TurnitinTheRelationshipofAnemia

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Submission date: 26-Oct-2023 02:24PM (UTC+0700)
Submission ID: 2207781131
File name: TheRelationshipofAnemia.pdf (199.71K)
Word count: 5118
Character count: 26723

International Journal of Health Sciences and Research
Vol.12; Issue: 6; June 2022
Website: www.ijhsr.org
ISSN: 2249-9571

Original Research Article

The Relationship of Anemia in Pregnant Women in the Second Trimester to Babies with Low Birth Weight at the Duren Sawit District Health Center in 2016

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DOI: https://doi.org/10.52403/ijhsr.20220616

ABSTRACT

According to the World Health Organization (WHO), anemia in pregnant women is the condition of mothers with hemoglobin (Hb) in the blood <11.0g/dL. More specifically, the pregnant women in the category of anemia when hemoglobin concentration in the blood is <11.0g/dL in the first and third trimester, whereas <10,5g/dL in the second trimester. The study was a survey research analytical cross-sectional study design using secondary data based on medical records of 50 patients of the month from June to December 2016 at Duren Sawit health center. This study also conducted a chi-square statistical test to see if there is a significant relationship or not. The age group with the most maternal anemia incidence is the 26-30 age group, with 17 (34%) patients out of 50 patients. The bivariate analysis results show no significant association between anemia in pregnant women in the second trimester with LBW in the Duren Sawit subdistrict health center because the p-value obtained was 0.237 (> 0.05).

Keywords: Anemia, LBW, Age.

INTRODUCTION

Anemia is a condition in which the blood hemoglobin level is insufficient for the body's physiological needs. The body's physiological requirements vary greatly, and this is influenced by various factors, including age, gender, smoking habits, and gestational age [1]. The physiological needs of the pregnant mother's body increase to require a large number of red blood cells. The nutrients consumed by pregnant women influence the level of red blood cells in the body. Pregnant women who lack folic acid, vitamin A, vitamin B12, and parasitic infections can experience a deficiency in the number of red blood cells, affecting low hemoglobin levels in the body and causing anemia.

Based on research conducted by WHO in 1993-2005, it was found that the prevalence of anemia in pregnancy was the second highest after anemia in preschool children, reaching 41.8%. Meanwhile, Asia ranks second after Africa, with most anemia in pregnant women at 48.2%. In Indonesia, the prevalence of anemia in pregnant women is still relatively high, reaching 37.1% [2].

Anemia in pregnancy is a condition in which the blood hemoglobin level is less than 11 g/dL. Anemia in pregnancy can cause several adverse conditions for the birth of a baby, including increasing the risk

of premature birth, low birth weight birth, and infant death at birth [3]. Low birth weight (LBW) is a baby with a birth weight of fewer than 2500 grams regardless of gestation death in neonates [4].

LBW in infants can cause various problems such as asphyxia, respiratory problems, hypothermia, hypoglycemia, breastfeeding problems, infections, high bilirubin levels, and bleeding problems. Long-term risks to LBW can also occur, such as developmental and growth disorders, visual impairment, hearing impairment, chronic lung disease, and increased frequency of congenital abnormalities. This research is essential to do considering the high prevalence of anemia in pregnant women in Indonesia, which can cause adverse conditions for the birth of a baby, which is limited to the problem of births with low birth weight. The issue of anemia in pregnant women that can impact the emergence of LBW gives interest to researchers to examine the effect of anemia in pregnant women with the incidence of LBW in infants at the Duren Sawit District Health Center in 2016. anemia in pregnant women.

Based on the background of the research above, the formulation of the research problem answered in this study is "How is the relationship between anemia in pregnant women in the second trimester to babies with low birth weight at the Duren Sawit Health Center in 2016? With the aim of research to determine the relationship between anemia in pregnant women in the second trimester to the birth of babies with low birth weight at the Duren Sawit District Health Center in 2016.

