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## The Relationship between Maternal Factors and Low Birth Weight (LBW) at PKU Muhammadiyah Gamping Hospital

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### ABSTRACT

**Background:** In 2020, the number of Infant Mortality Rates reached 2.4 million people due to LBW (34.5%). LBW contributes 60 to 80% of all infant deaths. LBW is babies born weighing less than 2500 grams. LBW has problems if the baby does not die at the time of birth, it will have a risk of growing and developing slowly, stunting, affected by non-communicable diseases, anemia, and impaired heart function.

**Purpose:** To determine the relationship between maternal factors and the incidence of LBW at PKU Muhammadiyah Gamping Hospital.

**Methods:** This research used a quantitative analytic survey with a case-control approach. This study used medical record data and maternal cohorts. The population in this study was 604 newborn babies at PKU Muhammadiyah Gamping Hospital with a total sample of 142 respondents. The sampling technique used is purposive sampling. This study employed the master table as a data collection method. The data analysis used is the chi-square test.

**Results:** Based on the results of chi-square analysis, maternal parity ( $p$ -value = 0.228) with OR = 1.518, gestational age (0.000) OR = 15.200, multiple pregnancies (0.009) and OR = 10.161, and preeclampsia (0.164) and OR = 0.571.

**Conclusion:** There is a significant relationship between gestational age and multiple pregnancies with the incidence of LBW. Meanwhile, parity and preeclampsia do not have a significant relationship with the incidence of LBW. It is recommended for every pregnant woman to carry out routine check-ups during pregnancy to prevent the occurrence of LBW.

**Keywords:** *LBW, Mother Factors*

## BACKGROUND

According to data from WHO in 2020, the number of newborn deaths is 2.4 million, and almost half (47%) of all under-five deaths occur in the neonatal period (the first 28 days of life). Indonesia is in the 7th place out of 10 countries with the highest newborn mortality rate (World Health Organization, 2022). The number of under-five mortality rates in Indonesia, in 2020, reached 28,158 deaths. In 2021, the under-5 mortality rate decreased to 27,566 deaths, which contributed to the neonatal mortality rate of 25,276 deaths (RI Ministry of Health, 2022). In 2020, the Infant Mortality Rate (IMR) in Yogyakarta was 11.22, 4.04 points higher than the 2019 IMR of 7.18 per 1,000 live births (DIY Health Office, 2020). Most infant deaths are caused by Low Birth Weight (LBW) conditions of 34.5% (RI Ministry of Health, 2022).

LBW babies are babies born prematurely or full-term babies weighing <2500 grams. LBW contributes 60 to 80% of all infant deaths and the risk of death is 20 times higher than babies with normal weight. The percentage of LBW in developing countries is twice as much as in developed countries. Indonesia is one of the developing countries that is in the third position as a country with the highest prevalence of LBW (11.1%), after India (27.6%) and South Africa (13.2%) (Princess et al., 2019). According to Apriani et al., (2021), The global prevalence for LBW is 15.5%, or about 20.6 million babies born each year. In 2020, the prevalence of LBW in Yogyakarta was 8.2% higher than in 2019 (Dinas Kesehatan DIY, 2020).

LBW babies have a greater risk of experiencing stunting and non-communicable diseases such as diabetes, hypertension, and heart disease (Khulasoh & Wijhati, 2020). The problems of LBW can be affected by maternal factors, such as parity, birth spacing, complications in pregnancy, gestational age, multiple pregnancies, preeclampsia, smoking habits, nutritional status, and socioeconomic status (Luqmanasari & Muliana, 2020). Fatahilah (2018) explains that the government has made various efforts to reduce maternal and infant mortality, one of the efforts is by conducting comprehensive and integrated antenatal care for all pregnant women aiming to find and prepare risk controls (Fatah, 2018).

The results of a preliminary study conducted at PKU Muhammadiyah Gamping Hospital on October 21, 2022, showed that the number of newborns born from August 1, 2021, to August 31, 2022, was 604 babies, including 71 babies with LBW. Based on the problems above, it is known that LBW still becomes a health problem for mothers and babies; therefore, this study aims to find out the relationship between maternal factors and the incidence of LBW at PKU Muhammadiyah Gamping Hospital.

## OBJECTIVE

The purpose of this study is to find out the relationship between maternal factors and risks with the incidence of LBW at PKU Muhammadiyah Gamping Hospital.

