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Relationship Between Anemia In Pregnancy And Postpartum Incidents

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Abstract
In Indonesia, the Maternal Mortality Rate (MMR) is still a problem. Postpartum hemorrhage, which accounts for 19.3% of all maternal deaths in Indonesia, is the leading cause of death for pregnant women. One of the risk factors for postpartum hemorrhage is anemia. The aim is to analyze the relationship between anemia in pregancy and the frequency of postpartum hemorrhage at the Tapa Health Center. The study design used case-control methodology and was an analytical observational study. With 150 samples, this sample used a 1:1 ratio between the control and case groups. Univariate and bivariate analysis techniques were used to analyze the data with the chi-square test and OR calculation. The results of the bivariate test on the variable of hemoglobin levels in trimesters 1, 2 and 3 with the incidence of postpartum hemorrhage each obtained statistically significant results with p equal to 0.000 (p <0.005), 0.000 (p <0.005) and 0.000 (p <0.005) which indicates that there is a relationship between mothers who experience anemia in pregnancy with the incidence of postpartum hemorrhage at the Tapa Health Center. And the OR results, 25.351x, 10.804x, and 35.821x, are the risk levels for experiencing postpartum hemorrhage. And the causes of postpartum hemorrhage were placental retention (44%), uterine atony (28%), uterine rupture (18.6%), and uterine inversion (9.4%). Conclusion: There is a relationship between anemia in pregnancy with the incidence of postpartum hemorrhage; the risk level of postpartum hemorrhage is higher in anemia in trimester 3, and the main cause is placental retention.

1. Introduction

It is estimated that around 810 mothers die due to complications in pregnancy and childbirth every day globally. History records that in 2017, there were approximately 295,000 women who died during and/or after pregnancy/childbirth. The maternal mortality ratio (MMR) is a ratio that describes the maternal mortality rate in a country (Ganchimeg et al., 2014). Based on data from the World Health Organization (WHO), MMR has several determinants of factors that cause an increase in value, namely difficult economic conditions and significant differences in access to adequate health facilities. The data shows 15 countries in the "high alert" category, such as Sudan, Somalia, Central Africa, Zimbabwe, Iraq, Haiti, and Afghanistan. These countries have MMR levels ranging from 31 (Syria) to 1150 (Sudan). In contrast to developed countries, whose average MMR ranges from 11-15 (Althabe et al., 2015; Ganchimeg et al., 2014). The hall then became a WHO observatory to measure the world's health level. Most of the causes can be prevented with adequate oral contraceptives. The main causes of maternal mortality during the labor process namely perinatal

(75%), premature labor, preeclampsia, and illegal abortion (Kementrian Kesehatan, 2016; Wolde et al., 2018).

Based on WHO data, the crude birth rate is calculated as each live births per 1000 population. Globally, the crude birth rate is around 17.56 per 1000 population. Based on 2022, the crude birth rate in Indonesia is around 16.92 per 1000 population. In addition, if we examine more deeply, one of the provinces in Indonesia, namely South Sulawesi, has a crude birth rate of 18.2 per 1000 population. However, in the early stages of the birth of the South Sulawesi Province population, the 2011 Population Census results were found to be (Kurniawan et al., 2021). Implementing maternal health is one of the aspects assessed in determining health status. According to demographic literature, Maternal Mortality Rate (MRR) is the number of maternal deaths per 42 days since the first pregnancy was carried out in the birthing place which was caused by the birth and its management, and not by other causes, Maternal Mortality Rate (MRR) is calculated per 1000 live births (Usman et al., 2022). Indonesia itself has not been free from the high maternal mortality rate. Demographics show the maternal mortality rate is 305/100,000 live births (Rohati & Siregar, 2023). This rate is a serious problem compared to traffic conditions in Southeast Asia. Indonesia is in the highest position in maternal mortality rates in the period 1991-2015. The high maternal mortality rate itself is an indicator of the failure of the universal health program in Indonesia, which targets a maternal mortality rate of 102/100,000 live births in 2015. Referring to the latest figures in 2020, there were 4,267 maternal deaths in Indonesia (Kementrian Kesehatan, 2016). This data increased when compared to the data in 2019, with 4,221 deaths (Tahun et al., 2024). If we draw a conclusion, based on research from the Indonesian Ministry of Health, the main causes of maternal mortality are blood (30.3%), hypertension during pregnancy (27.1%), infection (7.3%), and traffic. In addition, cancer, kidney disease, heart disease, and traffic diseases contributed 35.3% of maternal mortality cases in Indonesia (Kementrian Kesehatan, 2016). Blood in pregnancy played a role of 30.3% as the cause of the high rate of maternal mortality. Intrapalm perforation, based on research by Sunalrsih & Susalnalrial (2015), plays a role of 3% in maternal mortality. Then, based on research by Putri (2020), 8% of mothers with intrapartum perforation play a major role in increasing maternal mortality. Intrapalm perforation contributes 19.3% of maternal mortality overall (Kurniawan et al., 2021).

