

# An Analysis on Factors Associated with Low Birth Weight (LBW) Incidence in Tentara Wijayakusuma Hospital, Purwokerto

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## ABSTRACT

*Background: LBW is defined as a baby born with a weight of less than 2,500 grams. LBW is the leading cause of neonatal mortality in Indonesia in 2021 and can lead to growth failure, cognitive development disorders, and chronic illnesses in infants. Objective : To identify the factors associated with LBW incidence in Tentara Wijayakusuma Hospital, Purwokerto, in 2022. Method: This study employed an analytic survey design with a case-control approach and a retrospective view. The study population consisted of all medical records of mothers who gave birth in Tentara Wijayakusuma Hospital in 2022, with a total sample size of 64, including 32 cases and 32 controls. The sampling technique used was total sampling and simple random sampling. Data collection was done using data collection sheets and checklists. The data were analyzed using the Chi-Square test and multiple logistic regression analysis. Results: The study found significant associations between occupation ( $p=0.043$ ), gestational age ( $p=0.010$ ), interpregnancy interval ( $p=0.034$ ), anemia ( $p=0.001$ ), hypertension ( $p=0.025$ ), and pregnancy-induced hypertension ( $p=0.008$ ) with LBW incidence. The multivariate analysis indicated that the most dominant factor was anemia ( $p=0.000$ ). Conclusion: There are correlations between occupation, maternal age, interpregnancy interval, anemia, hypertension, and pregnancy-induced hypertension with LBW incidence. Anemia is the most dominant factor associated with LBW incidence in Tentara Wijayakusuma Hospital, Purwokerto, in 2022.*

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## 1. INTRODUCTION

Low birth weight babies (LBW) are babies born with less than normal weight. Normal baby weight if born at a sufficient age (gestational age 37-40 weeks) is between 2,500 to 4,000 grams [1]. Babies weighing less than 2,500 grams are 20 times more likely to die than normal babies. Babies with LBW can experience growth failure, impaired cognitive development, and suffer from chronic diseases in adulthood. Low birth weight babies (LBW) are babies born with less than normal weight. Normal baby weight if born at a sufficient age (gestational age 37-40 weeks) is between 2,500 to 4,000 grams [1]. Babies weighing less than 2,500 grams are 20 times more

likely to die than normal babies. Babies with LBW can experience growth failure, impaired cognitive development, and suffer from chronic diseases in adulthood [2].

According to the *World Health Organization* (WHO), the prevalence of LBW in the world in 2018 is 20 million or 15.5% of the number of babies born each year, and in developing countries it is the largest contributor with around 96.5%. Indonesia is one of the developing countries and Indonesia ranks 9th in the world for the occurrence of LBW where the incidence of LBW in Indonesia from 2007 to 2018, namely 5.4% in 2007, 5.8% in 2010 and 5.7% in 2018, experienced a significant increase of 6.2% in 2020 [3].

Based on the results of a preliminary study and data obtained at Wijayakusuma Hospital, Purwokerto, in 2021 there will be 346 births and 0.028% or 10 of them will be LBW babies. In 2022, a significant increase in cases was found, namely from January to December 2022 where out of 353 births, 0.090% or 32 of them gave birth to LBW babies. Through this data, researchers will conduct research to determine the factors related to the incidence of LBW at Wijayakusuma Hospital, Purwokerto so that the results can be used as prevention so that the incidence of LBW does not increase in the following years.

## 2. RESEARCH METHOD

This research is a documentation study of medical records which was carried out based on research ethics permission with letter number KEPK/UMP/78/I/2023. This research design uses an analytical survey with a *case control design*. The population in this study was all mothers who gave birth at RST Wijayakusuma Purwokerto in 2022, a total of 353 mothers. The sample in this study was all mothers who gave birth with LBW at Wijayakusuma Hospital in 2022. In this study, the sample used was 64 medical records in accordance with the inclusion criteria, namely 32 medical records of mothers who gave birth with LBW as the case group and 32 medical records of mothers who did not give birth with LBW as the control group. Incomplete medical records will not be taken because that is an exclusion criterion in this study.

The sampling technique in this study was *total sampling* for the case group and *simple random sampling* for the control group. The research instruments used in this research were data collection and check list sheets. This instrument has been tested for validity using face validity by one of the maternity lecturers at Muhammadiyah University, Purwokerto and has received valid certification. Data were analyzed using the Chi square test and multiple logistic regression test.

