



**MATERNAL AGE AT BIRTH AND LOW BIRTH WEIGHT (LBW) IN INDONESIA  
(ANALYSIS OF RISKESDAS 2018)**

Usia Ibu Melahirkan dan Berat Badan Lahir Rendah (BBLR) di Indonesia  
(Analisis Riskesdas 2018)

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**ABSTRACT**

Low birth weight (LBW) is one of the health problems that cause long-term and short-term consequences to a child, mainly due to maternal age, which is determined by very young or old maternal age. This study aims to determine maternal age's effect on LBW in a larger population while controlling for factors such as maternal education and occupation, residence area, socioeconomic status, iron consumption during pregnancy, Maternal and Child Health (MCH) book, gestational age, and ANC K4. The data for this study were obtained from the Basic Health Research 2018, and the unit of analysis was mothers with children under the age of five. A risk factor model approach was adopted to determine the association between maternal age variables and the incidence of LBW using multiple logistic regression with complex samples. The risk of LBW for mothers aged 20 or 35 years compared to mothers aged 21-34 years was 1.342 (95%CI:1.165-1.546). The final model equation included confounding variables such as socioeconomic status, MCH card ownership, gestational age, complete ANC, and CED in mothers. As a result, thus very young or old women were also at risk of having LBW children. The final multivariate analysis showed that maternal age at delivery had a highly significant association with LBW in Indonesia. This makes it necessary to educate pregnant women in particular and all levels of society to minimize the risk of LBW by preventing early marriage or delivering a baby at a very old age.

**Keywords:** LBW, maternal age, Riskesdas, Indonesia

**ABSTRAK**

Berat Badan Lahir Rendah (BBLR) merupakan salah satu masalah kesehatan yang menyebabkan konsekuensi jangka panjang dan jangka pendek pada seorang anak, terutama karena usia ibu, yang ditentukan oleh usia ibu yang sangat muda atau tua. Penelitian ini bertujuan untuk mengetahui pengaruh usia ibu terhadap BBLR pada tingkat populasi yang lebih besar dan dikendalikan untuk beberapa karakteristik seperti pendidikan dan pekerjaan ibu, pendidikan dan pekerjaan ayah, daerah tempat tinggal, status sosial ekonomi, konsumsi zat besi selama kehamilan, kepemilikan buku KIA, usia kehamilan, dan ANC K4. Data yang digunakan diperoleh dari Riset Kesehatan Dasar 2018, dan unit analisisnya adalah ibu yang memiliki anak di bawah usia 5 tahun. Pendekatan model faktor risiko diadopsi untuk menentukan hubungan antara variabel usia ibu dan kejadian BBLR menggunakan regresi logistik berganda dengan kompleks sampel. Besarnya risiko ibu usia 20 atau 35 tahun untuk kejadian BBLR dibandingkan dengan usia ibu 21-34 tahun adalah 1,342 (95%CI: 1,165-1,546). Variabel perancu yang dimasukkan dalam persamaan model akhir adalah status sosial ekonomi, kepemilikan buku KIA, usia kehamilan, ANC lengkap, dan KEK pada ibu dengan demikian wanita usia sangat muda atau tua juga berisiko memiliki anak dengan BBLR. Hasil akhir analisis multivariat menunjukkan bahwa usia ibu saat melahirkan memiliki hubungan yang sangat signifikan dengan kejadian BBLR di Indonesia. Hal ini membuat perlu adanya edukasi bagi ibu hamil khususnya dan semua lapisan masyarakat untuk meminimalkan risiko BBLR dengan mencegah pernikahan dini atau melahirkan seorang bayi di usia yang sangat tua.

**Kata kunci:** BBLR, usia ibu, Riskesdas, Indonesia

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## INTRODUCTION

According to WHO, low birth weight (LBW) is a weight of fewer than 2,500 grams and is currently a substantial public health problem, which is associated with short-term and long-term consequences. It is estimated that approximately 15-20 percent of all live births worldwide are LBW.<sup>1</sup> David J. Barker stated that inadequate nutrition in utero programs the fetus to have metabolic characteristics, leading to disease in the future.<sup>2</sup> The examination of Barker's hypothesis showed that LBW was associated with higher natural mortality, namely death under 41 years of age.<sup>3</sup> Some studies also stated that LBW increases the threat of degenerative diseases such as diabetes and cardiovascular disease in the future.<sup>4</sup> There was an inverse relationship between birth weight and cardiovascular death, which was associated with an increased risk of cancer in men. Birth weight is a developmental indicator that affects long-term health, which is a major predictor of prenatal mortality and morbidity. Meanwhile, a previous study has shown that low birth weight occurs due to the interplay of many factors.<sup>5</sup>