One of the most common causes of maternal mortality is postpartum hemorrhage. Based on data collected by the Indonesian Ministry of Health, summarized in the 2020 Pusdaltin, the most common cause of maternal mortality in 2020 was 1,330 cases (Puruk et al., 2024). Postpartum hemorrhage contributed 19.3% of the overall maternal mortality rate in Indonesia (Dewi et al., 2023). Postpartum hemorrhage is then categorized as primary and secondary based on the type of maternal mortality. In addition, postpartum hemorrhage can be caused by several aspects, namely postpartum hemorrhage, postpartum hemorrhage, excessive uterine contractions, oxytocin drip, maternal alveolar hemorrhage, and premature labor (Puruk et al., 2024). Maternal hemorrhage itself can be found in high-risk mothers, such as preeclampsia (Adolph, 2016). Complications of maternal hemorrhage itself include hemorrhagic shock to anemia. Decreased body volume can trigger the body to go into hypovolemic shock due to low blood volume. A decrease can follow this shock event in maternal distress and is a serious maternal event in the fetus (Hidayati et al., 2018). This maternal mortality event can be prevented by reducing maternal mortality risk factors, such as placenta previa, uterine atony, infection, malnutrition, eclampsia, multiparity, maternal pregnancy, too late pregnancy, maternal age, history of pregnancy examination (ALNC), and previous pregnancy chronology (Rohati & Siregar, 2023). Prevention is done by detecting these risk factors early through education on the importance of conducting ALNC routinely to midwives and obstetricians. With regular ALNC, a study showed that the positively correlated output was the risk of a more reverse delivery (Azizah et al., 2024). Anemia is a risk factor for postpartum events. Low hemoglobin levels cause low oxygen perfusion to the tissues, while the need for tissue perfusion increases during labor, so the body continues to compensate until there is a tendency for uterine atony in laboring mothers. Uterine atony occurs due to uterine contractions that are not adequate due to low perfusion to the tissues (Soleha, 2024). Atony during pregnancy is a common symptom of emerging neonatal malformations that develop and persist. According to the World Health Organization (WHO), the prevalence of maternal mortality in Southeast Asia has reached 48%, which is classified as a low-risk maternal health problem (Gyanendra et al., 2024). Based on the 2018 Riskesdas data, the incidence of maternal mortality in Indonesia has reached 48.9%, an increase from 37.1% in 2013 (Fatkhiyah et al., 2022). According to the 2024 Health Center in

Southeast Asia, there were 2,336 maternal mortality cases in the hospital work area. In contrast, 81 women out of 2336 women experienced postpartum hemorrhage during pregnancy. In addition, data from the health center showed that the incidence of postpartum hemorrhage in women in 2021 was 75. Based on the data that has been studied, the author decided to discuss the research topic related to postpartum hemorrhage, which was reviewed from the urgency of education in the recovery of postpartum hemorrhage in the field of knowledge. Therefore, researchers are interested in conducting research titled "The Relationship between Anemia in Pregnancy and Postpartum Perinatal Events in the Tapa Health Center."

2. Research Method

The research method used in this study was an observational analytical method with random control. The population of this study was 2336 pregnant women who gave birth at the Tapa Health Center from January 1, 2024, to December 31, 2024. The sample was taken using a purposive sampling method, namely, taking samples according to certain provisions. The sample in this study was a sample that was by what was desired and met the inclusion and exclusion criteria. This study used a 1:1 comparison of the control group in the postpartum hemorrhage case study, namely 75 patients. The comparison was 1:1, while the number of control group samples (patients who did not experience postpartum hemorrhage) was 75. So the total sample in this study was 150 samples. Data collection was carried out. The data collection method in this study used the secondary data method. Researchers collected related data and the required countervailing data. The obtained alkali data were processed using SPSS software and then analyzed descriptively and analytically.

