significant relationship. The Chi-square test was applied under specific assumptions regarding cell frequencies, and if the data did not meet these assumptions, Fisher's Exact Test or Pearson's Chi-square was used, depending on the table size. Multivariate analysis using logistic regression was performed to identify the most influential factors associated with preterm birth. This method was chosen because the dependent variable was binary (occurrence or non-occurrence of preterm birth), and independent variables with p-values ≤ 0.25 in the bivariate analysis were included in the model to identify the dominant predictors.

RESULTS AND DISCUSSION

Table 1 presents the distribution of respondents' characteristics in both the case and control groups, describing the frequency and percentage of each variable related to preterm birth. This comparison provides an overview of maternal and pregnancy-related factors that may influence the incidence of preterm delivery, including education level, maternal age, parity, interpregnancy interval, history of preterm birth, premature rupture of membranes (PROM), multiple pregnancy, and urinary tract infection (UTI)

Table 1. Frequency Distribution

Variables	Cases		Control		Total	
	n	%	n	%	n	%
Education Level						
Primary Education	19	28,4	9	13,4	28	20,9
Secondary Education	32	47,8	47	70,1	79	59,0
Higher Education	16	23,9	11	16,4	27	20,1
Maternal Age						
At Risk	30	44,8	16	23,9	46	34,3
Not At Risk	37	55,2	51	76,1	88	65,7
Parity						
At Risk	32	47,8	14	20,9	46	34,3
Not At Risk	35	52,2	53	79,1	88	65,7
Interpregnancy Interval						
At Risk	9	13,4	11	16,4	20	14,9
Not At Risk	58	86,6	56	83,6	114	85,1
History of Preterm Birth						
At Risk	8	11,9	21	31,3	29	21,6
Not At Risk	59	88,1	46	68,7	105	78,4
Premature Rupture of Membranes (PROM)						
Yes	54	80,6	37	55,2	91	67,9
No.	13	19,4	30	44,8	43	32,1
Multiple Pregnancy (Gemelli)						
Yes	12	17,9	2	3,0	14	10,4
No.	55	82,1	65	97,0	120	89,6
Urinary Tract Infection (UTI)						
Yes	26	38,8	5	7,5	31	23,1
No	41	61,2	62	92,5	103	76,9

Table 1, the data show that in the case group, the majority of respondents had a secondary education level (47.8%), maternal age was mostly not at risk (55.2%), parity was mostly not at risk (52.2%), and the interpregnancy interval was not at risk in 86.6% of cases. The history of preterm birth was predominantly not at risk (88.1%). For the PROM variable, 80.6% of respondents experienced PROM. Regarding the multiple pregnancy variable, most respondents did not have a multiple pregnancy (82.1%), and for the UTI variable, most respondents did not experience a UTI (61.2%).

In the control group, based on Table 1, the majority had a secondary education level (70.1%), maternal age was mostly not at risk (76.1%), parity was mostly not at risk (79.1%), and the interpregnancy interval was also mostly not at risk (83.6%). The history of preterm birth was mostly not at risk (68.7%). For the PROM variable, the

majority of respondents experienced PROM (55.2%). Regarding the multiple pregnancy (gemelli) variable, most respondents did not have a multiple pregnancy (97%), and for the UTI variable, the majority did not experience a UTI (92.5%).

Table 2. The Correlations Between Educational Level, Maternal Age, Parity, Interpregnancy Interval, History of Preterm Birth, Multiple Pregnancy, PROM, and UTI with the Incidence of Preterm Labor.