Maternal age is an important variable that causes LBW and premature birth of babies.<sup>6</sup> However, several studies stated that maternal age is not a significant factor influencing newborn weight, while reported that the very young age of the mother is a causal cause of the increased risk of LBW and premature babies.<sup>7</sup> In developing countries, the number of mothers giving birth at a relatively young age is significantly large, while it is most common among the older age in developed countries.<sup>8</sup> Similarly, older maternal age also carries risks, which are associated with decreased fetal growth potential mirroring biological tissue aging and its effects on various diseases.<sup>9</sup>

There is evidence of an increased risk of LBW in adolescent mothers who are below 20 years of age.<sup>10</sup> Meanwhile, the increased risk of LBW not only leads to prospective mothers who are still teenagers, but also the older ones. This is because the birth rate of women that are above 35 years old is also increasing in both developed and developing countries such as Indonesia. The results of the 2013 Susenas report that the percentage age of ever-married women aged 20-24 who were married before

the age of 18 in the country was 24 percent and in 2015 it was 23 percent.<sup>11</sup> Processed Susenas data in 2013 stated that Indonesian women aged 10 years who had their first marriage aged ≤15 years were 11 percent, while aged 16-18 years were 32.19 percent. Similarly, it was also reported that the age at first marriage of those who married at a relatively old age such as 25-49 years continues to increase from 1991-2012. Reports of increasing the age at first marriage for women aged 25-49 years are 17.1 percent (SDKI 1991), which increased to 18.1 percent (SDKI 1994), followed by 18.6 percent (SDKI 1997), 19.2 (SDKI 2002), 19.8 percent (SDKI 2007), and 20.1 percent (SDKI 2012).<sup>12</sup>

Indonesia still faces the challenge of early child marriage, however, women who want to delay marriage and having a baby are also increasing as shown by the high prevalence of LBW in the country. In 2013, there was a 10.2 percent decrease in LBW compared to 2010 which was 11.1 percent.<sup>8</sup> Low birth weight babies are the result of less fetal growth, which are born before 37 weeks of gestation,<sup>13</sup> leading to small babies. Although maternal age significantly influences LBW, others factors such as women's health behavior or characteristics, namely ethnicity, poverty status, age at menarche, maternal height, weight gain, and smoking during pregnancy also have independent effects on birth weight.<sup>7</sup>

It was discovered that women with ages less than 20 years and over 35 years are a risk factor during pregnancy.<sup>14</sup> This is because there are immature reproductive organs in women aged less than 20 years, while the maturity of the reproductive organs in women above 35 years also decreases, which affect pregnant women and their fetus. Previous studies that were carried out only focused on the relationship between maternal age and the incidence of LBW at the population level in Indonesia. Therefore, this study aims to determine the effect of maternal age on LBW at a larger population level and controlled for several characteristics such as mother's education and occupation, father's education and occupation, area of residence, socioeconomic status, iron tablets consumption during pregnancy, MCH book ownership, gestational age, and ANC K4.

## RESEARCH METHOD

In this study, the data used were obtained from the data of the entire population of Indonesian children below 5 years old (toddler), with the last child attached to the mother block data. For the inclusion criteria, the selected samples were selected when they have all the required variable entries. All ordinary households representing 34 provinces became the population at Riskesdas 2018, while a sample of households was selected based on the 2010 population census (PS). The Central Statistics Agency (BPS) also carried out a household selection technique by providing a list of selected census buildings from the selected Census Blocks.<sup>15</sup> The 2018 Riskesdas data was used, which can be linked to the March 2018 Susenas data due to a socio-economic status variable.

