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Mortality of the Pregnant Women with COVID-19 at Referral Hospitals in Central Java, Indonesia

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Abstract

APregnant women have a high potential for infections, including Covid-19. This study analyses the characteristics and outcomes of 95 maternal deaths caused by COVID-19. This observational-retrospective study descriptively analysed 95 maternal deaths due to COVID-19. The study took time in June – July 2021 at the COVID-19 Referral hospitals in Central Java Province. The study found that most of these deaths occurred in women between the ages of 20 to 35, with 74% falling in this age range. Furthermore, the study found that 63.2% of the patients required treatment for more than 48 hours. The study also noted that almost all of the women who died (98.9%) had not been vaccinated against COVID-19. Of the patients who received treatment, 73.7% received standard therapy. Additionally, 55.8% of the patients had a moderate condition when admitted to the hospital. More than half of the patients (52.6%) died in the intensive care unit (ICU). Furthermore, 63.2% of the patients arrived at the hospital alone. This data may suggest that some of these women were not receiving adequate support or medical care before hospitalisation.

Introduction

Novel coronavirus infection (SARS-CoV-2) was first reported by the Chinese Government in Wuhan, Hubei, China, to the World Health Organization (WHO) on Friday, December 31, 2019. This virus is transmitted between humans, has an incubation period of 2-14 days and is potentially symptomatic or asymptomatic. This virus has spread to most countries worldwide, so the WHO on March 11, 2020, declared the new coronavirus disease (COVID-19) a global pandemic (Sharma et al., 2021). The first case of SARS-CoV-2 infection was reported in Indonesia on March 2, 2020, while the first case of COVID-19 in the city of Semarang in adults was reported on March 17, 2020, and in infants on March 6, 2020 (van Empel et al., 2020, Pramana et al., 2020, Sumarni et al., 2020). Pregnant women have a high potential for infections, including SARS-CoV-2, due to physiological and mechanical changes during pregnancy and decreased immunity. If the respiratory system is disturbed, it will accelerate the occurrence of pathological conditions of respiratory failure (Yu et al., 2020).

In the June-July 2021 period, deaths due to COVID-19 in Indonesia have increased, it is in line with the high addition of daily COVID-19 cases in Indonesia, which is more than 1000 cases per day (Widiawaty et al., 2022). One of the factors causing the soaring mortality rate in Indonesia is the delay in handling COVID-19 in hospitals. Based on the monitoring of the Ministry of Health of the Republic of Indonesia, cases of death in

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hospitals occur faster than before the spike in cases. The high cause of death indicated that the patient came late to the hospital (Sujarwoto & Maharani, 2022). It is caused by increase dead on arrival at the emergency department (IGD). In early 2021 the average COVID-19 patient died after receiving treatment in the ICU/ isolation ward and had average case fatality rate in the hospital after 8 days of treatment. However, this is different when entering the months of June-July 2021, with the average death being 3-4 days after treatment. In early 2021 on average, COVID-19 patients died in the ICU, and only 1%-2% occurred in the emergency room (IGD), but in June-July 2021, almost 20% of deaths occurred in the ER (Surendra et al., 2021). Some cases of patients dying before receiving treatment at the hospital came in conditions of low oxygen saturation (<80%) (Allotey et al., 2021). The cumulative number of deaths (pregnant and non-pregnant women) of Covid-19 during the study period has reached 32,061 cases. That number is four times higher than in June 2021, with a total of 7,913 deaths (Ekawati et al., 2022).

Pregnant women are a group that is vulnerable to contracting COVID-19, where the condition of pregnancy occurs when there is a partial decrease in immunity due to physiological changes during pregnancy and can cause serious problems for pregnant women (Pramana et al., 2020, Dashraath et al., 2021). Based on previous research, SARS and MERS viruses in pregnant women have a high risk of death, spontaneous miscarriage, premature birth, and IUGR (Intrauterine Growth Restriction) with a fatality rate of 25% and 40% with several risks such as premature rupture of membranes, premature birth, tachycardia fetus, and fetal distress (Karimi-Zarchi et al., 2020). In a detailed analysis of published reports of 38 pregnant women with COVID-19, of whom 37 had rt-PCR-confirmed SARS-CoV-2 infection, no cases of severe pneumonia or maternal death were found in the respondents (Schwartz, 2020).

