

THE COMPARISON OF NEWBORN BIRTH WEIGHT BETWEEN ANEMIC AND NON-ANEMIC PREGNANT WOMEN IN 2019 AT SUNDARI HOSPITAL MEDAN

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Abstract : The condition of pregnant women greatly affects the fetus. Maternal nutrition, especially during conception and early pregnancy is one of the substantial determinants of fetal growth and development and the cornerstone of child health in the future. Anemia has become one of the predictors presumed to influence birth weight. Infants with low birth weight tend to suffer from diseases whether short-term effects or long-term effects. This observational with cross-sectional design involved 192 pregnant women with anemia and non-anemia giving birth at Sundari Hospital Medan in 2019. Data of age, education level, anemia, and birth weight were obtained from medical records. There was no statistically significant difference in newborn birth weight between anemic and non-anemic mothers (p-value = 0.075). There was no statistical difference in newborn birth weight between anemic and non-anemic mothers.

Keywords: anemia; pregnant; newborn birth weight

I. INTRODUCTION

The condition of the pregnant women greatly affects the fetus. Maternal nutrition, especially during conception and early pregnancy is one of the substantial determinant of fetal growth and development and cornerstone of child health in the future.¹ Anemia in pregnant women is a condition commonly found during pregnancy. Anemia is harmful for pregnant women because the complication that occurred does not only affect the mothers but also the infants.² Anemia in pregnant women has also been one of the predictors presumed influencing newborn birth weight.³ Based on basic health research data in 2018, the prevalence of anemia in pregnant women is approximately 48.9%, of which this percentage has increased compared to 2013 (37.1%).⁴

Low birth weight newborns are one of the major public health problem. WHO estimated that approximately 15-20% of newborn has birth weight less than 2500 grams, representing more than 20 million cases of 139 million births is low birth weight.⁵ From this data, Indonesia was ranked in the ninth with the percentage of low birth weight 6.2% of births every year.⁴ Newborn with birth weight less than 2500 gram is defined as low birth weight regardless of gestational age.⁶ Newborns with low birth weight tend to suffer from several diseases whether in short term or long term effect. Hazzani in 2011 revealed that low birth weight newborns have 12 times higher mortalitis and 3 times higher morbidities than with normal weight.⁷

II. RESEARCH METODHOLOGY

This Observational study with cross-sectional design has been held in Sundari Hospital since January 2019 till December 2019. All data from medical records from anemic and non-anemic pregnant women were included as study samples. Inclusion criterias in this research were pregnant women with gestational age 37-42 weeks without complications.

Pregnant women with comorbidities such as myasthenia gravis, chronic hypertension (in pregnancy), pregnancy with hidramnion, premature rupture of membranes, gestational diabetes mellitus, malabsorption syndrome, kidney diseases, heart diseases, blood diseases associated with coagulation, placenta previa (accreta, increta, percreta), and previous hepar diseases (hepatitis B); pregnant women with preterm labor (gestational age before 37 weeks); aterm infants with congenital anomaly; active infection currently suffered by pregnant women such as HIV, syphilis, and hepatitis B infection; and incomplete sample data were excluded from this study.

About 192 anemic and non anemic pregnant women giving birth in Sundari Hospital were obtained using total sampling method. Anemia during pregnancy was grouped as 3, which were low/mild (Hb 10-10.9 gr/dl), medium (Hb 7.1-10 gr/dl), and high/severe (Hb<7gr/dl). In this study, birth weight was defined as birth weight of less than 2500 gram and was weighed up to 24 hours after birth. (8) Furthermore, birth weight was subdivided as low (<2500 gram) and normal (≥2500 gram). Data about age, education level, anemia, and birth weight were obtained from medical records.

Data analysis

Univariate data analysis was done to determine frequency distribution. Categorical data was presented as frequency (n) and percentages. p value $<0,05$ was considered statistically significant. Data analysis was done using statistical software.

III. RESULTS AND DISCUSSION

One hundred ninety two anemic and non anemic pregnant women giving birth in Sundari Hospital since January 2019 till December 2019 were obtained in this study. Most of pregnant women aged 26-30 years old (81 people, 42.2%) with mean of age 30.29 years old, minimum age 22 years old and maximum 40 years old. Most of them graduated from Junior High School (72 people, 37.5%) and were non anemic (96 people, 50%). Mean of birth weight was 3025.63 gram, with minimum 1890 gram dan maximum 3800 gram. Of 192 newborns, about 170 infants had normal birth weight (88.5%) and 22 low birth weight (11.5%) (Table 1).