Variables	Cases		Control		P value
	n	%	n	%	
Education Level					
Primary Education	19	28,4	9	13,4	0.025
Secondary Education	32	47,8	47	70,1	
Higher Education	16	23,9	11	16,4	
Maternal Age					
At Risk	30	44,8	16	23,9	0.018
Not At Risk	37	55,2	51	76,1	
Parity					
At Risk	32	47,8	14	20,9	0.002
Not At Risk	35	52,2	53	79,1	
Interpregnancy Interval					
At Risk	9	13,4	11	16,4	0.808
Not At Risk	58	86,6	56	83,6	
History of Preterm Birth					
At Risk	8	11,9	21	31,3	0.012
Not At Risk	59	88,1	46	68,7	
Premature Rupture of Membranes (PROM)					
Yes	54	80,6	37	55,2	0.003
No.	13	19,4	30	44,8	
Multiple Pregnancy (Gemelli)					
Yes	12	17,9	2	3,0	0.011
No.	55	82,1	65	97,0	
Urinary Tract Infection (UTI)					
Yes	26	38,8	5	7,5	0.000
No	41	61,2	62	92,5	

Table 2 shows the relationship between several variables and the incidence of preterm birth, analyzed using the chi-square test. The results indicate significant associations between education level ($p = 0.025$), maternal age ($p = 0.018$), parity ($p = 0.002$), history of preterm birth ($p = 0.012$), premature rupture of membranes (PROM) ($p = 0.003$), multiple pregnancy ($p = 0.011$), and urinary tract infection (UTI) ($p = 0.000$) with preterm birth ($p < 0.05$). In contrast, the interpregnancy interval showed no significant relationship ($p = 0.808$). These findings suggest that maternal

and pregnancy-related factors such as education, age, parity, previous preterm birth, PROM, multiple pregnancy, and UTI are significantly associated with the risk of preterm birth.

Table 3. Results of Logistic Regression Test

Variabel	*p-value*	Exp(B)	95% CI	
			Lower	Upper
Education Level	0,018	1,245	0,214	0,060
Maternal Age	0,045	2,718	2,957	1,026
Parity	0,001	4,134	6,077	2,143
History of Preterm Birth	0,012	0,132	0,017	0,608
Premature Rupture of Membranes (PROM)	0,045	2,868	1,023	8,849
Multiple Pregnancy (Gemelli)	0,001	29,450	4,310	440,427
Urinary Tract Infection (UTI)	0,001	6,768	2,289	30,133

Table 3 shows that, based on the logistic regression test results, the most influential factor associated with preterm birth is multiple pregnancy (gemelli), with a p-value of 0.001, an odds ratio (OR) of 29.450, and a confidence interval (CI) of 4.310–440.427. This indicates that mothers with multiple pregnancies are 29.4 times more likely to experience preterm birth compared to those with singleton pregnancies. The next most influential factor is urinary tract infection (UTI), with a p-value of 0.001, an OR of 6.768, and a CI of 2.289–30.133, showing that mothers with UTIs are 6.7 times more likely to experience preterm birth than those without.

Education is a key determinant of health behavior and human development. Higher education levels enhance maternal knowledge and health awareness [10]. This study found a significant association between education level and preterm birth (p = 0.025). Mothers with only primary education were less likely to experience preterm birth compared to those with higher education (OR = 0.022, CI: 0.019–0.025). The multivariate test (p = 0.018) confirmed this relationship (OR = 1.245, CI: 0.214–0.060). These findings align with Andika and Sari (2023), who reported similar results [11].

Maternal age significantly influences pregnancy outcomes. Women younger than 20 or older than 35 are more prone to complications, including preterm birth

(Sijabat et al., 2023; Marcella et al., 2022). Other study also showed a significant relationship (p = 0.018, OR = 2.584, CI: 1.233–5.416), indicating that high-risk age mothers are 2.5 times more likely to have preterm births [12]. Maternal age as a risk factor for preterm birth [13]. The multivariate analysis confirmed this (p = 0.045, OR = 2.718), these results support previous studies [14].