Despite the presence of comorbid conditions in some women of obstetric aetiology, they do not appear to result in life-threatening maternal SARS-CoV 2 diseases. It is therefore, vital to recognize that comorbid maternal conditions, including preeclampsia, pregnancy-induced hypertension, uterine scarring, gestational diabetes, and uterine atony, do not appear to be risk factors for intrauterine transmission of SARS-CoV-2 to the fetus. The increase in the maternal and infant deaths also occurred during the COVID-19 pandemic (Allotey et al., 2021). Based on data from the Directorate of Family Health, Ministry of Health of the Republic of Indonesia, as of September 14, 2021, 1086 mothers died with positive PCR/antigen swab results (Akbar et al., 2022).

A total of 42,344,675 people have received the first dose of Covid-19 vaccination in Indonesia. An increase of 249,144 from Monday's data (July 19, 2021) shows that there are still 42,095,531 people. The recipients of the Covid-19 vaccination up to the second dose have now reached 16,451,288 people. Meanwhile, the national vaccination target is 208,265,720 (Utami et al., 2022). Based on the above problems related to cases of maternal mortality in hospitals, the researcher intends to further examine the factors that influence the mortality of pregnant women at the COVID-19 referral hospitals in Central Java Province.

Method

This research is quantitative research with an analytical descriptive approach. It took places on the COVID-19 referral hospitals in the province of Central Java, Indonesia, namely Dr. Kariadi Hospital Semarang, Dr. Moewardi Hospital Surakarta, Dr. Adyatma Hospital Tugurejo Semarang; KRMT Wongsonegoro Hospital, Semarang; Dr. Margono Hospital Purwokerto; Brebes Hospital; Dr. Soedjati Hospital Grobogan; Dr. R. Soetrasno Hospital Rembang; RAA Soewondo Hospital Pati and Kalijaga Hospital, Demak. The study involved pregnant women with COVID-19 who were treated and died in a referral hospital from June to July 2021. The independent variables in this study were susceptibility, namely the status of pregnancy at an age too young or too old (< 18 years or > 35 years) and having a history of comorbidities. Comorbidity is a condition in which a person suffers from two or more diseases. The disease is generally chronic such as hypertension, diabetes mellitus or other

diseases. The level of emergency, the status of patients when they come to the hospital (mild/moderate/severe Covid-19 symptoms; requires an isolator/without isolator room); and the provision of therapy, namely any therapy the respondent has received while in the hospital.

The subjects were 95 pregnant women who died of COVID-19 in Central Java referral hospitals during the study period from Juni-July 2021. Data obtained from the results of recording; reporting and epidemiological investigation of COVID-19 cases in 10 referral hospitals in Central Java province. Data collection was by each officer at the COVID-19 referral hospitals in Central Java province by the agreed reporting template, and coordinated with the Central Java Province COVID-19 task force team. In this study, the patient's data and information were not published and kept confidential. This study includes cases of maternal deaths with COVID-19 in June-July 2021. Patients were diagnosed with COVID-19 based on confirmation of positive RT-PCR test results. Parameters recorded were gestational age, comorbid, length of treatment, vaccination status, type of therapy, condition when the patients come to the hospital, location of the date, and referral type. Then the collected data were analysed descriptively using Microsoft Excel. This research has received approval and meets the ethical standards of research from the Ethics Committee of the Faculty of Public Health, Diponegoro University, Semarang No: 346/EA/KEPK-FKM/2021.

Results and Discussion

Table. 1 Overview of Patient Characteristics

Variable		**f**	**%**
Gestational age	**Too Young/Too Old**	24	25.3
	Safe age (20-35 years old)	71	74.7
Comorbid	**Have 1 or more comorbidities**	46	48.4
	No	49	51.6
Length of Treatment	**≤ 48 hours**	35	36.8
	> 48 hours	60	63.2
Vaccination status	**Not vaccinated yet**	94	98.9
	Vaccine dose 1	1	1.1
Type of Therapy	**Has not been recorded given therapy services**	19	20.0
	Standard	70	73.7
	Convalescent Plasma	5	5.3
	IVIG	1	1.1
Condition when the patient comes to the hospital	Not screened yet	1	1.1
	Severe	34	35.8
	Moderate	53	55.8
	Mild	7	7.4
Location of Death	**DOA**	18	18.9
	Emergency Room	6	6.3
	Isolation Room	21	22.1
	ICU non-ventilator	19	20.0
	ICU ventilator	31	32.6
Referral Type	Come Alone	60	63.2
	Public health center	16	16.8
	Another Hospital	19	20.0