## METHODS

This research employed a quantitative research method; using an analytic survey and a case-control study approach. This research was conducted at PKU Muhammadiyah Gamping Hospital by examining secondary data, namely from medical records and the mother's cohort. This research instrument used a master table. The population in this study was all newborns at PKU Muhammadiyah Gamping Hospital

from August 1, 2021, to August 31, 2022, with a total of 604 respondents. The samples used in this study were 142 infants, consisting of 71 cases in the case group taken by purposive sampling technique and 71 control group infants taken by random sampling. The variables examined in this study were parity, gestational age, multiple pregnancies, and preeclampsia with LBW. This research proved to be worthy research with an ethical letter issued from PKU Muhammadiyah Gamping Hospital No. 195/KEP-PKU/XII/2022 on December 2, 2022.

## RESULTS

Table 1. Characteristics of Respondents Based on Age, Occupation, Education

Characteristics	Criteria	Case		Control	
		f	%	f	%
Mother's age	Risky	15	21,1	14	19,7
	No risk	56	78,9	57	80,3
	Total	71	100,0	71	100,0
Profession	Self-employed	33	46,5	35	49,3
	Civil servant	4	5,6	4	5,6
	IRT	34	47,9	32	45,1
	Total	71	100,0	71	100,0
	Base	0	0,0	2	2,8
Education	Intermediate	49	69,0	46	64,8
	Tall	22	31,0	23	32,4
	Total	71	100,0	71	100,0

(Source: Medical Records of PKU Muhammadiyah Gamping Hospital)

In Table 1. in the case group most respondents are distributed in the age of the mother who is at risk of 78.9%. Most of the jobs are found in IRT jobs by 47.9% and the dominant respondent's education is at secondary education by 69.0%. Whereas in the control group, the respondents who are mostly distributed are at the age of mothers who are not at risk is 80.3%. For jobs, there are more entrepreneurs 49.3%, and in education, there are more in secondary education 64.8%.

Table 2. Frequency Distribution of Maternal Factors Associated with LBW Events at PKU Muhammadiyah Gamping Hospital

Mother Factor	F	(%)
Parity		
1. Risky	55	38,7
2. No risk	87	61,3
Gestational age		
1. Preterm	43	30,3
2. Term	99	69,7
Multiple pregnancies		
1. Multiple pregnancies	10	7,0
2. Singletons	132	93,0
Preeclampsia		

1. Preeclampsia	22	15,5
2. Not preeclampsia	120	84,5

(Source: Medical Records of PKU Muhammadiyah Gamping Hospital)

Based on Table 2. It can be concluded that the majority of parity mothers at PKU Muhammadiyah Gamping Hospital, namely parity not at risk, are 87 respondents (61.3%). Maternal gestational age is the most common term for as many as 99 respondents (69.7%). In multiple pregnancies, 132 respondents (93.0%) are dominated by mothers who are singletons. Whereas in preeclampsia, the most mothers who do not experience preeclampsia, namely 120 respondents (84.5%).

Table 3. Relationship between maternal factors and LBW at PKU Muhammadiyah Gamping Hospital

	LBW						OR 95% CI	P-value
	Case		Control		Total			
	n	%	n	%	n	%		
<b>Parity</b>								
Risky	31	43,7	24	33,8	55	38,7	1,518 (0,769-2,994)	0,228
No risk	40	56,3	47	66,2	87	61,3		
Total	71	100,0	71	100,0	142	100,0		
<b>Gestational Age</b>								
Preterm	38	53,5	5	7,0	43	30,3	15,200 (5,471-42,227)	0,000
Term	33	46,5	66	93,0	99	69,7		
Total	71	100,0	71	100,0	142	100,0		
<b>Multiple Pregnancies</b>								
Multiple pregnancies	9	12,7	1	1,4	10	7,0	10,161 (1,252-82,488)	0,009
Singletons	62	87,3	70	98,6	132	93,0		
Total	71	100,0	71	100,0	142	100,0		
<b>Preeclampsia</b>								
Preeclampsia	8	11,3	14	19,7	22	15,5	0,571 (0,202-1,323)	0,164
Not preeclampsia	63	88,7	57	80,3	120	84,5		
Total	71	100,0	71	100,0	142	100,0		

(Source: Medical Records of PKU Muhammadiyah Gamping Hospital)

