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THE ASSOCIATION BETWEEN Hb LEVELS AND PLACENTA PREVIA IN GRAVIDA PATIENTS

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Abstract

A placenta previa develops in the lower part of the uterus, covering the internal uterine ostium entirely or partially. The risk of maternal and infant mortality and morbidity rises as the placenta's inadequate vascularization expands to cover the entire birth canal. Hemoglobin (Hb) level is a biochemical indicator to determine the nutritional status of pregnant women, and reduced blood supply to the placenta can be caused by a lack of Hb levels in pregnant women. The purpose of this study was to determine the association between Hb level in gravida patients and the incidence of placenta previa at Sultan Agung Islamic Hospital, Semarang. This research was an observational analytic study with a cross-sectional design, which was conducted on 97 respondents who met the inclusion and exclusion criteria. The data was taken from the patient's medical record document from January 2017 - January 2018 at Sultan Agung Islamic Hospital. Analysis of the research data using the Chi-Square test. The findings revealed a significant correlation between Hb level and placenta previa incidence, low Hb levels (<11 g/dl) could significantly increase the risk of placenta previa in gravida patients.

Keywords: *Gravida; Hb levels; Placenta*

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1. Introduction

Low Hb levels in pregnant women are one of the health issues that are almost certain to happen during pregnancy. Pregnancy anemia may raise the chance of having a baby with Low Birth Weight (LBW). (Hasegawa et al., 2012; Rahmati et al., 2017), the possibility of bleeding before, during, and in extreme cases, leading to the mother's and child's deaths. At 177 deaths per 100,000 live births, Indonesia has the third-highest maternal mortality rate in Southeast Asia. (The World Bank Data, 2019).

Placenta previa increases the risk of maternal and infant mortality as well as morbidity because of the extensive bleeding. (Gibbins et al., 2018). Placenta previa can result in significant bleeding both during pregnancy and following a cesarean section. (Swarup & Anand, 2021). The main placenta previa complication that causes heavy and fatal bleeding and necessitates hysterectomy is placenta accreta (Rajuddin et al., 2019), which develops when the placenta is in the lower uterine segment and causes trophoblast tissue to invade the myometrium and then the perimetrium. (Ali et al., 2018). Reduced placental vascularity is another factor that could affect how often placenta previa occurs (Jansen et al., 2020).

Preliminary data from the Sultan Agung Islamic Hospital in Semarang's medical records section indicates that there has been an increase in the prevalence of placenta previa, with 114 cases reported in 2017 compared to 48 the year before. This description states that to lower the prevalence of placenta previa, pregnancy checks must be performed at least four times per month beginning at a young gestational age, especially in monitoring Hb levels.

Additionally, expectant mothers who have a chance of developing placenta previa will be closely watched and transferred to hospitals with

more advanced equipment. To support pregnant women's health by reducing the risk of placenta previa, scientists are motivated to look into the connection between Hb levels and the prevalence of placenta previa.

2. Method

This study is an analytic observation using medical record data which is then analyzed using a cross-sectional design, to obtain a correlation between the independent and dependent variables. The population in this study were all gravida patients hospitalized at Sultan Agung Hospital, Semarang from January 2017-January 2018 recorded in medical record documents.

The sample size formula in this study follows the Lwanga and Lemeshow formula (Lwanga & Lemeshow, 1991). Determination of the level of significance based on the results of another study (Kurniawan & Maulina, 2015) with a review of issues relating to the incidence of placenta previa at Cut Meutia General Hospital, North Aceh Regency in 2012–2013 and the relationship between maternal age and parity.

$$n = \left[\frac{Z\alpha^2 \times P \times Q}{d^2}\right]$$

n : sample size required
Zα : defined significance level (α=0.05 ; Z=1.96) (Kurniawan & Maulina, 2015)
P : anticipated population proportion 0.1 (Kurniawan & Maulina, 2015)
d : absolute precision required on either side of the proportion (in percentage points)
Q : Proportion of people who are not sick *(1-P)*

$$n = \left[\frac{1{,}96^2 \times 0{,}5 \times (1 - 0{,}5)}{0{,}1^2}\right]$$

$n = 96.04 \sim 97$

Purposive sampling was the technique that was employed. Subject data that satisfied the inclusion criteria were used in this study. The medical Record Document which is the source of data to be studied contains about: Medical Record document registration number; Mother's Age; Hb level; Incidence of placenta previa.

Editing, coding, and data entry were done after the information was gathered from the Medical Record document of the inpatient poly obstetrics at Sultan Agung Islamic Hospital. Data were analyzed using the chi-square test, and when *p* is less than alpha (p<0.05) and the level of significance is 95%, Ho is rejected and Ha is accepted, indicating that the dependent variable and the independent variable are significantly associated.

3. Results and Discussion

Characteristics of respondents

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics	Frequency (f)	Percentage (%)
Age (years)		
20-25	24	24.7
26-30	40	41.2
31-35	33	34
Previous history of placenta previa		
Yes	39	40/2
No	58	59.8
Levels of Hb		
< 11 mg/dl	14	14.4
≥ 11 mg/dl	83	85.6

Table 1 shows the demographic characteristic of the respondents. Most of the respondents had a diagnosis of placenta previa when they entered RSI Sultan Agung Semarang were 26-30 years old, and as many as 40 gravida patients (41.2%). The number of gravida patients diagnosed with placenta previa was 39 gravida patients (40.2%) while those who were not diagnosed with placenta previa were 58 gravida patients (59.8%). There were 14 gravida patients (14.4%) who had Hb levels <11 mg/dl at the time of initial hospitalization, then 83 gravida patients (85.6%) (Kurniawan & Maulina, 2015).