The conceptual framework in this study is a risk factor model approach, where the main independent variable is maternal age at delivery and the confounding variables were maternal education, mother's occupation, father's education and occupation, area of residence, socioeconomic status, iron consumption during pregnancy, ANC K4 (once for the first trimester checkup, once for the second trimester checkup, twice for the third trimester checkup), and the size of the upper arm circumference as measurement of chronic energy deficiencies (CED). Subsequently, the selected variables were analyzed using the statistical data processing application SPSS version 16 with serial number 5061284 for univariate, bivariate, and multivariate descriptions. The univariate analysis shows the frequency distribution and cross-test tables, while the bivariate analysis was carried out to determine whether the selected variables meet the requirements to enter into multivariate. When the bivariate significance test shows a P-value < 0.25, therefore, the confounding variable meets the requirements to be included in multivariate (12). The multivariate analysis used was logistic-complex sample multiple regression analysis. The complex sample data were analyzed using an analytical model, which includes weighted variables that have been averaged, primary

sampling unit (PSU), and strata variables. The number of samples (N) and the percentage age displayed in the univariate and bivariate analyses are in form of the average weighted N CED. The final model used was the one that meets the combination of the significant rules of a P-value, 95%CI, and Odds Ratio. In this analysis, ethical approval was not requested but it was continued using the approval obtained during the implementation of Riskesdas 2018, which has been approved by the Commission. The Health Research Ethics (KEPK) was from the Research and Development Agency of the Ministry of Health of the Republic of Indonesia with the number LB.02.01/2/KE.024/2018. The ethical approval was accompanied by an explanatory text and an Informed Consent form from the respondents.

## RESULT

In Table 1 showed that the prevalence of LBW in this study was 6.0 percent, which showed an increase compared to the 5.2 percent in 2013. Most of the mothers who gave birth to toddlers between January 1, 2013, and the time of data collection in 2018 were in a fairly ideal age range of 20 to 35 years. Based on the mother's educational backgrounds, it was discovered that the proportion of mothers with higher education compared to those with low education is not significantly different. Similarly, fathers with higher education slightly different from those with low educational background. Furthermore, most of the father work, while only 1.9 percent do not have a job. More respondents live in urban areas compared to respondents in rural areas with non-poor economic status, which is slightly higher than the poor economic group. Mothers who consumed 90 pills during pregnancy were significantly larger than those who consumed more than 90 pills. For ownership of MCH books, the proportion of children who have MCH books is greater than those without the books. Approximately more than 90 percent of gestational age ended at the age less than 37 weeks and the proportion who had an examination during pregnancy. A total of 77.8 percent of respondents had a complete ANC (ANC K4) and only 22,2 percent did not do it.

Table 1  
Frequency Distribution of Dependent and Independent Variables in Research about The Relationship between Maternal Age at Birth and The Incidence of LBW in Indonesia (Riskesdas 2018)

Variabel		N weighted samples	%	95% CI
Low Birth Weight	No	35946	94.0	93.7 - 94.4
	Yes	2280	6.00	5.6 - 6.3
Mother's age	21-34 yo	30787	80.5	80.0 - 81.1
	<20 or ≥35	7436	19.5	18.9 - 20.0
Mother's education	High	19160	50.1	49.4 - 50.9
	Low	19066	49.9	49.1 - 50.6
Mothers's occupation	Yes	14719	38.5	37.8 - 39.2
	No	23507	61.5	60.8 - 62.2
Father's education	High	18610	52.0	51.2 - 52.8
	Low	17192	48.0	47.2 - 48.8
Fathers's occupation	Yes	35107	98.1	97.8 - 98.3
	No	695	1.9	1.7 - 2.2
Residence	Urban	22371	58.5	58.0 - 59.1
	Rural	15855	41.5	40.9 - 42.0
Socio Economic Status	Rich	21039	59.3	58.5 - 60.1
	Poor	14430	40.7	39.9 - 41.5
Intake of Fe during pregnancy	>90	10864	30.9	30.1 - 31.7
	≤90	24308	69.1	68.3 - 69.9
Ownership of MCH Book	Yes	25857	67.6	66.9 - 68.4
	No	12369	32.4	31.6 - 33.1
Age of pregnancy	≥37 Week	1999	5.2	4.9 - 5.6
	<37 Week	36227	94.8	94.4 - 95.1
ANC K4 (4 <sup>th</sup> Antenatal Care)	Yes	29752	77.8	77.2 - 78.4
	No	8474	22.2	21.6 - 22.8
Chronic energy deficiency	No	33334	87.9	87.4 - 88.4
	Yes	4569	12.1	11.6 - 12.6

Based on the ANC examination variable, the proportion of mothers suffering from chronic energy deficiency (CED) at the time of the examination was within the range of 12 percent, which is significantly smaller than those who did not suffer from CED. The overall data distribution of all variables in this study is very good, as shown by the relatively narrow 95%CI (Confidence Interval) range.

