DESCRIPTION OF HEMOGLOBIN LEVELS IN PREGNANT WOMEN WITH COVID-19 BASED ON CHARACTERISTICS

Rosalinda Agnestya Indra[1], Neneng Martini[2], Ariyati Mandiri[3], Akhmad Yogi Pramatirta[4]

[1,2,3,4]Fakultas Kedokteran, Universitas Padjadjaran
email: rosalinda18001@mail.unpad.ac.id

ABSTRAK : DESKRIPSI KADAR HEMOGLOBIN PADA IBU HAMIL DENGAN COVID-19 BERDASARKAN KARAKTERISTIK

Latar Belakang: Coronavirus merupakan penyakit menular yang disebabkan oleh virus SARS-CoV-2. Pada tahun 2021 kasus coronavirus di Indonesia mencapai 4.251.945 jiwa. Pada periode April 2020 – Desember 2021, di RSHS terdapat 269 ibu hamil yang terinfeksi coronavirus. Ibu hamil termasuk salah satu kelompok orang yang rentan terkena virus ini. Selain rentan terkena coronavirus ibu hamil juga rentan terkena anemia.

Tujuan: Penelitian ini bertujuan untuk melihat gambaran kadar hemoglobin pada ibu hamil dengan COVID-19 di RSHS Bandung periode April 2020 – Desember 2021.

Metode: Metode penelititan ini adalah deskriptif dengan desain *cross-sectional* dengan pendekatan kuantitatif dengan menggunakan data sekunder yang diambil dari rekam medik RSHS Bandung pada periode April 2020 - Desember 2021. Teknik pengambilan sampel menggunakan total sampling. Besar sampel yang diambil dalam penelitian sebanyak 269 data ibu hamil. Analisis data menggunakan tabel distribusi frekuensi dan cross-tabulation.

Hasil: Hasil penelitian ini didapatkan bahwa 46% ibu hamil dengan COVID-19 mengalami anemia. Ibu hamil yang mengalami anemia berdasarkan usia paling banyak <20 tahun sebesar 29% dengan anemia sedang, kemudian untuk usia kehamilan terbanyak yaitu trimester I sebesar 33% dengana anemia berat, selanjutnya untuk paritas terbanyak yaitu grandemultipara sebesar 43% dengan anemia sedang.

Kesimpulan: Adanya perubahan imunologis dan hematologis pada masa kehamilan, hal ini menyebabkan ibu hamil lebih berisiko terhadap terinfeksi COVID-19 dan anemia, sehingga menyebabkan ibu hamil masuk ke dalam populasi yang berisiko.

Saran: Diperlukan penelitian yang lebih mendalam mengenai kadar Hb ibu hamil sebelum dan sesudah terpapar COVID-19 pada tahun yang sama di tempat yang berbeda.

Kata kunci: Covid-19, Ibu hamil, Kadar Hemoglobin.

ABSTRACT

Background: Coronavirus is an infectious disease caused by the SARS-CoV-2 virus. In 2021 coronavirus cases in Indonesia reached 4,251,945 people. In the period April 2020 - December 2021, at RSHS there were 269 pregnant women who were infected with the coronavirus. Pregnant women are one of the groups of people who are vulnerable to this virus. Apart from being susceptible to coronavirus, pregnant women are also susceptible to anemia.

Purpose: This study aims to see an overview of hemoglobin levels in pregnant women with COVID-19 at the Bandung Hospital for the period April 2020 – December 2021.

Method: This research method is descriptive with a cross-sectional design with a quantitative approach using secondary data taken from the medical records of RSHS Bandung in the period April 2020 - December 2021. The sampling technique uses total sampling. The sample size taken in this study was 269 data from pregnant women. Data analysis used frequency distribution tables and cross-tabulations.

Results: The results of this study found that 46% of pregnant women with COVID-19 experienced anemia. Pregnant women who experienced anemia based on age <20 years at most were 29% with moderate anemia, then for the most gestational age, namely the first trimester, 33% with severe anemia, then for the most parity, namely grandemultipara, 43% with moderate anemia.