Correlation of Hb levels and incidence of placenta previa.

Table 2 shows gravida patients with Hb levels <11 mg/dl and experiencing placenta previa. The data for gravida patients with Hb levels 11 mg/dl and having placenta previa were 26 people, while gravida patients with Hb level 11 mg/dl and having no placenta previa were 57 people.

Table 3 shows Chi-square analysis results show *p*-value = 0.000 (p < 0.05) so Ho is rejected and Ha is accepted. This indicates a significant association between Hb levels in gravida patients and the incidence of placenta previa in gravida patients. To determine the association between Hb level in gravida patients and the incidence of placenta previa, an association test was conducted. From this test, the OR was 28.5 (OR >1, meaning that a low Hb level (<11 mg/dl) increased the risk of placenta previa in gravida patients (Table 4)

When a mother has Hb levels below 11 mg/dl in either the first or third trimester or levels below 10.5 mg/dl in the second trimester of pregnancy, anemia occurs. (Di Renzo et al., 2015; Stephen et al., 2018). Pregnant women who are anemic are more likely to experience LBW, bleeding before and during delivery, and, in severe cases, can even lose both the mother and the unborn child. It has a significant impact on both maternal and infant mortality rates. (Young, 2018), where based on Survei Demografi Kesehatan Indonesia (SDKI) 2007, the maternal mortality rate (MMR) of 228 per 100,000 live births, and the infant mortality rate (IMR) of 34 per 1,000. live birth (Badan Pusat Statistik et al., 2012).

Table 2. Crosstabulation of Hb levels and Previous History of Placenta Previa

Hb Level * PP Crosstabulation

			PP		Total
			Plasenta Previa	Tidak Plasenta Previa	
Hb Levels	Hb <11 gr/dl	Count	13	1	14
		Expected Count	5.6	8.4	14.0
		% within KadarHb	92.9%	7.1%	100.0%
		% of Total	13.4%	1.0%	14.4%
	Hb ≥ 11 mg/dl	Count	26	57	83
		Expected Count	33.4	49.6	83.0
		% within KadarHb	31.3%	68.7%	100.0%
		% of Total	26.8%	58.8%	85.6%
Total		Count	39	58	97
		Expected Count	39.0	58.0	97.0
		% within KadarHb	40.2%	59.8%	100.0%
		% of Total	40.2%	59.8%	100.0%

Table 3. Chi-Square Tests between Hb levels in gravida patients and Previous History of Placenta Previa

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	**18.866[a]**	**1**	**.000**		
Continuity Correction[s]	16.394	1	.000		
Likelihood Ratio	20.321	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	18.672	1	.000		
N of Valid Cases	97				

a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 5.63.
b. Computed only for a 2x2 table

Placenta previa increases the risk of maternal and infant mortality as well as morbidity because of the extensive bleeding. In addition to after a cesarean section, severe bleeding linked to placenta previa can also happen during pregnancy. (Takeda et al., 2020). The main complication that causes heavy and fatal bleeding due to placenta previa is the occurrence of placenta accreta due to the placenta being located in the lower uterine segment and causing trophoblast tissue to invade into the myometrium and then to the perimetrium and require a hysterectomy (Ali et al., 2018; Garmi & Salim, 2012).

Based on bivariate analysis with a chi-square of Hb levels in gravida patients with placenta previa, it shows a *p*-value = 0.000 ($p < 0.05$) so Ho is rejected and Ha is accepted. This indicates a significant relationship between Hb level in gravida patients and the incidence of placenta previa in gravida patients.

Another factor that can affect the frequency of placenta previa is the reduced vascularity of the placenta (Delli Pizzi et al., 2019; Firmansyah, 2017). The placenta with insufficient vascularization then expands to cover all parts of the birth canal (DS & Bird, 2017; Woods et al., 2018). Reduced vascularity in the placenta can be caused by a lack of Hb levels in pregnant women (Gebremeskel et al., 2020; Rai & Cross, 2014). Seeing from the results of the initial survey by observing the data from the obstetrical medical record section at RSI Sultan Agung Semarang, there was an increase in the incidence of placenta previa. The incidence of placenta previa in 2016 was 48 cases and in 2017 it increased by 114 cases.

By examining the data from the obstetrical medical record section at RSI Sultan Agung

Semarang, it is possible to infer from the results of the initial survey that there has been an increase in the incidence of placenta previa. In 2016, there were 48 cases of placenta previa, and there were 114 more cases in 2017. This study has several limitations, including the number of samples for data collection with a minimal sample size, where a higher sample size can still be found which will be related to the level of validity of the study. In addition, other risk factors for the incidence of placenta previa such as a history of abortion, distance births, and multiple pregnancies also need to be considered in this study.

4. Conclusions and suggestions

In conclusion, this observational study demonstrated a significant relationship between Hb levels in gravida patients and the incidence of placenta previa in gravida patients, low Hb levels (<11 mg/dl) increase the risk of placenta previa in gravida patients. Nevertheless, further studies are still required to confirm the result.

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