Table 2 showed that mothers who gave birth at the age of <20 or >35 years had a higher proportion of LBW infants compared to those at the age of 20-35 years. Low-educate and non-working mothers have a proportion of children with LBW, although the figures are not significantly different. Based on educational level, higher education also has lower LBW children among working fathers compared to those who do not work. The proportion of LBW

children below 5 years is higher in mothers who live in rural areas compared to urban areas. Similarly, mothers with socio-economic class in the poor group have a higher proportion of LBW of children below 5 years than mothers with non-poor economic status groups. It was also discovered that children who have MCH books have a lower proportion of LBW than children who do not have MCH books. The proportion of LBW children was 2 times higher in mothers who gave birth at an age less than 37 weeks gestation compared to those who gave at the gestation period. Mothers who did ANC K4 had a lower proportion of LBW children than those without ANC K4. Furthermore, the results showed that the proportion of children with LBW is higher in mothers who are in the category of chronic energy deficiency (CED).

Table 2  
Cross-tabulation between The Variable of Maternal Age at Birth and The Confounding Variable with The Variable of LBW Toddlers in Indonesia (Riskesdas 2018)

Variabel		LBW			
		Yes		No	
		N Weighted samples	%	N Weighted samples	%
Mother's age at birth	20-35 yo	1700	5.5	29087	94.5
	≤20 or ≥35	580	7.8	6856	92.2
Mother's education	High	1057	5.5	18103	94.5
	Low	1223	6.4	17843	93.6
Mother's occupation	Yes	856	5.8	13862	94.2
	No	1423	6.1	22083	93.9
Father's education	High	993	5.3	17616	94.7
	Low	1103	6.4	16088	93.6
Father's occupation	Yes	2038	5.8	33068	94.2
	No	58	8.5	636	91.5
Residence	Urban	1298	5.8	21073	94.2
	Rural	982	6.2	14872	93.8
Socio Economic Status	Rich	1127	5.4	19911	94.6
	Poor	988	6.9	13441	93.1
Intake of Fe during Pregnancy	>90	567	5.2	10296	94.8
	≤90	1506	6.2	22802	93.8
Ownership of MCH Book	Yes	1475	5.7	24382	94.3
	No	805	6.5	11563	93.5
Age of Pregnancy	≥37 Week	50	2.5	1948	97.5
	<37 Week	2229	6.2	33997	93.8
ANC K4 (4 <sup>th</sup> Antenatal Care)	Yes	1625	5.5	28126	94.5
	No	655	7.7	7819	92.3
Chronic energy deficiency	No	1878	5.6	31456	94.4
	Yes	389	8.5	4179	91.5

Based on the initial multivariate analysis, the column displays the final multivariate model with OR adjusted and a column of P-value. The results of the final multivariate analysis showed that maternal age at birth had a significant relationship with the incidence of LBW with an OR of 1.342 (95%CI:1.165-1.546). The confounding variables included in the final model equation are socioeconomic status with OR 1.247 (95%CI:1.095-1.420), ownership of Mother and Child book with OR 1.190 (95%CI:1.027-1.378), gestational age OR 2.712 (95%CI:1.826-4.028), examination of ANC K4 1.318 (95%CI:1.138-1.526), and chronic energy deficiency (CED) with OR 1.577 (95%CI 1.326-1.876). This showed that the age of the mother at delivery ≤20 or ≥35 years has a risk of 1.342 times for LBW children compared to maternal delivery age of 21-34 years after controlling for variables of socioeconomic status, ownership of MCH book,

gestational age, ANC K4, and Chronic Energy Deficiency (CED). The confounding variable that has the greatest influence on the incidence of LBW in Indonesia is gestational age with an OR of 2.712.

The results proved that the prevalence of LBW children below the age of 5 years in Indonesia was 6.0 percent in 2018. Based on multiple logistic regression analysis, it was shown that there was a significant relationship between maternal age and the occurrence of LBW with a significance P-value <0.05. The maternal age of ≤20 or ≥35 years has a risk of OR 1.342 (95%CI: 1.165-1.546) for the birth of babies with LBW compared to the ages between 20-35 years after controlling for confounding variables, which is not in line with the results of previous studies.