LITERATURE REVIEW

Anemia is a condition where the Hb level is low due to pathological conditions. Anemia is a condition where the hemoglobin level, hematocrit, and red blood cell count are below the normal values set for individuals [5]. Anemia in pregnancy is a condition in which the mother has a hemoglobin level of less than 11 g/dl in the first and third trimesters or a hemoglobin level of less than 10.5 g/dl in the second trimester. Anemia is a lack of functioning of red blood cells (RBCs), leading to a reduced ability to carry oxygen and unusual complications [6]. These red blood cells are produced in the bone marrow. Red blood cells have a life expectancy of about 120 days. Meanwhile, the body needs iron, vitamin B12, and folic acid for erythropoiesis. If there is a deficiency of one or more of these ingredients, there is an inhibition in the increase in red blood cells so that anemia develops. Anemia is often called lack of blood which is a condition where the level of hemoglobin (Hb) in the blood is less than normal (<12 g/dl) which results in decreased endurance, decreased ability and concentration, decreased fitness, fetal inhibition growth, and will endanger the development of the fetus. pregnancy.

Blood will increase during pregnancy which is known as hydremia or hypervolemia. The increase in blood cells is smaller than the increase in blood plasma during pregnancy, resulting in blood thinning. The rise in blood during pregnancy begins at ten weeks of gestation, and the blood increase reaches a peak at 32 and 36 weeks of gestation. Physiologically, blood thinning relieves the heart's work, which gets heavier with pregnancy. The hematological changes associated with pregnancy are due to increased circulating changes in the placenta and breast growth [7].

Patients with anemia are characterized by easy weakness, fatigue, lethargy, shortness of breath, pale face, difficulty concentrating, and excessive fatigue. Anemia is characterized by pallor (tongue, deep lips, face, palms), quickly tired, faster heart rate, apathy, dizziness, dizzy eyes, and drowsiness. Symptoms of anemia that commonly occur in pregnant women are frequent palpitations, paleness, speedier breathing, fatigue, headaches, weakness, dizziness, lack of appetite, decreased body fitness, and impaired wound healing [8]. These symptoms are caused by the brain

and heart experiencing a lack of oxygen distribution from the blood. The heart rate of people with anemia is usually faster because they try to compensate for the lack of oxygen by pumping blood faster. This results in a decrease in the ability to work and body fitness. If this condition lasts for a long time, the work of the heart becomes heavy and can cause congestive heart failure. Iron anemia can also cause the body's immune system to decrease so that the body is easily infected [9].

The causes of anemia in general are: a) Lack of nutrition (malnutrition); b) Lack of iron in the diet; c) Malabsorption; d) Heavy blood loss: past childbirth, menstruation, and others; and e) Chronic diseases such as pulmonary tuberculosis, intestinal worms, malaria. The leading causes of anemia in pregnant women are inadequate intake of food sources of Fe, increased demand for Fe during pregnancy (physiological changes), and heavy blood loss [10]. The factors that influence anemia in pregnant women are divided into three parts, namely: fundamental elements (social economy, knowledge, education); b) indirect factors (Ante Natal Care Visits (ANC) and maternal age; c) direct factors (adequate consumption of iron tablets, pregnancy distance, parity, nutritional status, and infectious diseases).

Mild anemia has no effect on pregnancy and delivery except that the mother will have low iron levels, and there will be a possibility of moderately severe anemia in subsequent pregnancies. Moderate anemia can cause increased weakness, lack of energy, fatigue, and poor performance. Severe anemia can cause palpitations, tachycardia, shortness of breath, and increased heart rate leading to cardiac stress, decompensation, and heart failure, which can be fatal. An increased incidence of preterm delivery (28.2%), pre-eclampsia (31.2%), and sepsis has been associated with anemia [11].

The fetus still gets iron from the transfer of iron from the mother through the placenta. Gradually, the fetus tends to experience a decrease in iron stores due to the depletion of maternal iron stores. This condition inhibits fetal growth and increases perinatal mortality. Prevention of anemia in pregnant women is an effort that can be made to overcome anemia due to iron deficiency, as follows: a) By increasing the consumption of foods rich in iron, especially from easily absorbed animal sources such as liver, fish, and meat. In addition, it is necessary to increase foods that are rich in vitamin C and vitamin A to help absorb iron and support the process of forming hemoglobin; b) Fortification, namely adding iron, folic acid, vitamin A, and essential amino acids (fortification) to foodstuffs that the target group widely eats; and c) Mass iron supplementation in the target group for a certain period.