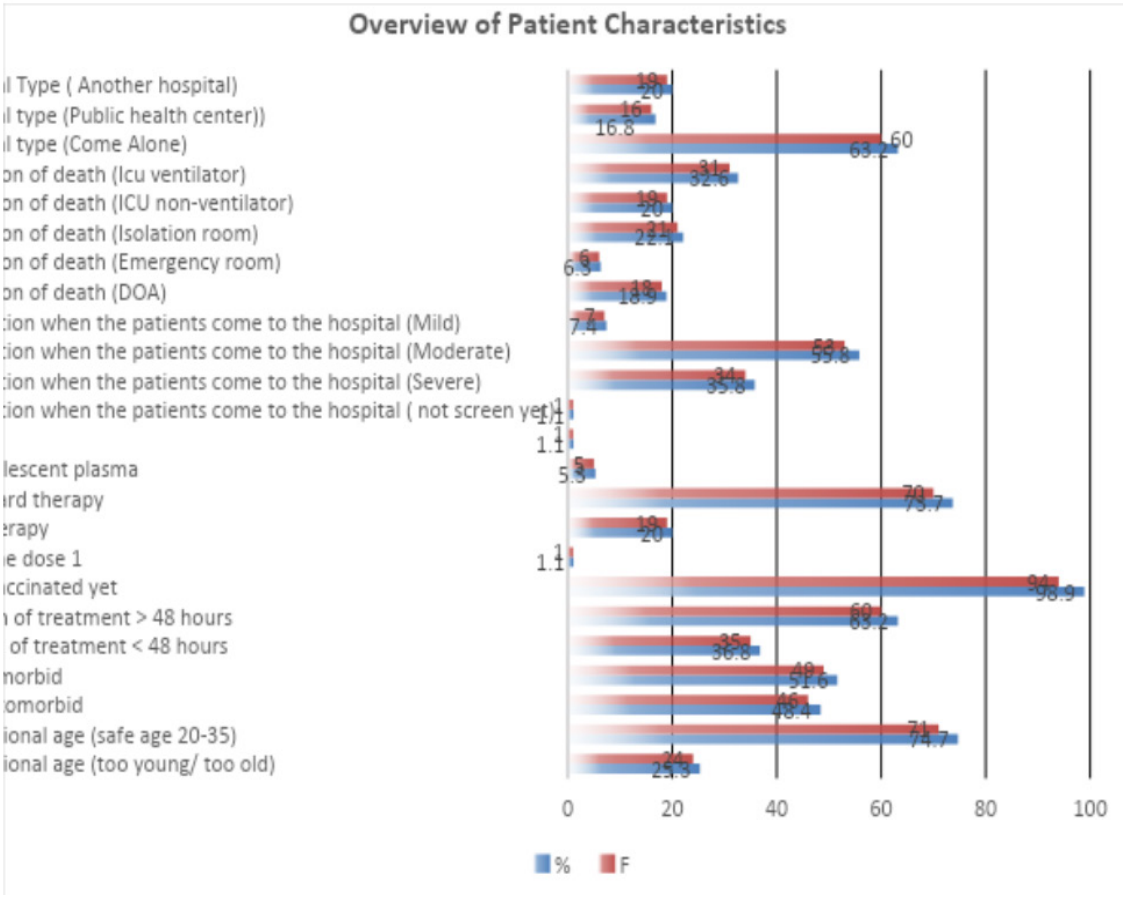

Figure 1. Describing the characteristics of the patient

Table 1 and Figure 1 show the distribution of patient characteristics. A total of 71 respondents (74.7%) had a pregnancy at a safe age (20-35 years), and 24 respondents (25.3%) had a pregnancy at a risky age (too young/too old). 98.9% of patients have not been vaccinated, and only 1.1% have received the first dose of the vaccine. The type of therapy received was 73.3% standard, 5.3% convalescent plasma, and 1.1% IVIG (intravenous immunoglobulin). Standard therapy is NaCl infusion, empiric antibiotics with levoflaxcine 1 × 750 mg, azithromycin 1 × 500 mg, and antiviral Oseltamivir 2 × 75 mg. SpO2 must be maintained at 95% saturation. If SpO2 drops below 95%, blood gas analysis is required Oxygen therapy until the target O2 saturation is at least 95%. About 20% there is no data on the type of therapy given. 55.8%, or 53 respondents, came to the hospital with a moderate illness, and 35.8% with a critical condition. We found that 18.9% of pregnant women died on arrival at the ER (dead on arrival/ DOA or died in our emergency department / ED) and died while receiving treatment in the ER (6.3%). There were 60 patients (63.2%) who came alone to the hospital, and others were referrals from Community Health Centers/ Puskesmas (16.8%) and other hospitals (20.0%).

The ability to organize surge capacity adequately in hospitals would be able to control the risk of death due to Covid-19 because the ICU does not overflow and more prepared (pandemic-ready) to provide early treatment in the form of ICU access and ventilators for critical patients due to Covid-19, such as in Singapore and Belgium (Chew et al., 2020, Taccone et al., 2021). In several hospitals in major cities in Central Java, the bed occupation ratio (BOR) of Covid patients treated in the ICU during the July-August 2021 period was reported to exceed 100%, even though based on data collection in the online Hospital Information System (Sistem Informasi Rumah Sakit/SIRS), the total capacity of 1361 beds for ICU occupied 81.63% as of July 1, 2021, and in fact, the occupancy has decreased to around 62.02% of the total capacity of 1535 beds in Central Java.

Adequate oxygen therapy is also an aspect that determines the success of saving the lives of Covid 19 patients (Ospina-Tascón et al., 2022, Yarnell & Sklar, 2022). This oxygen therapy certainly requires speed & adequacy of its supply and distribution. The problem is out of stock supplies of medical oxygen occur globally and nationally, which encourages the government to make policies to secure the adequacy of supply (Mart et al., 2022). The scarcity of medical oxygen is also experienced by most hospitals in Central Java, as reported in SIRS online for the period July – August 2021, there were fluctuations in medical oxygen stock deficits ranging from 30-45% of the total requirement of around 424,940 m3/day (Central Java Covid-19 Task Force, 2021)