Table 3  
Multivariate Analysis of Early and Late Models of The Relationship between Maternal Age at Birth and The Incidence of LBW below 5 Years Old Children in Indonesia (Risksdas 2018)

Variabel	OR Adjusted (95 % CI)	p	OR Adjusted (95 % CI)	p
	Early Model		Late Model	
Mother's age at birth				
20-35 yo	<b>Ref</b>		<b>Ref</b>	
≤20 or ≥35 yo	1.325 (1.131-1.553)	0.000	1.342 (1.165-1.546)	0.000
Mother's education				
High	<b>Ref</b>			
Low	1.003 (0.856-1.176)	0.966		
Father's Education				
High	<b>Reff</b>			
Low	1.134(0.966-1.331)	0.123		
Father's occupation				
Yes	<b>Reff</b>			
No	1.451(0.952)	0.083		
Socio Economy Status				
Rich	<b>Ref</b>		<b>Ref</b>	
Poor	1.234 (1.075-1.438)	0.003	1.247 (1.095-1.420)	0.001
Ownership of MCH Book				
Yes	<b>Ref</b>		<b>Ref</b>	
No	1.297 (1.108-1.519)	0.001	1.190 (1.027-1.378)	0.021
Fe intake during pregnancy				
>90	<b>Ref</b>			
≤90	1.123 (0.953-1.322)	0.165		
Pregnancy Age				
≥37 Week	<b>Ref</b>		<b>Ref</b>	
<37 Week	2.469 (1.639-3.718)	0.000	2.712 (1.826-4.028)	0.000
ANC K4				
Yes	<b>Ref</b>			
No	1.277 (1.082-1.508)	0.004	1.318(1.138-1.526)	0.000
Chronic Energy Deficiency (CED)				
No	<b>Ref</b>		<b>Ref</b>	
Yes	1.606 (1.335-1.932)	0.000	1.577 (1.326-1.876)	0.000

The final multivariate analysis also showed that the confounding variables for the incidence of LBW in children below 5 years are age at birth, socio-economic status, ownership of MCH book, gestational age, ANC K4 examination, and chronic energy deficiency in the mother. However, confounding variables that were not included in the multivariate model were mother's education and occupation, father's education and occupation, as well as iron consumption during pregnancy. The confounding variables that have the greatest influence on the incidence of LBW in Indonesia are gestational age with OR 2.712 (1.826-4.028), Chronic energy deficiency with OR 1.577 (1.326-1.876), and ANC K4 with OR 1.318 (1.326-1.876)

## DISCUSSION

A multilevel logistical analysis using the 2012 IDHS data also showed that maternal age at birth was significantly associated with LBW. This indicated that mothers who gave birth to their babies at the age below 20 years tended to have LBW babies and are at a higher risk than those who delivered at 21 to 34 years.<sup>16</sup> Yilgwan (2010) also stated that the weight of newborns was significantly influenced by the age of the mother when they gave birth, where the incidence of LBW babies is high in adolescent mothers with 65.52 %.<sup>17</sup> Similarly, Rizvi et al. (2007) reported that the risk of LBW increases when the mother is very young.<sup>18</sup> Other scientific studies discovered that mothers

with age > 35 years are at risk for their children to be born prematurely (less than 37 weeks gestation) or with LBW (< 2.5 kilograms).<sup>19</sup>

Maternal age is an important variable that causes LBW and premature birth. Meanwhile, a systematic review conducted by Aras from Mangalore University India in 2013 identified studies related to maternal age and childbirth weight. It was discovered that age is not a significant variable affecting the birth weight of newborns. However, the majority of the studies show that very young maternal age is a causal determinant of the increased risk of low birth weight and premature birth.<sup>7</sup> LBW babies are assumed to be more vulnerable and likely to die, however, those who survive will experience health problems and cognitive disorders.<sup>20,21</sup> Cases of morbidity and mortality including infectious diseases, stunted growth, and low body weight, are common in babies with LBW.<sup>22</sup> The prevalence of LBW can describe the level of maternal health, poverty, poor nutritional status, and inadequate antenatal care (ANC).<sup>23</sup> Reproductive health history such as abortion, stillbirth, early neonatal death, complications of pregnancy, and many children play an important role in the increase in LBW babies.<sup>24,26</sup>