Low birth weight (LBW) babies are babies born with a birth weight of fewer than 2500 grams (up to 2499 grams) [12]. LBW is a baby born weighing less than 2,500 grams regardless of gestational age. The clinical characteristics of babies with low birth weight can be seen from birth weight equal to or less than 2500 grams, body length less or equal to 45 cm, chest circumference less than 30 cm, and head circumference less than 33 cm [13]. Assessment of LBW is done by weighing the baby at birth or in the first 24 hours. In terms of treatment and life expectancy, LBW is distinguished as follows: a) Low birth weight (LBW) babies are babies with a birth weight of 1500-2499 grams; b) Very low birth weight (LBW) babies are babies whose birth weight is less than 1,500 grams, and c) Extremely low birth weight (LBW) babies are babies whose birth weight is less than 1000 grams [14].

The two leading causes of LBW are prematurity and intrauterine growth retardation (IUGR). Meanwhile, LBW is caused by premature labor, slow intrauterine growth, or both. The risk factors for LBW are [15; 16; 17] a) Genetic and inherited factors, including the sex of the baby, ethnicity, height of pregnant women, weight before pregnancy, hemodynamics of pregnant women, father's height and weight

and other genetic factors; b) Demographic and psychosocial factors, including maternal age, socioeconomic status (education, occupation, and/or income), marital status, psychological factors of pregnant women; c) Obstetric factors, including parity, childbearing interval, sexual activity, fetal growth and gestational age of the previous child, previous experience of spontaneous abortion, experience of induced abortion, previous experience of stillbirth or neonatal death, previous experience of infertility, and fetal exposure to diethylstilbestrol ; d) Nutritional factors, including weight gain during pregnancy, energy intake, energy expenditure, work and physical activity, protein intake/status, iron and anemia, folic acid and vitamin B12, minerals zinc and copper, calcium, phosphorus, and vitamins D, vitamin B6, and other vitamins and minerals; e) Maternal morbidity during pregnancy, including general morbidity and episodic disease, malaria, urinary tract infection, genital tract infection; f) Exposure to toxic substances, including smoking, drinking alcohol, consumption of caffeine and coffee, marijuana use, dependence on narcotics, and exposure to other toxic substances; and g) Antenatal care, including the first antenatal visit, number of antenatal visits, and quality of antenatal care. The risk factors for LBW are divided into first factors related to nutrition, namely: prepregnancy weight, weight gain during pregnancy, pregnancy height, anemia in pregnancy, zinc status and zinc supplementation in pregnant women, and other nutrients, and second, social factors include individual behavior, race or ethnicity and antenatal care [18; 19].

Baker and Tower modified several risk factors, and determinants of the incidence of LBW from the modification results resulted in a classification that was differentiated according to infant factors, namely: sex, genetics, race, and condition of the placenta, and maternal factors, namely: maternal age, parity, birth spacing, height body weight, pre-pregnancy weight, and weight gain during pregnancy, as well as environmental factors, namely: social status, economy, nutrition/BMI, maternal infections/diseases, service utilization, smoking/alcohol, and mother's level of knowledge [20; 21].

Two types of risk can occur in LBW: immediate and long-term. The primary risk may be hypothermia, hypoglycemia, fluid disturbances, hyperbilirubinemia, respiratory distress syndrome, patent ductus arteriosus, and infection. Long-term risks can occur due to developmental and growth disorders, visual impairment, hearing impairment, chronic lung disease, and increased frequency of congenital abnormalities [22; 23]. The problems that arise with LBW are: Asphyxia, Respiratory disorders, Hypothermia, Hypoglycemia, Problems with breastfeeding, Infections, Jaundice (high bilirubin levels), and Bleeding problems.

Prevention that can be done to prevent the occurrence of LBW babies is to suggest that mothers increase pregnancy checks periodically four times during pregnancy and start at a young gestational age. Provide support and explanations that can play a role in improving maternal education and improving the family's economic status to improve access to the use of antenatal care and maternal nutritional status during pregnancy [24;25]. Anemia in pregnant women can cause various risks to the fetus, one of which is LBW. Nutrients supply nutrients to the fetus from the mother through the placenta. The supply of nutrients to the fetus depends on the amount of maternal blood flowing to the placenta and the nutrients it transports. The efficiency of the placenta in concentrating, synthesizing, and transporting nutrients determines the food supply to the fetus. In pregnant women who are anemic, the supply of oxygen and nutrient input is reduced, resulting in impaired fetal growth and development.