Parity is defined as the number of children a woman has given birth to alive [15]. The statistical analysis in this study shows a significant relationship between parity and preterm birth, with a p-value of 0.002 and an odds ratio (OR) of 3.461 (95% CI: 1.620–7.397). This means that mothers with high-risk parity (either too low or too high) have a 3.4 times greater risk of experiencing preterm birth compared to mothers with normal parity. This finding is supported by the multivariate analysis, which also indicates a significant association between parity and preterm delivery. Physiologically, both low parity (nulliparous/primiparous) and high parity (grand multiparous, parity ≥4) can impact maternal health during pregnancy [16]. In cases of high parity, structural changes in the uterus and blood vessels from repeated pregnancies can disrupt nutrient delivery to the fetus. This condition increases the risk of intrauterine growth restriction (IUGR) and preterm labor [14]. Meanwhile, in low-parity mothers (nulliparous), the body may not yet be fully adapted to the physiological changes of pregnancy, thereby increasing the risk of complications such as preterm birth [6].

Short birth intervals (<2 years) may affect uterine recovery and increase complications [17]. However, this study found no significant relationship (p = 0.808, OR = 0.790, CI: 0.304–2.052). This aligns with Syufal Ningsih et al. (2022). Although not statistically significant, maintaining an optimal birth interval remains essential for maternal health [18].

A previous preterm birth is a strong predictor of recurrence delivery [19]. study showed a significant association (p = 0.012, OR = 0.297, CI: 0.121–0.731). Multivariate analysis confirmed this (p = 0.012, OR = 0.132), indicating that mothers with prior preterm births are more likely to experience recurrence [15]. Other study similarly found that prior preterm birth increases the risk by over four times (p = 0.006, OR = 4.259) (Sijabat et al., 2023).

Premature rupture of membranes (PROM) significantly increases preterm birth risk [20], [21]. This study found a significant association (p = 0.003, OR = 3.368, CI: 1.554–

7.301). Multivariate results confirmed this (p = 0.045, OR = 2.868). PROM, especially preterm PROM, can trigger early labor due to uterine infection or overdistension [22], [23].

Multiple pregnancy (gemeli) significantly raises preterm risk due to uterine overdistension and hormonal changes [24]. This study found a strong association (p = 0.011, OR = 7.091, CI: 1.521–33.057), and multivariate analysis further strengthened it (p = 0.001, OR = 29.450, CI: 4.310–440.427). Other study also confirming multiple pregnancy as a major risk factor [21].

Urinary tract infection (UTI) is one of the most common bacterial infections worldwide, with a global prevalence reaching 150 million cases annually—particularly in developing countries such as Indonesia (Achmad Murtafiul Azhmi et al.,). UTIs can affect all age groups, but women are more susceptible due to anatomical factors, such as a shorter urethra (2–3 cm) and the close proximity between the urinary tract and anus, which facilitates ascending infections [26] [27]. During pregnancy, increased uterine pressure on the urinary tract may lead to urinary stasis and vesicoureteral reflux [28]. Hormonal changes and relative immunosuppression during pregnancy can reduce the body's ability to fight infections. UTIs during pregnancy not only affect maternal health but also significantly increase the risk of preterm birth, likely due to systemic inflammatory responses that trigger early uterine contractions [29]. This study found a highly significant association (p = 0.000, OR = 7.363, CI: 2.793–22.141). After adjusting for confounders, UTI remained a strong predictor (p = 0.001, OR = 6.768). These results align with previous study reinforcing that UTI independently increases preterm birth risk.

CONCLUSION

Based on the results of the study titled “Factors Associated with Preterm Birth at Sleman Regional Hospital in 2023”, it was found that several factors are significantly associated with preterm birth. Bivariate analysis showed significant relationships between the following variables and preterm birth: education level, maternal age, parity (p-value 0.002), history of preterm birth (p-value 0.012), premature rupture of membranes (PROM) (p-value 0.003), multiple pregnancy (p-value 0.011), and urinary tract infection (UTI) (p-value 0.000). Meanwhile, interpregnancy interval (p-value 0.808) showed no significant association with the incidence of preterm birth. Multivariate analysis revealed that the strongest predictors of preterm birth were Multiple pregnancy (Gemeli): OR 29.450, UTI: OR 6.768, Parity: OR 4.134, PROM:

OR 2.868, Maternal age: OR 2.718, Education level: OR 1.245, History of preterm birth: OR 0.132. Based on these findings, it is recommended that healthcare providers strengthen early detection and management of high-risk pregnancies, particularly among mothers with multiple pregnancies, urinary tract infections, high-risk parity, and PROM. Health education should also focus on improving maternal awareness regarding reproductive health, infection prevention, and appropriate birth spacing to reduce the risk of preterm birth.