Usually, LBW children have more respiratory, cognitive, and neurological problems compared to children with normal weight. This showed that premature babies are at risk of heart defects, lung disorders, brain damage, and delayed development.<sup>27</sup> There will be physical and mental problems when women get pregnant at a young age or less than 20 years. This is because the uterus and pelvis have not developed optimally, which can lead to maternal as well as infant morbidity and also stop or inhibit the mother's growth and physical development. The mother needs to prepare mentally to avoid the problems in households due to changes that occur during pregnancy. Furthermore, there is a risk of severe labor with medical complications when physical and mental factors that have not been maximized are combined. Young maternal age is also associated with a short cervix, while small uterine volume is related to preterm delivery, leading to LBW in infants. Adolescents usually gain weight during pregnancy compared to older women<sup>28</sup>. It takes a few cycles for a woman's body to start producing

an environment that is conducive for pregnancy. In older age, there is a change in hormone levels that is needed to maintain the uterine environment, therefore, older women also have a great chance of giving birth to babies with LBW.<sup>29</sup>

Maternal age less than 20 years old is included in those with high-risk pregnancies, where possible complications include pregnancy poisoning or preeclampsia and placenta previa which leads to bleeding during birth. This is due to immature reproductive organs because the mother is not ready psychologically or physically. The risk of pregnancy in mothers aged above 35 years is due to a decrease in the ability of the reproductive organs to occur, which causes bleeding in the delivery process.<sup>30</sup> Adolescent girls who are still growing need to compete for nutrients with the fetus. Moreover, the psychological factors also included unplanned teenage pregnancies, unwanted, or discovered too late.<sup>31,32</sup>

However, several studies stated that older maternal age does not increase the risk of having a baby. A study led by Alice Goisis examined thousands of Finnish families, where at least two children were born to the same mother between 1987 and 2000. It was discovered that in the same family, older maternal age was not a risk factor for LBW. Meanwhile, the risk increased especially with the age of the mothers when they compared children born to different mothers at varied ages. The probability of low birth weight for a mother aged 40 years and over is twice as high (4.4%) as for a woman between 25 and 29 years (2.2%). The occurrence of LBW was also stated to be caused by individual circumstances in the parents' lives or behavioral problems. Furthermore, it was stated that potential candidates for these individual risk factors include fertility problems, older maternal age, maternal stress levels, and unhealthy behavior.<sup>33</sup>

Similar to,<sup>33</sup> Mumbare et al. (2012) WHO conducted a study in Nigeria also discovered that there was no relationship between LBW and maternal age as a significant risk factor. Meanwhile, the significant predictors for the delivery of neonates with LBW were malnutrition, uncomplete ANC, and weight gain during pregnancy.<sup>34</sup> In developed countries,

such as Finland and Sweden, childbearing at an older age, that has become increasingly common in the last three decades.<sup>35</sup> In Finland, 8.3 percent of primigravida women were over the age of 35 years in 1997, which increased to 10.4 percent in 2007. Similarly, in 2007, 10 percent of primigravida were aged 35 years old or more in Sweden, while 19.2 percent of all women giving birth in Finland were over 35 years old compared to 16.7 percent in 1997.<sup>36</sup> Bodyweight and age also do not always have a negative influence on a person's health. Moreover, several mothers who are pregnant at a young age pay more attention to their pregnancies because they feel that the health and fetus are very important, especially during the first birth. Mothers who are over 35 years old has risk factors so they can be more aware of health and the fetus, therefore, they do routine pregnancy checks and consult a doctor. This is to ensure that the pregnancy is well cared for to deliver a healthy and safe baby.

Low birth weight (LBW) is an important indicator of public health because it can help predict future health. Since a healthy life starts from the mother's womb, it is necessary to ensure that the mother passes through the period of pregnancy and childbirth safely. Therefore, it is very important to minimize the incidence of LBW by providing education to all Indonesians to avoid getting married at a very young age or delivering a baby at a relatively old age. The law on marriage contained in Law No.1/1974 article 7 concerning marriage, stated that the minimum age for marriage for women is 16 years and 19 years for men. This was later updated in Law No. 16 of 2019, where the minimum age for men and women is 19 years. However, according to the BKKBN, the ideal age for marriage for women is 21 years, while it is 25 years for men.<sup>37</sup> Furthermore, there is a need to improve maternal health services at the primary, secondary, and tertiary level to provide optimal health services for pregnant women. With quality maternal and neonatal health services from the lowest level of health services to referral, it is believed that the targets for achieving the National Long-Term

and Medium-Term Plan (RPJMN) to reduce maternal mortality (MMR) and infant mortality (IMR) by 2020-2024 can be reached.