In addition to anemia, various other factors influence the occurrence of LBW, such as gestational distance, parity, and age of pregnant women. Pregnancy spacing that is too short (< 1 year) causes inadequate

maternal nutrition, resulting in reduced nutritional intake for the fetus, which affects fetal growth and causes low birth weight. In mothers with too many parity numbers (> 3) can endanger the health of mothers and children. Biologically, the amount of parity will lead to the possibility of placenta previa (the placenta is located at the bottom of the uterus so that it covers part or all of the birth canal), and bleeding complications occur in mothers who have a large number of births so that babies born will tend to have low weight. The age of the pregnant mother also affects the condition of the fetus. In pregnant women who are still too young (< 20 years), blood flow to the cervix and uterus is low due to the immaturity of the uterine organs, which affects the flow of nutrients from the uterus to the fetus. In addition, there is competition for nutritional needs between mother and fetus. In pregnant women who are too old (> 35 years), there is a high prevalence of chronic health such as hypertension, diabetes mellitus and health complications during pregnancy, causing the occurrence of low birth weight.

RESEARCH METHOD

This type of research is a cross-sectional analytic study with a case study approach (case control). The study was conducted to determine the relationship between anemia in pregnant women and infants with low birth weight. The study was conducted retrospectively based on data taken from medical records. The study was carried out in January 2017 by taking data from medical records related to anemia in pregnant women and the incidence of LBW in infants born in 2016. The study was carried out at the Duren Sawit District Health Center. The population in this study were all pregnant patients who underwent antenatal care (ANC) and gave birth at the Duren Sawit District Health Center in 2016. Sampling was carried out using a non-probability sampling method, namely each subject in the population had an unequal opportunity to be selected as the research sample. The sampling technique used in this study is consecutive sampling. Consecutive sampling is a method of selecting pieces based on subjects who come sequentially and meet the selection criteria and are included as research samples until the minimum number of samples is met. The calculation results obtained a minimum sample (n) of 40.60, which was rounded up to 41 people. Therefore, in this study, the sample size used in each group was 41 people, according to the large variable proportion. Data collection uses secondary data, namely medical record data in 2016. The data collected is in the form of data on the age of pregnant women, hemoglobin levels, and weight of newborns. This study used univariate data analysis to determine the frequency of occurrence of LBW in pregnant women, both those with anemia and those without descriptive statistical analysis. In addition, bivariate analysis was also conducted to determine the relationship between anemia in pregnant women and the incidence of LBW in infants with the one-sample chi-square test. The chi-square test was also carried out to determine the relationship between anemia in pregnant women and the incidence of LBW by adding the control variables of maternal age, gestational distance, and parity. The analysis in this study was carried out using the SPSS v.24.0 assistance program.

RESULT AND DISCUSSION

This research was conducted for four months, from September 9, 2016, to January 23, 2017. The study was conducted at the Puskesmas Duren Sawit, East Jakarta. The research design used was an analytic study with a cross-sectional approach. This study aims to determine the relationship between anemia in pregnant women in the second trimester to babies with low birth weight at the Duren Sawit District Health Center. The number of successfully obtained samples was 50 patients with characteristics that match the predetermined criteria. Data collection uses secondary data in medical records taken from the medical records

section of the Duren Sawit District Health Center. The data obtained were checked again and then processed using SPSS (Statistical Package for Social Science) v24.0 software.

The distribution of sociodemographic characteristics in this study includes patients' age distribution.

Table 1. Distribution of Patient Characteristics by Age

Age	Patient	
	Frequency (n)	%
16 – 20	7	14
21 – 25	14	28
26 – 30	17	34
31 – 35	10	20
36 – 40	2	4
Total	**50**	**100**

The distribution of patient characteristics based on age in Table 1 shows the majority of patients aged between 26-30 years, as many as 17 patients (34%), 14 patients (28%) aged 21-25 years, ten patients (20%) aged 31-35 years, seven patients (14%) were aged 16-20 years, and only two patients (4%) were aged between 36-40 years.