Conclusion: There are immunological and haematological changes during pregnancy, this causes pregnant women to be more at risk of being infected with COVID-19 and anemia, thus causing pregnant women to enter the at-risk population.

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Suggestions: For future researchers, more in-depth research is needed regarding the Hb levels of pregnant women before and after being exposed to COVID-19 in the same year in different places.

Keywords: COVID-19, Pregnant women, Hemoglobin Levels

INTRODUCTION

Coronavirus is a group of viruses that enter through the respiratory tract and can cause disease in animals and humans. Several types of Coronavirus are known to cause respiratory infections in humans, ranging from coughs, colds to more serious ones such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). A new type of coronavirus discovered in December 2019 in Wuhan, China, namely SARS-CoV-2, causes the disease COVID-19 and has now become a pandemic occurring throughout the world (WHO, 2021). According to WHO, in 2021, COVID-19 cases in the world reached 254,256,432 people, while in Indonesia it reached 4,251,945 people (WHO, 2021).

One other vulnerable group is pregnant women, where hormonal and immunological changes occur which result in them being more susceptible to immunological diseases and infections with various viruses during pregnancy and after giving birth (Fuhler, 2020)

There are 47,244,379 pregnant women experiencing COVID-19 in the United States (Covid Data Tracker, 2021). Meanwhile in Indonesia, the Ministry of Health stated that 35,099 pregnant women were confirmed positive for COVID-19 (Ministry of Health of the Republic of Indonesia, 2021). In pregnant women there are changes in the hematological system including changes in blood and blood clotting. The blood volume in pregnant women increases to around 1500 ml consisting of 1000 ml of plasma and around 450 ml of red blood cells. Red blood cell production increases during pregnancy depending on the amount of iron available. Although red blood cell production increases, hemoglobin and hematocrit decrease. The decrease in Hb and hematocrit occurs due to rapid expansion of blood volume, making pregnant women vulnerable to anemia (Tyastuti, 2016). According to the 2019 Indonesian Health Profile, 48.9% of pregnant women in Indonesia experience anemia (Ministry of Health of the Republic of Indonesia, 2019). The West Java Health Service stated that in 2020 there were 63,246 pregnant women experiencing anemia. As many as 300 pregnant women with COVID-19 died in West Java until August 2021 (Dinkes Jabar, 2021).

The impact of anemia in pregnant women can be primary or secondary urinary tract disorders, uterine atony, retained placenta, wounds that are difficult to heal so that pelvic sepsis can occur, uterine involution disorders and postpartum depression. Meanwhile, from the perinatal side, anemia in pregnancy can cause poor pregnancy outcomes, including congenital abnormalities in the fetus, intrauterine growth restriction (IUGR), babies with low birth weight (LBW) and prematurity (Tyastuti, 2016). Covid in pregnant women affects Hb levels. During pregnancy, women are at risk of contracting viruses and respiratory illnesses, including COVID-19. SARS-Cov-2 infection which directly attacks the respiratory system causes respiratory failure, causing hypoxia in the body. Hypoxic conditions in the body will trigger inflammation and disrupt iron metabolism, where iron will be difficult for the body to absorb. This causes a decrease in iron levels for erythropoiesis and worsens anemia in pregnant women and can also result in multiorgan dysfunction syndrome in pregnant patients with COVID-19. This happens because Covid is an infection that is a factor in making anemia worse (Taneri, 2020) (Olga et al, 2020).

Regarding existing pathophysiology, this is in line with several studies which state that the majority of patients hospitalized due to COVID-19 have Hb levels lower than the normal range (Kemenkes RI, 2021). In another study, it was also stated that patients hospitalized with COVID-19 at a severe stage experienced anemia which had an impact on their quality of life (Posemah et al, 2021). The aim of this research is to find out what hemoglobin levels look like in pregnant women with Covid-19.