AUTHORS' CONTRIBUTIONS

All authors contributed equally to the development of this study. Ari Nur Utami contributed to the study conception, data collection, and drafting of the manuscript. Niken Meilani contributed to research design, data analysis, and interpretation of results. Anton Kristijono provided supervision, critical review, and final approval of the manuscript. All authors read and approved the final article.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to RSUD Sleman for granting permission and providing support during the research process. Appreciation is also extended to all enumerators who assisted in data collection and contributed to the successful completion of this study.

FUNDING INFORMATION

This research was self-funded by the authors. No external financial support, grants, or sponsorships were received for the conduct of this study or the preparation of this manuscript.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author upon reasonable request. All data were collected and analyzed specifically for this research and are not publicly available due to privacy and institutional restrictions.

DISCLOSURE STATEMENT

The views and opinions expressed in this article are solely those of the authors and do not necessarily reflect the official policy or position of any institution or organisation affiliated with the authors. The data presented in this study are original and derived from the authors' own research, and have not been previously published or submitted to any other journal.

REFERENCE

1. Dinkes DIY. Profil Kesehatan DIY Tahun 2022. Published online 2023. doi:10.1007/978-3-642-94500-7_1
2. Bappeda. Angka Kematian Bayi. Bappeda DIY.
3. Panada Sedianing Drastita, Hardianto G, Fitriana F, Utomo MT. Faktor Risiko Terjadinya Persalinan Prematur. *Oksitosin J Ilm Kebidanan*. 2022;9(1):40-50. doi:10.35316/oksitosin.v9i1.1531
4. WHO. Kelahiran prematur.
5. Siska V, Absari N, Rahmawati I, Andini P. Faktor-Faktor yang Berhubungan dengan Persalinan Prematur. 2021;2(2).
6. Solama W, Kurniawaty, Adeisna VC. Faktor-faktor yang Berhubungan dengan Kejadian Persalinan Preterm. *J 'Aisyiyah Med*. 2024;9:191-201.
7. WHO. Kelahiran Prematur. WHO.
8. Putri RJ. *Faktor-Faktor Yang Mempengaruhi Kejadian Persalinan Prematur Di RSUD Dr. M. Yunus Bengkulu*. 2019.
9. Jańczewska I, Wierzba J, Jańczewska A, Szczurek-Gierczak M, Domżalska-Popadiuk I. Prematurity and Low Birth Weight and Their Impact on Childhood Growth Patterns and the Risk of Long-Term Cardiovascular Sequelae. *Children*. 2023;10(10). doi:10.3390/children10101599
10. Andika P, I DAN, Sari RM. Faktor-Faktor yang Mempengaruhi Persalinan Prematur di RSUD Dr. M. Yunus Bengkulu. *PREPOTIF J Kesehat Masy*. 2023;7(April):944-950.
11. Rahim I, Fitriani R, Gama AW, Rahman A, Alwi Z. Analisis Faktor Risiko Kejadian Persalinan Prematur Di RSUD Haji Makassar Tahun 2021. *J Kedokt dan Kesehat*. 2023;9.
12. Loviana N, Darsini N, Kedokteran F, Airlangga U. Faktor yang Berhubungan dengan Kejadian Persalinan Prematur di RSUD DR Soetomo. *Indones Midwifery Heal Sci J*. 2019;3(1):85-97. doi:10.20473/imhsj.v3i1.2019.85-97
13. Marcella F, Isnaini N, Utami VW. Usia ibu dan paritas dengan kejadian persalinan prematur. *MJ (Midwifery Journal)*. 2022;2(4):215-220.
14. Syufal Ningsih N, Aprilia Tiodika T, Florensia Situmeang I. Faktor-Faktor Yang Berhubungan Dengan Kejadian Persalinan Prematur Di RSUD Cibinong Kabupaten Bogor. *Indones J Midwifery Sci*. 2022;1(1):29-39.
15. Herman SJTH. Buku Acuan Persalinan Kurang Bulan (Prematur) 1. *Buku Acuan Persalinan Kurang Bulan*. Published online 2020:1-219.
16. Musviratunnisah BY, Benvenuto AF, Saputra IPBA, Hanafi F. Hubungan Anemia, Usia Ibu, dan Paritas dengan Kejadian Berat Badan Lahir Rendah di RSUD Patut Patuh Patju. *Mahesa Malahayati Heal Student J*. 2024;4:2294-2304.
17. Hipson M, Anggraini EK, Studi P, Kebidanan D, Palembang SA. Analisis Faktor-Faktor yang Berhubungan dengan Persalinan Normal. *J Ilm Multi Sci Kesehat*. 2021;13(2):89-100.
18. Niswah FI. *Faktor Risiko Kejadian Persalinan Prematur (Studi Kasus Di Rsud Tugurejo Semarang)*. Vol 1.; 2020.
19. Lontaan GIA, Wagey FW, Tendean HMM. Hubungan Faktor-Faktor Risiko dengan Persalinan Prematur di RSUP Prof.Dr. R.D Kandou Manado Periode 2021-2022. *e-CliniC*. 2025;13(1):78-84.
20. Nurfaizah A, Silvana R, Dwiryanti R. Hubungan Infeksi Saluran Kemih Dengan Kejadian Ketuban Pecah Dini Di Rumah Sakit Muhammadiyah Palembang. *MESINA (Medical Sci Journal)*. 2020;1:9-14.
21. Sofiana K, Wahyuningsih HP, Meilani N. Factor related to preterm premature rupture of membrane among pregnant women. *Int J Public Heal Sci*. 2024;13(2):564. doi:10.11591/ijphs.v13i2.23668