## 3. RESULTS AND DISCUSSIONS

### 3.1. Univariate

Table 1 . Frequency Distribution of Factors Associated with the Incidence of LBW at Wijayakusuma Hospital Purwokerto (n=64)

No	Information	Case (LBW)		Control (Not LBW)	
		F	%	F	%
1.	<b>Maternal Age</b>				
	Risk	8	25%	7	21.9%
	Not Risk	24	75%	25	78.1%
2.	<b>Education</b>				
	Elementary school	1	3.1%	2	6.3%
	Junior High School	6	18.8%	8	25%
	Senior High School	22	68.8%	17	53.1%
	College	3	9.4%	5	15.6%
3.	<b>Occupation</b>				
	Work	18	56.3%	9	28.1%
	Doesn't work	14	43.8%	23	71.9%
4.	<b>Gestational Age</b>				
	Preterm	18	56.3%	7	21.9%
	Aterm	14	4.8%	25	78.1%
	Postterm	-	-	-	-
5.	<b>Parity</b>				
	Primipara	11	34.4%	11	34.4%
	Multipara	21	65.6%	20	62.5%
	Grande Multipara	-	-	1	3.1%
6.	<b>Interpregnancy Interval</b>				
	Ideal	21	65.6%	29	90.6%
	Not ideal	11	34.4%	3	9.4%
7.	<b>Anemia</b>				

No	Information	Case (LBW)		Control (Not LBW)	
		F	%	F	%
8.	Anemia	18	56.3%	4	12.5%
	Not Anemia	14	43.8%	28	87.5%
9.	<b>Hypertension</b>				
	Hypertension	10	31.3%	2	6.3%
9.	Not Hypertension	22	68.8%	30	93.8%
	<b>Congenital Defects</b>				
10.	There is a birth defect	3	9.4%	1	3.1%
	No birth defects	29	90.6%	31	96.9%
10.	<b>Gemeli</b>				
	Gemeli	3	9.4%	1	3.1%
11.	Not Gemeli	29	90.6%	31	96.9%
	<b>KPD</b>				
11.	KPD happened	16	50%	5	15.6%
	There's no KPD	16	50%	27	84.4%

Based on table 4.2, in the maternal age sub-variable, it was found that in both the case group and the control group, the majority of mothers had a non-risk age category with almost the same number of 24 (75%) in the case group and 25 (78.1 %) in the control group. In the education sub-variable, it was found that in both the case group and the control group, most mothers had educational status up to high school with a total of 22 (68.8%) in the case group and 17 (53.1%) in the control group. . In the occupational sub-variable, the result was that in the case group most of the mothers were in the working category, namely 18 (56.3 %), while in the control group most of the mothers were in the non-working category of 23 (71.9%).

In the gestational age sub-variable, the results showed that in the case group, the majority of mothers fell into the preterm gestational age category, namely 18 (56.3 %), while in the control group the majority of mothers fell into the term gestational age category, namely 25 (78, 1%). In the parity sub-variable, the results showed that in both the case group and the control group, the majority of mothers had almost the same number of multiparous parity categories, namely 21 (65.6 % ) in the case group and 20 (62.5%) in the control group. . In the sub-variable of pregnancy distance, the results showed that in both the case group and the control group, the majority of mothers had the ideal pregnancy distance category with a total of 21 (65.6 % ) for the case group and 29 (90.6%) for the control group. In the Anemia sub-variable, the results showed that in the case group, the majority of mothers were in the Anemia category, 18 (56.3 % ), while in the control group, the majority of mothers were in the non-Anemia category, namely 28 (87.5%).

In the Hypertension sub-variable, it was found that in both the case group and the control group, the majority of mothers were in the non-hypertensive category, with a total of 22 (68.8 % ) in the case group and 30 (93.8%) in the control group. In the sub-variable of congenital defects in babies, the results showed that in both the case group and the control group, the majority of mothers did not give birth to the same number of babies with congenital defects, where in the case group there were 3 (9.4%) and in the control group there were also 3 ( 9.4%). In the Gemeli sub-variable, the results showed that in both the case group and the control group, the majority of mothers fell into the non-Gemeli category with the same number, where in the case group there were 3 (9.4%) and in the control group there were also 3 (9.4%). %). In the sub-variable of PROM, the results obtained were that in the case group, there was the same number of categories where PROM occurred and that did not occur, namely 16 (50%), whereas in the control group the results showed that the majority of mothers were in the category where KPD did not occur, namely 27 (84.4%).