## DISCUSSION

### 1. Relationship between Parity and Low Birth Weight at PKU Muhammadiyah Gamping Hospital

The results of the analysis show that the parity of mothers who are at risk gave birth to more LBW babies (43.7%) than NBW babies (33.8%). According to the results of statistical tests, there is no relationship between parity and the incidence of LBW babies as indicated by the value of  $p = 0.228$  and the value of  $OR = 1.518$ , which means that parity at risk has a greater risk of 1.518 times higher to give birth to LBW babies than parity not at risk. This study agrees with research conducted by Putri et al., cited by Salawati (2019) that there is no

relationship between parity and the incidence of LBW, with the results of the Fisher's Exact statistical test at 95% CI,  $\alpha = 0.05$ ,  $p = 0.085$  ( $> 0.05$ ). Similar to the research conducted by Khotijah (2018), there is no significant relationship between parity and the incidence of LBW as evidenced by the value of  $p = 0.462$ . Raidanti & Wahidin (2021) also have a similar point to Khotijah, stating that there is no relationship between high parity and the incidence of LBW as indicated by the value of  $p = 0.580$ .

The first delivery or more than three times will have a negative impact on the mother and fetus. After experiencing three deliveries, there is a risk of giving birth to defective babies or low birth weight babies, and this increases the maternal mortality rate (Sembiring et al., 2019). The previous argument is supported by Sari & Hasmita (2019), which obtained a  $p$ -value = 0.000, meaning there is a parity relationship with the incidence of LBW at Puri Husada Tembilahan Regional Hospital. Fatmawati & Wati (2021), found that a value of  $p = 0.000$ , which means there is a relationship between parity number and LBW. Kurniasari (2018), stated that there was a significant relationship between parity and the incidence of LBW at RSIA Annisa Jambi City in 2017 with a  $p$ -value of 0.01. Yulianti (2021), stated that there is a relationship between maternal parity and the incidence of LBW with a statistical value of  $p=0.000$ . This research is also in line with Khairani et al., (2020), stating that there is a significant relationship between parity and the incidence of LBW at RSUD Dr. M Yunus Bengkulu in 2017 with  $p$  value = 0.025.

According to Indah & Utami (2020), primiparous mothers have no previous experience in pregnancy and childbirth, therefore, LBW can occur due to inadequate nutritional status which affects the weight of the newborn baby, lack of ANC visits and inadequate knowledge of care during pregnancy and psychological conditions, especially readiness to accept pregnancy. In Grande multipara or mothers who have given birth  $> 4$  times, it can cause a decrease in the function of the pregnancy organs (Sari & Hasmita, 2019).

## **2. Relationship between Gestational Age and Low Birth Weight at PKU Muhammadiyah Gamping Hospital**

The result of the analysis shows that 38 respondents (53.5%) of mothers with preterm gestational age give birth to LBW babies higher than mothers who give birth term with 33 respondents (46.5%) LBW babies. The result of the analysis shows that there is a relationship between gestational age and the incidence of LBW proven by the value of  $p = 0.000$  and the OR value of 15.200, which means that preterm gestational age has a risk of 15.200 times higher than term. Gestational age is the age of the fetus which is calculated in weeks based on the first day of the last menstrual cycle. 37 weeks of gestation is the best age for the fetus. Preterm gestational age has a higher risk of giving birth to LBW babies because the shorter the gestation period, the less perfect the body's organs can affect the baby's weight at birth (Indah & Utami, 2020).

In line with Indah & Utami (2020), the results of bivariate analysis show  $p = 0.000$ , which means that there is a significant relationship between gestational age and low birth weight. This research is in line with Sembiring et al., (2019), who explained that there is a significant relationship between

gestational age and LBW at Mitra Medika Hospital in Medan with  $p = 0.015$ . Apriani et al., (2021) also explained that there is a relationship between gestational age and the incidence of low birth weight (LBW) with a value of  $p = 0.000$ . Even further, Aulia et al., (2019) also stated that there was a significant relationship between gestational age and the incidence of LBW with a statistical value of  $p = 0.001$ .

According to Sembiring et al., (2019), Preterm gestational age increases the incidence of LBW due to disturbances in fetal development and growth. LBW can also be caused due to full-term gestational age, such as malnutrition during pregnancy, the mother has other diseases, and thus the growth of the fetus is not optimal experiencing growth disturbances. According to Back and Rosenthal's theory cited by Sasmita & Khotimah in Jayanti et al., (2020), the baby's weight increases according to gestational age because the growth of the fetal organs will follow according to the gestational age, the less the gestational age, the less perfect the growth of the organs will be including the birth weight.