Table 2. Distribution of patients based on second trimester Hb levels

Hb (g/dL)	Patient	
	Frequency (n)	%
<10,5	**23**	**46**
10,5	6	12
>10,5	21	42
Total	**50**	**100**

Based on table 2 regarding patients' Hb levels, 23 (46%) patients had Hb < 10.5, and 21 (42%) patients had Hb > 10.5, meanwhile, only 6 (12%) patients had Hb levels. Hb=10.5. In this study, the results showed that most patients had low/bad Hb levels.

Table 3. Distribution of Newborn Weight Characteristics

Baby Weight (grams)	Patient	
	Frequency (n)	%
<2500	2	4
2500 – 4000	48	96
Total	**50**	**100**

The distribution of weight characteristics of newborns in table 3 shows that 48 (96%) babies were born with a weight between 2500-4000 grams, while there were only 2 (4%) babies born weighing <2500 grams. In this study, it was found that almost all infants had average weight. The bivariate analysis aims to determine the relationship between the independent and dependent variables using the Chi-square test (x2). The relationship between anemia in pregnant women in the second trimester with the incidence of LBW is indicated by the p-value < 0.05.

Table 4. Results of the relationship between anemia in pregnant women in the second trimester and the incidence of LBW

Hb level	Baby Weight				Total		p
	<2500		2500-4000				
	F	%	F	%	F	%	
<10,5	0	0.0	23	100.0	23	100.0	0,237
10,5	0	0.0	6	100.0	6	100.0	
>10,5	2	9.5	19	90.5	21	100.0	
Total	**2**	**4.0**	**48**	**96.0**	**50**	**100.0**	

The statistical analysis results showed a p-value = 0.237 (p >0.05), meaning that there was no significant relationship between anemia in pregnant women in the second trimester and the incidence of LBW at the Duren Sawit District Health Center.

Based on univariate analysis, it was found that the age group of 26-30 years had the most anemia, with 17 (34%) patients. The age group of 21-25 years was the second highest as many as 14 (28%) patients, while the lowest was the age group of 36-40 years, there were only two patients (4%).

The value of 10.5 g/dL is the typical limit used by the Duren Sawit sub-district health center laboratory to detect the patient's Hb level. Hb levels of more than 10.5 g/dL indicate a higher value than expected but are still tolerable. On the other hand, if the Hb level is less than 10.5 g/dL, the value is less than expected, so the patient requires special attention.

From the study results, it was found that there was no significant relationship between anemia in pregnant women in the second trimester and the incidence of LBW at the Duren Sawit District Health Center because the p-value obtained was > 0.05. When pregnant women perform ANC and laboratory results are obtained with Hb

levels <10.5, the patient will be immediately referred to a nutritionist to improve the patient status and increase the patient's Hb level.

The limitations of this study are a) Researchers only used medical records in assessing the relationship between anemia in pregnant women in the second trimester and the incidence of LBW, and the study was only carried out once by means of case-control, and b) The medical record data collection time is short because it has to adjust to the author's lecture schedule, and the research queue schedule is in the medical record with other students.

CONCLUSION

Based on the results of the study, it can be concluded that: a) The number of patients in this study was 17 (34%) belonging to the 26-30 year age group, 14 (28%) patients 21-25 years old, ten patients (20%) aged 31-35 years, seven patients (14%) were aged 16-20 years while only 2 (4%) patients were aged 36-40 years; b) A total of 23 (46%) patients had Hb levels <10.5, and 21 (42%) patients had Hb > 10.5; meanwhile, only 6 (12%) patients had Hb levels = 10.5. So it can be concluded that the majority of patients have low Hb levels; c) A total of 48 (96%) babies were born with a weight between 2500-4000 grams, while there were only 2 (4%) babies born weighing <2500 grams. This study found that almost all infants had average weight, and d) Pregnant women who experience anemia in the second trimester do not affect the importance of the babies born and do not cause low birth weight babies. Thus, it is suggested that further research can produce better research with sufficient research time for researchers to examine the data in detail and with a larger sample size to represent the proportion in the East Jakarta area.

Acknowledgement: None

Conflict of Interest: None

Source of Funding: None

Ethical Approval: Approved

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How to cite this article: Nia Reviani, Batara Imanuel Sirait. The relationship of Anemia in pregnant women in the second trimester to babies with low birth weight at the Duren Sawit District Health Center in 2016. *Int J Health Sci Res*. 2022; 12(6):126-133. DOI: *https://doi.org/10.52403/ijhsr.20220616*

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