## CONCLUSION AND RECOMMENDATION

### Conclusion

There was a significant relationship between maternal age and the incidence of LBW at the limit of significance of the p-value < 0.05.

### Recommendation

From the result of this study showed that educating every pregnant woman is very important to reduce the incidence of LBW children and improve quality maternal health services at all levels. Educating young women especially for prospective brides about the best and the risky age for pregnant is also important so that they can arrange everything to reduce the LBW

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## REFERENCES

1. WHO. *Sixty-fifth World Health Assembly: Resolutions And Decision Annexes..* [https://www.who.int/nutrition/topics/WHA65.6\\_resolution\\_en.pdf](https://www.who.int/nutrition/topics/WHA65.6_resolution_en.pdf), accessed 26 June 2020). (2012).
2. Almond, D., W., H. H. & Schanzenbach, D. W. *Inside the War on Poverty: The Impact of Food Stamps on Birth Outcomes.* (2011) doi:10.3386/w14306.
3. Requejo, J. Taking Stock Of Maternal, Newborn And Child Survival. *Countdown To 2015 Decad. Rep.* (2010).
4. Risnes, K. R. *et al.* Birthweight And Mortality In Adulthood: A Systematic Review And Meta-Analysis. *Int J Epidemiol* . 40, 647–61 (2011).
5. Hussain, S., Ahmed, S., Tarar, S. H. & Tasleem, G. Low Birth Weight: Frequency ,