### **3. Relationship of Multiple Pregnancy with Low Birth Weight at PKU Muhammadiyah Gamping Hospital.**

The result of the analysis shows that mothers with multiple pregnancies give birth to more LBW babies (12.7%) than those with NBW babies (1.4%). The statistical test result shows a  $p$  value = 0.009 which means there is a relationship between multiple pregnancies and low birth weight babies,  $OR = 10.161$ , which means that multiple pregnancies have a 10.161 times greater risk of giving birth to low birth weight babies than mothers who are not pregnant with twins. According to Yulianti in Prawiryohardjo (2021), the weight of the fetus in multiple pregnancies is lighter than the fetus in a single pregnancy. The weight gain for twins is the same as for a single pregnancy fetus until the gestational age reaches 30 weeks. Furthermore, the weight gain is smaller due to excessive stretching, causing reduced blood circulation to the placenta (Yulianti, 2021).

In line with Indah & Utami (2020), there is a significant relationship between multiple pregnancies and the incidence of LBW because of the value of  $p = 0.000$  ( $<0.05$ ). Handayani & Ernawati (2017) stated that there is a relationship between multiple pregnancies and LBsW because of the value of  $p = 0.001$ . Even further, Sembiring et al., (2019) have a  $p$ -value = 0.000 ( $p$ -value  $<0.05$ ) which means that there is a relationship between multiple pregnancies and the incidence of LBW. According to Indah & Utami in Manuaba (2020), multiple pregnancies can also cause complications during pregnancy, especially in TM II and III, such as Intrauterine Growth Retardation (IUGR), premature growth, growth anomalies occur that can make the fetus grow smaller until it dies (Indah & Utami, 2020).

### **4. Relationship between Preeclampsia and Low Birth Weight at PKU Muhammadiyah Gamping Hospital**

Table 3 states that preeclampsia mothers give birth to 8 babies with low birth weight babies compared to 14 babies with low birth weight babies. The results of the analysis show that there is no relationship between preeclampsia



and the incidence of LBW babies with  $p = 0.164$  and  $OR = 0.571$ , which means that preeclampsia mothers are more at risk of giving birth to LBW babies than mothers who do not have preeclampsia. It is supported by Raidanti & Wahidin (2021), who explain that there is no significant relationship between preeclampsia and the incidence of LBW with a  $p\text{-value} = 0.656$ . In line with Lisnawati et al., (2020), based on the chi-square test obtained  $p = 0.197$  and the Odds Ratio ( $OR$ ) = 1.939. Nur'aisyah (2020) stated that the results of bivariate analysis using the chi-square test obtained a value of  $p = 0.863$  which means that there is no relationship between preeclampsia and the incidence of low birth weight babies (LBW) at PKU Muhammadiyah Hospital, Bantul.

According to Raidanti & Wahidin in Prawirohardjo (2021), preeclampsia mothers are at risk of giving birth to LBW babies. Preeclampsia will cause abnormalities in the placenta as well as vasospasm and endothelial injury. Preeclampsia causes failure in the trophoblastic invasion of the spiral arteries failing spiral artery remodeling, resulting in decreased blood flow to the uteroplacental causing hypoxia and placental ischemia resulting in retarded fetal growth (Raidanti & Wahidin, 2021). In addition, according to Yulianti in Ilyas (2021), Preeclampsia can result in delayed fetal growth and stillbirth because preeclampsia will cause calcification in the placenta area, while the baby gets food and oxygen from the placenta, with calcification in the placenta area, food, and oxygen supply that enters the fetus is reduced (Yulianti, 2021). Preeclampsia can cause Intrauterine Growth Retardation (IUGR) and give birth to LBW babies (Surico et al., 2019).

The results of Faadhillah's research show there was significant relationship between preeclampsia and LBW incidence with  $P\text{-value} = 0.001$ , PR value adjusted 1.483 (95% CI 1.192-1.846) after controlled by the Confounding variable (Surico et al., 2019). Obtained a  $p\text{-value} = 0.000$  and it can be concluded that there is a significant relationship between preeclampsia and LBW due to the  $p\text{-value} (0.000 < 0.05)$  (Oktarina et al., 2021). The  $P\text{ value} = 0.000$  concluded that there was a relationship between preeclampsia and the incidence of low birth weight babies at the Palembang Muhammadiyah Hospital (Budiarti et al., 2022). Chi-square statistical test with  $p\text{-value} = 0.000$  shows that there is a significant relationship between preeclampsia and the incidence of LBW at the Regional General Hospital Raden Mattaher Jambi with an  $OR$  value of 3.496 (Primadevi & Susanti, 2022). The results of the Continuity Correction test obtained a value of  $x^2$  of 4.441 with a value of  $p = 0.035 (< 0.05)$ , thus is a significant relationship between preeclampsia and the incidence of LBW at RSUD Dr. M. Yunus Bengkulu in 2017 (Khairani et al., 2020). There is a difference between the theory and the results of the analysis that has been carried out by researchers.