### 3.2. Bivariate

Table 2. Relationship between mother's age , education, occupation, gestational age, parity, interval between pregnancies, anemia, hypertension, congenital defects, gemeli and PROM

Sub Variable	Incidence of Low Birth Weight Babies (LBW)						p-value
	LBW		Not LBW		Total		
	n	%	N	%	n	%	
<b>Maternal Age</b>							
Risk	8	25%	7	21.9%	15	23.4%	1,000
Not Risk	24	75%	25	78.1%	49	76.6%	
<b>Education</b>							
Elementary school	1	3.1%	2	6.3%	3	4.7%	0.624

Sub Variable	Incidence of Low Birth Weight Babies (LBW)						p-value
	LBW		Not LBW		Total		
	n	%	N	%	n	%	
Junior High School	6	18.8%	8	25%	14	21.9%	
Senior High School	22	68.8%	17	53.1%	39	60.9%	
College	3	9.4%	5	15.6%	8	12.5%	
<b>Occupation</b>							
Work	18	56.3%	9	28.1%	27	42.2%	0.043
Doesn't work	14	43.8%	23	71.9%	37	57.8%	
<b>Gestational Age</b>							
Preterm	18	56.3%	7	21.9%	25	39.1%	0.010
Aterm	14	43.8%	25	78.1%	39	60.9%	
<b>Parity</b>							
Primipara	11	34.4%	11	34.4%	22	34.4%	0.599
Multipara	21	65.6%	20	62.5%	41	64.1%	
Grande Multipara	0	-	1	3.1%	1	1.6%	
<b>Interpregnancy Interval</b>							
Ideal	21	65.6%	29	90.6%	50	78.1%	0.034
Not ideal	11	34.4%	3	9.4%	14	21.9%	
<b>Anemia</b>							
Anemia	18	56.3%	4	12.5%	22	34.4%	0.001
Not Anemia	14	43.8%	28	87.5%	42	65.6%	
<b>Hypertension</b>							
Hypertension	10	31.3%	2	6.3%	12	18.8%	0.025
Not Hypertension	22	68.8%	30	93.8%	52	81.3%	
<b>Congenital Defects</b>							
There is a birth defect	3	9.4%	1	3.1%	4	6.3%	0.302
No congenital defects	29	90.6%	31	96.9%	60	93.8%	
<b>Gemeli</b>							
Gemeli	3	9.4%	1	3.1%	4	6.3%	0.606
Not gemeli	29	90.6%	31	96.9%	60	93.8%	
<b>KPD</b>							
KPD occurred	16	50.0%	5	15.6%	21	32.8%	0.008
KPD did not occur	16	50.0%	27	84.4%	43	67.2%	

Based on table 2, it is known that the factors that are significantly related to the incidence of LBW at RST Wijayakusuma Purwokerto are occupation, gestational age, gestational spacing, Anemia, Hypertension, and KPD. Factors that were not significantly related to the incidence of LBW were mother's age, education, parity, congenital defects and obesity .

The results of this study indicate that maternal age is not related to the incidence of LBW. The results of this study are supported by the results research of Indah & Utami (2020) which concluded that there was no significant relationship between maternal age and LBW. Based on the results of this study, the researchers assumed that there was no relationship between gestational age and the incidence of low birth weight babies because in this study the data showed that more mothers who gave birth to low birth weight babies were in the non-risk category or in the age range of 20-35 years, namely 24 (75 %) compared to the unsafe age in pregnancy or age-at-risk category. Maternal age is not related to the incidence of LBW because maternal age is not the only factor causing LBW, but there are several other things, namely disease in the mother, factors from the fetus, or factors from the environment that can be a risk factor for LBW [4].

The results of this study indicate that education is not related to the incidence of LBW. The results of this study are supported by the results of Rahim & Muharry (2018) which showed that there was no significant relationship between education and the incidence of LBW in the Kuningan Regency area. Education is closely related to one's knowledge. At this time, even with not very high formal education, it was very easy for people to access information through social media [5].

The results of this study indicate that work is related to the incidence of LBW. The results of this research are supported by the research results of Fransiska et al. (2020) who also concluded that there was a significant relationship between mother's work and the incidence of LBW. Mother's work can be seen to what extent the

burden must be carried out, both physically and mentally and mentally. The heavy work of mothers during pregnancy can cause prematurity and giving birth to LBW babies [5].

The results of this study indicate that gestational age is related to the incidence of LBW. The results of this study are supported by the results of the research by Shaohua et al. (2022) also observed that there was a relationship between gestational age and the incidence of LBW. This research also explained that neonates who were born at full term (gestational age 37 weeks or more) were 85% less likely to experience LBW [7].

