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Comparison of Hemoglobin Levels in Mothers Before and After Cesarean Section at Bendan Hospital, Pekalongan City

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ABSTRACT

Background & Objective: Cesarean section, or Sectio Caesarea, is a frequently used delivery method when vaginal birth is not possible or poses a risk to the mother and baby. **Method:** The type of research conducted was comparative research, which aims to compare the hemoglobin levels in pregnant women before and after undergoing a cesarean section at Bendan Hospital. Hemoglobin level is a very important indicator for assessing maternal health status, particularly during and after the delivery process. **Result:** The average hemoglobin level before cesarean delivery was known to be 11.7 g/dl, with a minimum level of 9.1 g/dl and a maximum level of 14.8 g/dl. Furthermore, the average hemoglobin level in pregnant women after cesarean delivery was 10.8 g/dl, with a minimum level of 7.7 g/dl and a maximum level of 13.2 g/dl. **Conclusion:** Based on the parametric test (paired test), a sig value of 0.000 < 0.05 was obtained, meaning there is a statistically significant difference between the hemoglobin levels in pregnant women before and after delivering by cesarean section at Bendan Hospital.

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Introduction

Childbirth is the series of processes culminating in the delivery of a full-term or near-full-term fetus from the mother's uterus, followed by the expulsion of the placenta from the mother's body through the birth canal, either spontaneously or with assistance. This process can occur naturally without any assistance or medical intervention. One delivery option is a cesarean section, which involves surgery to deliver the fetus and placenta through an incision in the mother's abdominal wall and uterus. Cesarean section, or Sectio Caesarea, is a frequently used delivery method when vaginal birth is not possible or poses a risk to the mother and baby (Beno J, Silen A., 2022). A cesarean section can cause postpartum hemorrhage because the

anesthesia during the procedure causes excessive relaxation of the myometrium, preventing the uterus from contracting. If the uterus does not contract, postpartum hemorrhage will occur. This can affect the mother's health, one aspect being the level of hemoglobin (Hb) in the blood (Santoso, 2022).

Hemoglobin is a protein in red blood cells responsible for transporting oxygen throughout the body. Normal hemoglobin levels are crucial for maintaining maternal health, especially during and after the delivery process (Beno J, Silen A., 2022). Pregnant women typically undergo health checks that include analysis of hemoglobin levels. Low hemoglobin levels, or anemia, can increase the risk of complications during delivery, including significant blood loss. Therefore, it is important to monitor and manage the mother's hemoglobin levels during pregnancy (Verra Sri Tustianti, Budi Santoso, 2007).

Following a Cesarean Section, a mother's hemoglobin level can change. The surgical process itself can cause blood loss, which may potentially lower hemoglobin levels. Furthermore, factors such as recovery time, nutritional intake, and the body's response to surgery also influence the recovery of hemoglobin levels. In some cases, blood transfusion may be necessary to address post-operative anemia (Aritha & Femina Sari, 2018).

The prevalence of anemia among pregnant women in Indonesia shows a concerning figure. According to data from the 2018 Basic Health Research (Riskesdas), the prevalence reached 48.9%, an increase from 37.1% in 2013 (Hayati et al., 2023). The WHO notes that the global prevalence of anemia in pregnant women is 40% (Sadiman & Yuliawati, 2024). Anemia can lead to various serious complications such as premature birth and an increased risk of maternal mortality (Fatriona, 2022). To prevent it, efforts include providing iron tablets and health education, although compliance in consuming iron tablets is still relatively low (Asmin et al., 2021).

In 2023, Bendan Hospital recorded 191 patients who underwent Cesarean sections, aged between 18 and 41 years. This shows a significant increase compared to 2022, where the number of patients undergoing similar surgery was only 95, with an age range of 19 to 42 years.

Previous research by Vhalentina Manik in 2022 used medical record data of fertile-aged pregnant women scheduled for Cesarean section at YPK Mandiri Hospital from April to June 2022. The population in this study was 62 people, with 48 samples meeting the inclusion criteria. The results showed an average pre-Cesarean hemoglobin level of 11.7 g/dl and a post-Cesarean level of 11.5 g/dl (Santoso, 2022). Another study by Rismanur Oktaviani in 2024, covering the period December 2023 to July 2024, with a population of 14 samples, found an average pre-operative level of 12.6 g/dl and an average post-operative level of 10.6 g/dl (Oktaviani, 2024).