Table 1. Baseline Characteristics

Characteristics	Total (n)	Percentages (%)
Age (years old)		
≤ 25	36	18.8
26 -30	81	42.4
31 -35	57	29.7
≥36	18	9.4
Maternal education level		
Elementary school	1	0.5
Junior high school	72	37.5
Senior high school	59	30.7
Associate degree	16	8.3
Bachelor	44	22.9
Anemia		
Non-anemia	96	50.0
Low	66	34.4
Medium	25	13
High	5	2.6
Birth weight		
Low birth weight	22	11.5
Normal birth weight	170	88.5

The Total of 96 non anemic pregnant women, about 86 women gave birth to newborns with normal birth weight (89.6%) and 10 women to low birth weight newborns (10.4%). Sixty two of 66 pregnant women with low/ mild anemia delivered normal weight newborns (93.9%) and only 4 with low birth weight (6.1%). From 25 pregnant women with medium anemia, about 20 women gave birth to babies with normal birth weight (80.0%) and 5 low birth weight babies (20.0%). Of 5 women with high anemia, there were 3 mothers delivered low birth weight newborns (60%) and 2 with normal birth weight (40.0%). Statistical analysis test showed p value=0,001 concluding that there was statistically significant difference between newborn birth weight of anemic and non anemic pregnant women (Table 2).

Table 2. The comparison between anemia in pregnant women with birth weight newborns.

Category of anemia	Category of Birth Weight				Total	Sig.
	Low birth weight	%	Normal	%		
Non-anemia	10	10.4	86	89.6	96	0,001
Low	4	6.1	62	93.9	66	
Medium	5	20.0	20	80.0	25	
High	3	60.0	2	40.0	5	

Based on WHO, anemia has been one of the major public health problems if the population study showed the prevalence of anemia about 5 percents or more; if the prevalence is approximately 40% in total population, severe public health problem was determined. The prevalence of anemia in pregnant women was second most common in Southeast Asia (48%).⁵ One of Southeast Asia countries is Indonesia. In Indonesia, the prevalence of anemia in pregnant women is still high (37.1%) or one of 1 pregnant women in Indonesia suffer from anemia.^{9,10} For babies, anemia in pregnancy is associated with higher risk of preterm labor, spontaneous abortion, low birth weight, intrauterine fetal death, lower APGAR score at 5 minutes, and intrauterine growth restriction.¹¹⁻¹³

Physiologically, in early second trimester, pregnant women will produce 30-40 mL/kg plasma causing hypervolemia. But, along with hypervolemia, hematological cell count will not increase. As a result, hemodilution and maternal anemia occurs. Low hemoglobin levels lead to reduced oxygenation in tissues and will stimulate the changes in angiogenesis and fetal hypoxia. Based on this theory, due to diminished placental transport, nutrition and oxygen to fetus will also reduced. In pregnancy, low hemoglobin levels can increase the risk of uteroplacental hypoxia. Hypoxia can cause fetal growth into suboptimal.¹⁴⁻¹⁶ Besides

that, significantly reduced birth weight in anemic pregnant women is caused by diminished of the exchange side of placenta, which is directly associated with maternal hemoglobin levels.¹⁷

Jwa *et al.* stated that pregnant women with minimal reduction of hemoglobin levels in early until late pregnancy have high risk in delivering low birth weight newborns compared to women with moderate-severe reduction. Serial studies by Whittaker *et al.* about hematological changes, including Hb and plasma volume in England was concluded that there was no significant relationship at all between hemoglobin level change before and at the end of pregnancy with placenta weight or feta weight, eventhough this changes in hemoglobin was indeed negatively correlated with body weight and placenta. Similar results was also found by Bakacak *et al.*, although the result was not significant ($p=0.06$). The only reason why this event could happen was the changes in hemoglobin levels during pregnancy reflects the expansion of plasma volume. The lower decrease in hemoglobin levels in early pregnancy indicated that there was failure in expansion of plasma volume which can disturb the fetoplacental circulation.¹⁸

This study and study done by Syifaurrehman *et al* together showed that the proportion of baby with low birth weight was higher in anemic pregnant women compared to non anemic. But, Syifaurrehman *et al* didn't succeed in finding thath mild, moderate, high anemia influenced the prevalence of low birth weight and non low birth weight. On the contrary, statistical test results found p value= $0,001$. This implied that there was difference in birth weight between anemic pregnant women and non anemic. Sughra and Imran in their researches also discovered that there was significant relationships between anemic and non anemic mothers with birth weight ($p<0,001$).¹⁹ Kumari *et al.*, in their studies in 2019 comparing 4 groups of anemia (non anemia, mild, moderate, and sever anemia) with low birth weight also stated that there was significant relationships between anemic groups and low birth weight ($p=0,0003$). Pregnant women with severe anemia had 2,5 higher risk than non anemic.²⁰ Heydarpour *et al.* in his study proved that there was significant relationship between birth weight and anemia only in third trimester pregnant women.²¹

As for the limitations of this study was data obtained in this study only from medical records of pregnant women. One of the limitation in obtaining data from this medical record is lots of incomplete or missing data.

IV. CONCLUSION

It could be concluded that there was statistically significant difference in newborn birth weight between anemic and non-anemic pregnant woman.

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