RESEARCH METHODS

This research uses a descriptive method with a cross-sectional design and a quantitative approach. The population in this study were pregnant women at RSHS Bandung with the target population in this study being pregnant women with Covid at Hasan Sadikin Hospital Bandung in April 2020 - December 2021. The sample in this study was pregnant women infected with COVID-19 at RSHS Bandung in April 2020 - December 2021 as many as 269 pregnant women. The sampling technique in this research is Total Sampling and the data required in

this research includes secondary data obtained from looking at medical record data at Hasan Sadikin Hospital, Bandung.

Before carrying out this research, researchers needed permission from several related parties such as the research ethics committee and permission from Hasan Sadikin Hospital, Bandung. The data analysis used in this research is univariate analysis which aims to explain or describe and obtain the frequency distribution of pregnant women. The results will be displayed using cross-tabulation to see an overview of hemoglobin levels in mothers infected with COVID-19.

RESEARCH RESULTS

Based on table 1, it was found that 53.9% of pregnant women with Covid-19 were not anemic. Meanwhile, pregnant women with Covid-19 experienced the most anemia, namely 25.3%.

Table 1
Frequency Distribution of Hb Levels of Pregnant Women with Covid-19 at RSHS Bandung Period April 2020 – December 2021

Variabel		Frequency (n)	Percentage (%)
Hemoglobin Levels	Normal	145	53,9
	Mild Anemia	49	18,2
	Moderate Anemia	68	25,3
	Severe Anemia	7	2,6

Table 2
Frequency Distribution of Characteristics of Respondents of Pregnant Women with Covid-19 at RSHS Bandung for the Period April 2020 – December 2021

Characteristics		Frequency (n)	Percentage (%)
Age	<20 years	14	5,2
	20-35 years	202	75,1
	>35 years	53	19,7
Gestasional age	Trimester I	3	1,1
	Trimester II	6	2,2
	Trimester III	260	96,7
Parity	Nulipara	79	29,4
	Primipara	96	35,7
	Multipara	87	32,3
	Grandemultipara	7	2,6

Based on table 2, it is found that the most data from ages 20-35 is 75.1% of pregnant women. In the gestational age category, it was in the third trimester group, namely 96.7%. The highest parity was 35.7% in the primipara category.

Based on table 3, it is found that the Hb levels of pregnant women during Covid-19. The age category that most often experiences anemia is <20 years old with moderate anemia at 29%. Meanwhile, in the gestational age category, there are still many pregnant women who experience severe anemia in the first trimester, as much as 33%. In the parity category, anemia is the most common, namely grandemultipara as much as 43% with moderate anemia.

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Table 3
Hb levels based on characteristics of pregnant women with Covid-19 at RSHS Bandung Period April 2020 – December 2021

Karakteristik	Kadar Hb								Total (%)
	Normal		Anemia						
			Ringan		Sedang		Berat		
	f	%	f	%	f	%	f	%	
Usia									
<20 tahun	8	57	1	7	4	29	1	7	100
20-35 tahun	109	54	36	18	52	26	5	2	100
>35 tahun	28	53	12	23	12	23	1	1	100
Usia Kehamilan									
Trimester I	2	67	0	0	0	0	1	33	100
Trimester II	3	50	2	33	0	0	1	17	100
Trimester III	140	54	47	18	68	26	5	2	100
Paritas									
Nulipara	45	54	11	14	23	29	2	3	100
Primipara	55	57	19	20	19	20	3	3	100
Multipara	46	53	17	20	23	26	1	1	100
Grandemultipara	1	14	2	29	3	43	1	14	100

DISCUSSIONS

Research results based on the age characteristics of pregnant women infected with COVID-19 at RSHS Bandung in 2020 - 2021, the majority of respondents were in the 20-35 year age range, amounting to 75.1%, namely the healthy reproductive age range. Healthy reproductive age according to the BKKBN is the best time range for a mother to give birth, namely between the ages of 20 – 35 years. This is because at the age of 20 – 35 years the body's working system is functioning normally. At less than 20 years of age, the mother's reproductive system cannot function optimally because it is still in the process of growing. At the age of more than 35 years, the physiological function of the mother's body begins to decline. This is a risk that can result in complications if the mother's age is less than or more than 35 years (Rahayu, 2017). Furthermore, the highest gestational age category was in the third trimester, namely 96.7%. This happens because RSHS is a referral hospital in West Java, so many pregnant women who are about to give birth first undergo a Covid-19 checking procedure (RSHS, 2019). The results of this study also show that 46% of pregnant women with Covid-19 experience anemia. This occurs due to several factors, namely during pregnancy there are physiological changes including the immunological and hematological systems (Posemah et al, 2021).