22. Norhayati E, Zulliati, Haryono IA. Hubungan Ketuban Pecah Dini (KPD) Terhadap Persalinan Preterm: Literatur Review. *Proceeding Sari Mulia Univ Midwefery Natl Semin*. 2022;4(01):120-129.
23. Agutina Ningsi, Afriani, Sonda M. *Asuhan Kegawatdaruratan Maternal Neonatal*.; 2023.
24. Saffira AN, Trisetiyono Y, Andar EBP., Dewantiningrum J. Luaran Maternal dan Neonatal pada Kehamilan Gamelli di RSUP Dr. Kariadi Semarang. *J Kedokt Diponegoro*. 2020;9:140-147.
25. Achmad Murtafiul Azhmi, Rahmawati2 F, Aryanti N, Erny. Hubungan Infeksi Saluran Kemih (ISK) dengan Persalinan Prematur pada Ibu Hamil di RS Intan Medika. Seminar Nasional COSMIC ke-2 Kedokteran Komunitas.
26. Hadi AN, Handaria D, Hajar N. Pengaruh Infeksi Saluran Kemih Dan Kadar Hemoglobin Pada Ibu Hamil Dengan Kejadian Partus Prematur Di Rsud Dr . M . M . Dunda Gorontalo. *Pros Semin Nas UNIMUS*. 2024;7:214-219.
27. Pitono AJ, Rahandity DC. Hubungan Infeksi Saluran Kemih dengan Persalinan Prematur di RS Santosa Borromeus Tahun 2023. *J Ilm Indones*. 2024;9(11).
28. Czajkowski K, Broś-Konopielko M, Teliga-Czajkowska J. Urinary tract infection in women. *Prz Menopauzalny*. 2021;20(1):40-47. doi:10.5114/pm.2021.105382
29. Tarigan ISB, Mukti AI, Yulizal O. Tingkat Pengetahuan Ibu Hamil tentang Infeksi Saluran Kemih (ISK) di Desa Sibolangit. *Edu Dharma J J Penelit dan Pengabdi Masy*. 2021;5(1):1. doi:10.52031/EDJ.V5I1.90