## CONCLUSION

Based on the results of the study, it can be concluded that from the 4 variables studied, 2 variables have significant relationships with the incidence of LBW, namely gestational age and multiple pregnancies. The gestational age variable obtained a  $p\text{-value} (0.000 \alpha < 0.05)$  with an  $OR = 15.200$  with a dominant preterm gestational age of 38 respondents (53.3%). The multiple pregnancy variable has a  $p\text{-value} (0.009 \alpha < 0.05)$

and an OR value of 10.161 which is more dominant for mothers with single pregnancies as many as 62 respondents (87.3%). Apart from that, variables that have no relationship with the incidence of LBW are parity and preeclampsia. The results of the chi-square test on the parity variable were  $p = 0.228$ ,  $OR = 1.518$  with the predominant non-risk parity being 40 respondents (56.3%). Furthermore, preeclampsia with results  $p=0.164$ ,  $OR=0$ , 571 with predominantly mothers who are not diagnosed with preeclampsia as many as 63 respondents (88.7%). This means that the variables parity and preeclampsia do not have a significant relationship with the incidence of LBW. It is hoped that future researchers will develop and explore maternal factors that are the cause of LBW, especially exploring parity and preeclampsia variables which are not in accordance with theory or previous research.

## REFERENCES

- Apriani, E., Subandi, A., & Mubarak, A. K. (2021). Hubungan Usia Ibu Hamil, Paritas dan Usia Kehamilan dengan Kejadian BBLR di RSUD Cilacap. *TeNS : Trends of Nursing Science*, 2(1), 45–52.
- Budiarti, I., Rohaya, R., & Silaban, T. D. S. (2022). Faktor-Faktor yang Berhubungan dengan Kejadian Bayi Berat Lahir Rendah (BBLR) di Rumah Sakit Muhammadiyah Palembang Tahun 2020. *Jurnal Ilmiah Universitas Batanghari Jambi*. <https://api.semanticscholar.org/CorpusID:251166165>
- Dinas Kesehatan DIY. (2020). Profil Kesehatan D.I Yogyakarta Tahun 2020. In *Profil Kesehatan Daerah Istimewa Yogyakarta tahun 2020*. Dinas Kesehatan DIY.
- Fatahilah. (2018). Program antenatal care terpadu dalam upaya penurunan angka kematian ibu. *HIGEIA (Journal of Public Health Research and Development)*, 1(3), 759–767.
- Fatmawati, E., & Wati, D. R. (2021). Hubungan Paritas Dengan Berat Badan Lahir Rendah (BBLR). *IJMT : Indonesian Journal of Midwifery Today*, 1(1), 49. <https://doi.org/10.30587/ijmt.v1i1.3419>
- Handayani, F., & Ernawati, D. (2017). Faktor-Faktor yang Berhubungan dengan BBLR di RSUD Wates Kabupaten Kulon Progo. In *Universitas 'Aisyiyah Yogyakarta*.
- Indah, F. N., & Utami, I. (2020). Faktor-Faktor Yang Berhubungan Dengan Kejadian Berat Badan Lahir Rendah (BBLR). *Intan Husada : Jurnal Ilmiah Keperawatan*, 8(1), 19–35. <https://doi.org/10.52236/ih.v8i1.173>
- Kemendes RI. (2022). *Profil Kesehatan Indonesia* (F. Sibuea, B. Hardhana, & W. Widiyanti (eds.)). Kementerian Kesehatan Republik Indonesia.
- Khairani, N., Sanisahhori, Suryani, & Kendari, C. P. (2020). Hubungan Paritas Dan Preeklamsi Dengan Kejadian BBLR Di RSUD dr. M. Yunus Bengkulu. *Chmk Midwifery Scientific Journal*, 3(2), 141–149.
- Khotijah, C. S. (2018). *Hubungan Usia Ibu dan Paritas Dengan Kejadian BBLR di RSUD Panembahan Senopati Bantul*. Universitas 'Aisyiyah Yogyakarta.
- Khulasoh, & Wijhati, E. R. (2020). *Hubungan Karakteristik Ibu Bersalin Dengan Kejadian Berat Bayi Lahir Rendah (BBLR)*. Universitas 'Aisyiyah Yogyakarta.
- Kurniasari, L. (2018). Hubungan Paritas, Jarak Kelahiran dan Riwayat Preeklamsia Dengan Kejadian BBLR di RSIA Annisa Kota Jambi Tahun 2017. *Scienta Journal*, 7(1), 53–57.
- Luqmanasari, E., & Muliana. (2020). Faktor Maternal Yang Berhubungan Dengan Bayi Berat Lahir Rendah di RS Amelia Pare Kediri Tahun 2018. *Jurnal ILKES (Jurnal*