The novelty of this research lies in the change of method, subjects, and objects from previous studies that used existing medical records or secondary data. In contrast, this current study uses primary data obtained through direct examination or observation of patients. Based on the above, the author is interested in researching "Comparison of Hemoglobin Levels in Mothers Before and After Cesarean Section at Bendan Hospital".

Objective

To determine if there is a difference in hemoglobin levels in mothers before and after a cesarean section.

Method

This study employed a total sampling method, collecting 30 samples. The samples used were venous blood from pregnant women about to deliver and those who had delivered via cesarean section at Bendan Hospital.

The study defined specific inclusion and exclusion criteria to ensure sample relevance. Inclusion criteria were: a) pregnant women scheduled for a cesarean section; b) aged 18-40 years; c) those who provided written informed consent; d) no history of hematological or clotting disorders affecting hemoglobin; and e) hemoglobin levels measured before and within 24-48 hours after surgery. Exclusion criteria included: a) history of chronic diseases affecting hemoglobin; b) pre-pregnancy anemia diagnosis; c) blood transfusion within 3 months before surgery; d) pregnancy complications; and e) use of medications that could influence hemoglobin levels.

Results

TABLE 1. Descriptive Analysis

	Shapiro-Wilk		
	Statistic	df	Sig.
Before C-section	.972	30	.602
After C-section	.972	30	.591

Based on the hemoglobin level examination of 30 pregnant women before and after delivering by Cesarean section at Bendan Hospital, the following was found: The average hemoglobin level before the Cesarean delivery was 11.7 g/dl, with a minimum level of 9.1 g/dl and a maximum level of 14.8 g/dl. Furthermore, the average hemoglobin level in pregnant women after the Cesarean delivery was 10.8 g/dl, with a minimum level of 7.7 g/dl and a maximum level of 13.2 g/dl.

TABLE 2. Hypothesis Testing

	N	Min	Max	Mean
Before C-section	30	9.1	14.8	11.7
After C-section	30	7.7	13.2	10.8

Based on the table above, it can be seen that the significance values for the hemoglobin levels of pregnant women before and after undergoing a cesarean section are 0.602 and 0.591, respectively. Both of these significance values are greater than 0.05, which indicates that the data is normally distributed.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Before C-section - After C-section	.8400	.7766	.1418	.5500	1.1300	5.924	29	.000

Based on the parametric test (paired t-test), a significance value (sig) of 0.000 < 0.05 was obtained, therefore H0 is rejected and Ha is accepted. This means that H1 is used, indicating that there is a statistically significant difference between the hemoglobin levels in pregnant women before and after delivering by cesarean section at Bendan Hospital.

Discussion

Based on the hemoglobin level examination of 30 pregnant women before and after delivering by Cesarean section at Bendan Hospital, the following was found: the average level before delivery was 11.7 g/dl (minimum 9.1 g/dl, maximum 14.8 g/dl), and the average level after delivery was 10.8 g/dl (minimum 7.7 g/dl, maximum 13.2 g/dl). The paired t-test resulted in a sig value of 0.000 < 0.05, meaning H0 is rejected and Ha is accepted. This shows that there is a difference in hemoglobin levels in mothers before and after cesarean section at Bendan Hospital, with an average decrease of 0.9 g/dl (from 11.7 g/dl to 10.8 g/dl).

This finding is consistent with research by Vhalentina Manik (2022) at YPK Mandiri Hospital, which also found a decrease in Hb levels, with averages of 11.7 g/dl pre-section and 11.5 g/dl post-section (a decrease of 0.2 g/dl). It is further supported by research from Rismanur Oktaviani (Dec 2023–Jul 2024) at Kajen Hospital, which found averages of 12.6 g/dl pre-operation and 10.6 g/dl post-operation (a decrease of 2 g/dl).

The blood loss during a cesarean section explains this decrease. While a normal vaginal delivery typically involves a blood loss of around 500ml, the blood loss during a CS can be several times higher. This occurs because the uterus holds one of the largest blood reserves in the body. During a CS procedure, blood vessels are cut when the surgeon incises the uterine wall to deliver the baby. This blood loss is caused by the process of incising the uterus, the effects of placental separation, or the occurrence of uterine atony after delivery.

Conclusion

This study conclusively found a statistically significant decrease in hemoglobin levels following cesarean sections at Bendan Hospital, with an average reduction of 0.9 g/dl. The findings align with previous research, confirming that surgical blood loss during a C-section leads to a measurable drop in hemoglobin. Therefore, it is

established that cesarean delivery has a tangible impact on maternal hemoglobin levels.

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