3. Results and Discussion
3.1 Results

Table 1. Bivariate Analysis of the Relationship between First Trimester Hemoglobin Levels and Post-Partum Hemorrhage Incidence

1st trimester hemoglobin levels	Postpartum hemorrhage		Amount	*P*-Vallue	OR
	Yes	No			
Anemia	64	14	78	0.000	25.351
Non anemia	11	61	72		
Amount	**75**	**75**	**150**		

Based on the results of the bivariate test on the variable of hemoglobin levels in the first trimester with the incidence of postpartum hemorrhage, statistically significant results were obtained with p <0.05 (p = 0.000) which showed that there was a relationship between mothers who experienced anemia in pregnancy with the incidence of postpartum hemorrhage at the Tapa Health Center. Then, testing was carried out to assess the OR (odds ratio) associated with hemoglobin levels with the incidence of postpartum hemorrhage. From the results of the statistical analysis, pregnant women who experience anemia in the first trimester will be at a 25.351x risk of experiencing postpartum hemorrhage.

Table 2. Bivariate Analysis of the Relationship between Second Trimester Hemoglobin Levels and Post-Partum Hemorrhage Incidence

Hemoglobin Levels Trimester 2	Postpartum hemorrhage		Amount	*P*-Vallue	OR
	Yes	No			
Anemia	57	17	74	0.000	25.351
Non anemia	18	58	76		
Amount	**75**	**75**	**150**		

Based on the results of the bivariate test on the variable of hemoglobin levels in the second trimester with the incidence of postpartum hemorrhage in the dalpaltkaln statistically significant results with p <0.05 (p = 0.000) indicating that there is a relationship between mothers who experience anemia in pregnancy with the incidence of postpartum hemorrhage in the Tapa health center. Then, testing was conducted to assess the OR (odds ratio) related to hemoglobin levels with the incidence of postpartum hemorrhage. From the results of the statistical analysis, pregnant

women who experience anemia in the second trimester will be at a 10.804x risk of experiencing postpartum hemorrhage.

Table 3. Bivariate Analysis of the Relationship between Hemoglobin Levels in the Third Trimester and the Incidence of Postpartum Hemorrhage

Hemoglobin Levels Trimester 3	Postpartum hemorrhage		Amount	*P*-Vallue	OR
	Yes	No			
Anemia	68	16	84	0.000	25.351
Non anemia	7	59	66		
Amount	**75**	**75**	**150**		

Based on the results of the bivariate test on the variable of hemoglobin levels in the third trimester with the incidence of postpartum hemorrhage in the palpatkaln statistically significant results with p <0.05 (p = 0.000) indicating that there is a relationship between mothers who experience anemia in pregnancy with the incidence of postpartum hemorrhage in the Tapa health center. Then, testing was conducted to assess the OR (odds ratio) associated with hemoglobin levels with the incidence of postpartum hemorrhage. From the results of the statistical analysis, pregnant women who experience anemia in the third trimester will be at 35.821 times to experience postpartum hemorrhage.