- Ilmu Kesehatan*), 11(2), 306–315.
- M, A., S, A., & P.E, S. (2019). Hubungan Anemia, Usia Kehamilan dan Preeklamsia Dengan Kejadian BBLR di RSI Siti Khadijah Palembang Tahun 2018. *Masker Medika*, 7(2), 332–342.
- Nur'aisyah. (2020). *Hubungan Preeklamsia Dengan Kejadian Bayi Berat Lahir Rendah (BBLR) Di Rsu Pku Muhammadiyah Bantul*. 1–10.
- Oktarina, M., Herdiani, T. N., Rahmawati, I., & Susanti, R. (2021). Hubungan Preeklamsi dengan Kejadian Berat Badan Lahir Rendah (BBLR) di RSUD DR.M. Yunus Bengkulu. *Jurnal Kesehtan Masyarakat*, 5(April), 139–145.
- Primadevi, I., & Susanti, R. U. (2022). Hubungan Preeklamsia dengan Kejadian Bayi Berat Lahir Rendah (The Correlation Between Preeclampsia With The Genesis Of Low Birth Weight). *Ners Akademika*, 1(1), 17–21. <https://doi.org/10.35912/nersakademika.v1i1.1714>
- Putri, A. W., Pratitis, A., Luthfiya, L., Wahyuni, S., & Tarmali, A. (2019). Faktor Ibu terhadap Kejadian Bayi Berat Lahir Rendah. *HIGEIA (Journal of Public Health Research and Development)*, 3(1), 55–62.
- Raidanti, D., & Wahidin. (2021). Hubungan Preeklampsia dan Paritas Tinggi Dengan Kejadian Bayi Berat Lahir Rendah. *Ahmar Metastasis Health Journal*, 1(1), 11–15.
- Sari, D. E. A., & Hasmita, Y. (2019). Hubungan Umur, Paritas, Anemia, dan Kehamilan Ganda Dengan Kejadian BBLR di Rsud Puri Husada Tembilahan Tahun 2015-2017. *Jurnal Kesehatan Husada Gemilang*, 2(1), 1–7.
- Sasmita, H., & Khotimah, H. (2020). Faktor Yang Berhubungan Dengan Kejadian Bayi Berat Lahir Rendah (BBLR) di Ruang Perinatologi RSUD Drajat Prawiranegara. *Jurnal Ilmu Kesehatan Politeknik Kesehatan Kementrian Kesehatan Palu*, 14(2), 128–133.
- Sembiring, J. B., Pratiwi, D., & Sarumaha, A. (2019). Hubungan Usia, Paritas dan Usia Kehamilan dengan Bayi Berat Lahir Rendah di Rumah Sakit Umum Mitra Medika Medan. *Jurnal Bidan Komunitas*, 2(1), 38–46.
- Surico, D., Bordino, V., Cantaluppi, V., Mary, D., Gentili, S., Oldani, A., Farruggio, S., Melluzza, C., Raina, G., & Grossini, E. (2019). Preeclampsia and intrauterine growth restriction: Role of human umbilical cord mesenchymal stem cells-trophoblast crosstalk. *PLoS ONE*, 14(6), 1–24. <https://doi.org/10.1371/journal.pone.0218437>
- World Health Organization. (2022). *Newborn Mortality*. World Health Organization.
- Yulianti, L. (2021). Faktor-Faktor Yang Berhubungan Dengan Kejadaian Bayi Berat Lahir Rendah (BBLR) di RSUD Gunung Jati Kota Cirebon. *Jurnal Ilmiah Kesehatan*, 21(1), 49–55.