- Demographic Profile And Association With Maternal Risk Factors At A Tertiary Care Teaching Hospital Introduction LBW Is A Sensitive Detrimental Of Mortality And Morbidity In The Neonatal Period And Beyond . Risk of mortality. 68, (2018).
6. Dennis, J. A. Young Maternal Age And Low Birth Weight Risk: An Exploration Of Racial/Ethnic Disparities In The Birth Outcomes Of Mothers In The United States1. *Soc Sci J.* 50, 625–34 (2013).
  7. Aras, R. Is Maternal Age Risk Factor For Low Birth Weight? *Arch. Med. Heal. Sci.* 1, 33 (2013).
  8. Kementerian Kesehatan. *Laporan Nasional Riskesdas 2018. Badan Penelitian dan Pengembangan Kesehatan. Jakarta.* (2019)  
doi:10.1017/CBO9781107415324.004.
  9. Swamy, G. K., Sharon Edwards, Gelfand, A., James, S. A. & Marie Lynn Miranda. Maternal Age, Birth Order, And Race: Differential Effects On Birthweight. *J Epidemiol Community Heal.* 66, 136–42 (2012).
  10. Restrepo-Méndez, M. C. *et al.* The Association Of Maternal Age With Birthweight And Gestational Age: A Cross-Cohort Comparison. *Paediatr. Perinat. Epidemiol.* 29, 31–40 (2015).
  11. BPS. *Perkawinan Usia Anak Di Indonesia 2013 Dan 2015.* (2017).
  12. Ritonga, R. Data Statistik Tentang Perkawinan Di Indonesia. *Lokakarya Perkawinan Anak , Moralitas Seksual, dan Polit. Desentralisasi di Indones.* 11 (2015).
  13. Wardlaw, T., Blanc, A., Zupan, J. & Ahman, E. *Country regional and global estimates.* (Unicef and WHO, 2004).
  14. Sticler, T. *Health Risks Associated With Pregnancy.* (2018).
  15. Ali, H. Y. *et al.* Evaluation Of An Animated Instructional Video As A Training Tool For Manual Perineum Support During Vaginal Delivery. *Int. J. Gynecol. Obstet.* (2017)  
Doi:10.1002/ljgo.12115.
  16. Siramaneerat, I., Agushybana, F. & Meebunmak, Y. Maternal Risk Factors Associated With Low Birth Weight In Indonesia. *Open Public Health J.* 11, 376–383 (2018).
  17. Yilgwan, C., Abok, I., Yinnang, W. & Vajime, B. Prevalence And Risk Factors Of Low Birth Weight In Jos. *Jos J. Med.* 4, (2010).
  18. Rizvi, S. A., Hatcher, J., Jehan, I. & Qureshi, R. Maternal Risk Factors Associated With Low Birth Weight In Karachi: A Case-Control Study. *East. Mediterr. Heal. J.* 13, 1343–52 (2007).
  19. Cutland, C. L. *et al.* Low Birth Weight: Case Definition And Guidelines For Data Collection, Analysis, And Presentation Of Maternal Immunization Safety Data. *Vaccine* 35, 6492–6500 (2017).
  20. S M Ceesay *et al.* Effects On Birth Weight And Perinatal Mortality Of Maternal Dietary Supplements In Rural Gambia: 5 Year Randomised Controlled Trial. *Clin. Trial BMJ* 315, 786–90 (1997).
  21. BC, C. & Lao, T. T.-H. Maternal Height And Length Of Gestation: Does This Impact On Preterm Labour In Asian Women? *Aust. N. Z. J. Obstet. Gynaecol.* 49, 388–92 (2009).
  22. Sebayang, S. K., Dibley, M. J., Kelly, P. J., Shankar, A. V. & Shankar, A. H. Determinants Of Low Birthweight, Small-For-Gestational-Age And Preterm Birth In Lombok, Indonesia: Analyses Of The Birthweight Cohort Of The SUMMIT Trial. *Trop. Med. Int. Heal.* 17, 938–50 (2012).
  23. Black, R. E. *et al.* Global, Regional, And National Causes Of Child Mortality In 2008: A Systematic Analysis. *Lancet* 375, 1969–87 (2010).
  24. Panaretto, K. *et al.* Risk Factors For Preterm, Low Birth Weight And Small For Gestational Age Birth In Urban Aboriginal And Torres Strait Islander Women In Townsville. *Aust N Z J Public Heal.* 30, 163–70 (2006).
  25. Walraven, G. E. L. *et al.* The Aetiology Of Low Birthweight In A Rural Area Of Tanzania. *Trop. Med. Int. Heal.* 2, 558–567 (1997).
  26. Forssas, E., Gissler, M., Sihvonon, M. & Hemminki, E. Maternal Predictors Of Perinatal Mortality: The Role Of Birthweight. *Int. J. Epidemiol.* 28, 475–78 (1999).
  27. Glass, H. C. *et al.* Outcomes For Extremely Premature Infants. *Anesth. Analg.* 120, 1337–1351 (2015).
  28. Gibbs, C. M., Wendt, A., Peters, S. & Hogue, C. J. The Impact Of Early Age At First Childbirth On Maternal And Infant Health. *Paediatr. Perinat. Epidemiol.* 26, 259–84 (2012).
  29. Stanford. *Causes and implications of low birth weight. Infants Primary determining factors of low birth weight infants.* (2000).
  30. Patricia A Cavazos-Rehg, M. J. K. *et al.* Maternal Age And Risk Of Labor And Delivery Complications. *Matern Child Heal. J* 19, 1202–11 (2015).
  31. Leslie, E. & Elizabeth, R. Nutrition of

- Women and Adolescent Girls: Why It Matters. (2003).
32. Breuner, C. C. & Farrow, J. A. Pregnant Teens In Prison - Prevalence, Management, And Consequences. *West. J. Med.* 162, 328–30 (1995).
  33. Goisis, A., Remes, H., Barclay, K., Martikainen, P. & Myrskylä, M. Advanced Maternal Age And The Risk Of Low Birth Weight And Preterm Delivery: A Within-Family Analysis Using Finnish Population Registers. *Am. J. Epidemiol.* 186, 1219–26 (2017).
  34. SS, M., G, M., Darade R, Y. S., MK, T. & K, P. Maternal Risk Factors Associated With Term Low Birth Weight Neonates: A Matched-Pair Case Control Study. *Indian Pediatr* 49, 25–8 (2012).
  35. Carolan, M. & Nelson, S. First Mothering Over 35 Years: Questioning The Association Of Maternal Age And Pregnancy Risk. *Heal. Care Women Int* 28, 534–55 (2007).
  36. Lampinen R, Vehviläinen-Julkunen K, K. P. A. Review of Pregnancy in Women Over 35 Years of Age. *Open Nurs. J.* 3, 33–38 (2009).
  37. BKKBN. *Usia pernikahan ideal 21-25 tahun.* <https://www.bkkbn.go.id/detailpost/bkkbn-usia-pernikahan-ideal-21-25-tahun> (2017).