3.2. Discussion

Primary postpartum hemorrhage is defined as bleeding that occurs within <24 hours after the baby is born with a quantity of >500 cc. Postpartum hemorrhage usually occurs in the third stage of labor or when health workers try to deliver the baby's placenta (Satriyandari & Hariyati, 2017). Postpartum hemorrhage can be caused by trauma such as uterine inversion and uterine rupture. Uterine inversion usually appears as a bluish-gray mass protruding from the vagina. Patients with uterine inversion may have signs of shock without losing much blood (Enniyati et al., 2019). Uterine rupture can cause intrapartum and postpartum hemorrhage. Induction and augmentation increase the risk of uterine rupture, especially for patients with previous cesarean delivery. Before labor, the main signs of uterine rupture are abdominal pain, loss of uterine contractions, maternal tachycardia, fetal bradycardia, and vaginal bleeding (Izaak & Linasari, 2024). The results of this study are in line with Febriyanti's study (2021) which showed that several etiologies of primary postpartum hemorrhage are placental retention, birth canal laceration, uterine atony, and uterine inversion (Febriyanti et al., 2021). In addition, a similar study at Jombang Regional Hospital showed that the incidence of postpartum hemorrhage can also be caused by predisposing factors, one of which is anemia during pregnancy. 50% of the samples in the study were found to have anemia which caused postpartum hemorrhage. The results of the study above explain that the most common cause of postpartum hemorrhage is placental retention (Mutika et al., 2023). This is in line with the study by Apriani (2016) which stated that placental retention is the most common cause of primary postpartum hemorrhage at Baiturrahim Jambi Hospital compared to other causes such as uterine atony, birth canal laceration, and blood disorders (Lanny Apriani, 2016). The results of the study also showed that there was a significant relationship between placental retention and the incidence of postpartum hemorrhage. In addition, this study is also supported by Hayati's research (2019) at the Bandung City Hospital, the most common cause of postpartum hemorrhage is placental retention (Hayati, Maidartati Sri, 2019). These results are also in accordance with the theory of Oxorn and William (2010), placental retention inhibits uterine contractions and retraction so that if the placenta has been delivered by manual placentation it will cause fatigue, causing uterine atony or bleeding in the area (Sianturi, 2019). Placental retention is a condition where the baby's placenta is still left in the uterus for more than 30 minutes after the baby is born. The cause of placental retention is the difficulty of removing the placenta even with active assistance during the third stage due to strong adhesions from the placenta and uterus. There are several causes of placental retention, namely 1) the placenta has not been released from the uterine wall due to deep adhesions; 2) the placenta has been released but has not come out due to uterine atony which then worsens the level of bleeding (Susanto, 2024).

Uterine atony is the inability of the uterus to contract normally after the placenta is born. Postpartum bleeding in physiological conditions is controlled by myometrial contractions,

especially those surrounded by blood vessels that vascularize the placental adhesion. Uterine atony can occur due to failure of myometrial contractions (Purwanti & Trisnawati, 2016). Poor contractions can cause inadequate contractions needed by the myometrium, resulting in postpartum hemorrhage (Zuhra & Fitri, 2023). Based on the study's results, it is known that most deliveries are to women aged 20-35 years. This shows that the community has understood about their reproductive health, although there are still mothers who give birth at the age of <20 years and> 35 years who are at risk of postpartum hemorrhage, which can result in maternal death. The results of this study are based on the research, which states that the frequency of pregnant women aged 20-35 years is greater than that of those aged <20 years and> 35 years (Ratnaningtyas & Indrawati, 2023). At the age of ≤ 20 years, the female reproductive organs are still in the development stage and are not ready to carry a fetus. If the mother is too young, it is feared that there will be several complications such as miscarriage, preeclampsia, eclampsia, premature babies, LBW, vesicovaginal fistula, retovaginal fistula and cervical cancer. Meanwhile, women who give birth when they are > 35 years old experience decreased reproductive organ function due to degenerative causes and decreased body strength, which affects the difficulty during the labor process. Suppose the mother is pregnant and gives birth to an old child. In that case, there will be a greater risk of miscarriage, preeclampsia, eclampsia, obstructed labor, massive bleeding, LBW, and other congenital abnormalities. This is, who stated that at the age of ≥ 35 years, there is a decline in women's reproductive function, which can lead to the most frequent complication, namely lacerations in the genital organs, causing postpartum bleeding to become more massive.

4. Conclusion

Based on the results of the study related to the relationship between anemia and primary postpartum hemorrhage in the Palpal Health Center, it was concluded that postpartum hemorrhage in this study was found in 75 samples, with the highest cause of hemorrhage being placental retention in the uterine cavity. The occurrence of postpartum hemorrhage in pregnancy in the first trimester (85.3%), second trimester (76%), and third trimester (90.7%) was the highest incidence of postpartum hemorrhage, which was correlated with postpartum hemorrhage. The relationship between maternal and postpartum hemorrhage in the community health center. The calculation of OR indicates a high ratio for experiencing maternal hemorrhage in pregnancy.

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