The results of this study indicate that parity is not related to the incidence of LBW. The results of this study are supported by the results of Noor et al. (2020) which showed that there was no significant relationship between parity and the incidence of LBW. Parity is the number of births that result in live births. Parity 2 to 3 is the safest parity from a maternal point of view. Pregnancies of more than 4 times both live and dead children (*grande multi gravida*), have a high risk of subsequent pregnancies and deliveries. This is related to the work of the body's systems that are too frequent and in a relatively short period of time [9]. But in this study, the number of parity <4 people also had the same risk .

The results of this study indicate that the spacing of pregnancies is related to the incidence of LBW. The results of this study are in line with the results of a study by Fatimah (2023) which showed that there was a significant relationship between the spacing of pregnancies and the incidence of LBW at the Bantargadung Health Center in 2021. The spacing of pregnancies that are too close causes the mother to be unable to achieve good anthropometric status (BMI) to prepare for pregnancy. Subsequent pregnancies and pregnancies that are too long cause the reproductive organs to need an adaptation process like the first pregnancy [10].

The results of this study indicate that anemia is related to the incidence of LBW. The results of this study are in line with the results of Rahadinda et al. (2022) which stated that there was a significant relationship between Anemia and the incidence of LBW, which also explained that Anemia during pregnancy has adverse effects on the mother and fetus. Anemia during pregnancy causes disruption of the supply of oxygen and nutrients from mother to fetus [11].

The results of this study show that hypertension is related to the incidence of LBW. The results of this study are in line with the results of the research by Manullang & Simanjuntak (2020) which showed that there was a significant relationship between hypertension and the incidence of LBW at Graha Juanda Hospital Bekasi in 2018. In the research by Manullang & Simanjuntak (2020) it was also explained that pregnant women who experience hypertension can cause food intake for the fetus to be hampered due to narrowing of the blood vessels. Inhibited food intake causes the development of the fetus in the womb to be hampered. In the end the baby is born with a low birth weight [12].

The results of this study indicate that birth defects are not related to the incidence of LBW. The results of this study are in line with the results of Indrasari (2012) which showed that there was no significant relationship between birth defects and the incidence of low birth weight babies (LBW) [13].

The results of this study indicate that gemely is not related to the incidence of LBW. The results of this study are in line with the results of Azzizah et al. (2021) which showed that there was no significant relationship between multiple pregnancies and the incidence of LBW at dr. Soekarno. Statistically, the results of this study indicate that gemeli are not at risk for LBW [14].

The results of this study show that KPD is not related to the incidence of LBW. The results of this study are in line with the results of research by Astuti (2022) which shows that there is a relationship between KPD and the incidence of LBW. KPD is a complication during pregnancy that interferes with the growth of the fetus in the womb thereby increasing the risk of low birth weight births. Premature rupture of membranes also causes oligohydramnios which will compress the umbilical cord causing asphyxia and hypoxia in the fetus and reducing nutrition to the fetus and disrupting fetal growth and ending with the birth of a baby with LBW [15].

### 3.3. Multivariate

Table 3. Multivariate Analysis Results

Sub Variable	Unstandardized Coefficients		Wald	Sig. (p-value)	OR	Nagelkerke R Square
	B	S.E				
Gestational Age	2,043	0.865	5,571	0.018	7,711	0.624
Anemia	3,793	0.922	16,924	0,000	44,408	
Hypertension	3,581	1,057	11,479	0.001	35,895	
Constant	-16,008	3,784	17,900	0,000	0,000	

After conducting multivariate analysis with multiple logistic regression, and conducting interaction and confounding tests, it was found that the Anemia sub-variable was the most dominant sub-variable associated with



the incidence of low birth weight babies (LBW) at the Wijayakusuma Army Hospital (RST) Wijayakusuma Purwokerto because the sub-variable Anemia has the smallest *p-value* ( $p\text{-value} = 0.000$ ) and the analysis results show that the OR value is the largest, namely 44.408. The OR results explained that anemia had a greater chance than other variables of 44.408 times higher than mothers who were not anemic after controlling for gestational age and hypertension sub-variables.

#### 4. CONCLUSION AND RECOMMENDATION

Based on the results of the research that has been done, the results of the factors associated with the incidence of LBW at the Wijayakusuma Hospital in 2022 are occupation, gestational age, gestational interval, Anemia, Hypertension, and KPD. The Anemia sub-variable has the highest *Coef B* (3.793) and *OR* (44.408) and the lowest *p-value* (0.000), when compared to other sub-variables, which shows that the most dominant sub-variable is related to the incidence of LBW in RST Wijayakusuma Purwokerto namely Anemia sub-variable. Based on these results, it is hoped that the RST Wijayakusuma Purwokerto, especially existing health workers, can help reduce the incidence of LBW, one of which is by increasing the provision of health promotion (promkes) or holding anemia prevention campaigns.

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