Based on research conducted by researchers, it can be seen that most pregnant women with COVID-19 who experience anemia are aged < 20 years with moderate anemia, namely 29%. This happens because the mother's reproductive system cannot function optimally and is still in the process of growing, so it needs iron for the fetus and itself (Olga et al, 2020). In the gestational age category, anemia is the most common in the first trimester with severe anemia at 33%. Anemia in the first trimester can be caused by loss of appetite, morning sickness, and the start of hemodilution at 8 weeks of pregnancy so that the first trimester can make you twice as likely to experience anemia (Permatasari, 2021). Meanwhile, in the parity category, the majority of pregnant women experienced moderate anemia in grandemultipara, 43%. Grandemultipara parity is a woman who has given birth to a viable (live) baby more than five times. This is in line with research that shows that parity has a significant influence on the incidence of anemia, where the more frequently a mother gives birth, the frequency of iron in the mother's body decreases, which results in a decrease in Hb levels which makes the mother suffer from anemia during pregnancy (Permatasari, 2021).

In pregnant women, blood changes and blood clotting occur. Blood volume in pregnant women increases by around 1500 ml, consisting of 1000 ml plasma and around 450 ml red blood cells. This increase in blood occurs around the 10th to 12th week. The function of the increase in blood is as the body's defense against hypertrophy of the vascular system due to enlargement of the uterus, hydration of tissue in the fetus and mother when the pregnant woman is standing or lying down and fluid reserves to replace blood lost during pregnancy. childbirth and

postpartum. Peripheral vasodilation occurs in pregnant women which functions to maintain normal blood pressure even though blood volume in pregnant women increases. HR production increases during pregnancy. Even though HR production increases, hemoglobin and hematocrit decrease, this is called physiological anemia in pregnant women. The fastest expansion of blood volume occurs during the second trimester of pregnancy. The lowest Hb occurs at 20 weeks of gestation and then increases slightly until the pregnancy is full term (Tyastuti, 2016)

When the Covid-19 virus attacks the immune system, the reaction that occurs is that the innate immune system activates hepcidin. Hepcidin is a key regulator of iron entry into the blood circulation which functions to inhibit ferroportin. Meanwhile, ferroportin itself is a transmembrane protein that transports iron from inside the cell to outside the cell, resulting in iron being blocked in reticuloendothelial macrophages and ultimately decreasing HB levels in the blood. Apart from that, the Covid-19 virus can attack the respiratory system, causing the lower respiratory tract to secrete pulmonary infiltrates, thus worsening the circulation of oxygen and carbon dioxide. Because the virus enters through the respiratory system and causes failure in the respiratory system which then causes hypoxic conditions. Furthermore, inflammation and changes in iron metabolism occur which result in HB levels in the blood continuing to decrease, causing anemia (Taneri, 2020) (Olga et al, 2020).

The research results cannot state that anemia occurs due to COVID-19, there are several other factors that can influence or cause anemia, such as age, gestational age. and parity. Apart from that, there is some data on mothers who have experienced anemia and bleeding.

CONCLUSIONS

The results of this study stated that 46% of pregnant women infected with Covid-19 experienced anemia with the most age characteristics being <20 years, 29% with moderate anemia, then for the highest gestational age, namely the first trimester, 33% with severe anemia, then for parity. The largest number is grandemultipara at 43% with moderate anemia.

SUGGESTION

For pregnant women, it is hoped that the results of this research will provide an idea of how to pay attention to nutritional intake and optimal age during pregnancy to avoid anemia during pregnancy. For future researchers, more in-depth research is needed regarding the Hb levels of pregnant women before and after being exposed to COVID-19 in the same year in different places.

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