Pregnant women and comorbid diseases (hypertension and diabetes mellitus) are risk factors for SARS-CoV-2 infection (Wei et al., 2021). Based on data from the Indonesian Obstetrics and Gynecology Association (POGI), as many as 13.7% of pregnant women are more susceptible to SARS-CoV-2 infection than women who are not pregnant (Purwono et al., 2023). During pregnancy, there are changes in the immune system and physiological changes in the body. Therefore, WHO recommends that if there are pregnant women with symptoms of COVID-19, should be prioritized to undergo RT-PCR examination (Mirbeyk et al., 2021). Factors that make it easier for pregnant women to become infected with SARS-CoV-2 are having a history of traveling/ living in a country/territory of Indonesia which is a local transmission, a history of contact with confirmed/probable cases of being infected with SARS-CoV-2 and a history of contact with animals infected with SARS-CoV -2 (Jamieson & Rasmussen, 2022). In addition, both normal pregnancy and COVID-19 are marked by a decrease in lymphocytes, so pregnant women are susceptible to infection with SARS-CoV-2 (Phoswa & Khaliq, 2020). In the emergency management variable, there are indicators of the patient condition coming to the hospital in a mild, moderate, severe, or critical. Our research is a case of the death of pregnant women in the second wave of the COVID-19 pandemic in Indonesia, especially those admitted to COVID-19 referral hospitals in central Java-Central province.

The Indonesian Obstetrics and Gynecology Association (POGI) noted that 20 percent of the deaths of pregnant women (pregnant mothers) in the last 17 months were those infected with COVID-19. In the era of the pandemic, maternal deaths with COVID-19 contributed 20 percent to the maternal mortality rate in Indonesia. In fact, within July 2021, it tripled (Helmyati et al., 2022). In cases of death of pregnant women due to COVID-19, it could occur due to late handling because of the labour force. Health care providers did not have much guidance on monitoring pregnant women for COVID-19 or how to care for the infected. In addition, many pregnant women did not receive optimal care when their immune systems are compromised, resulting in a critical condition for pregnant women taken to a referral hospital. Moreover, pregnant women were not served when they need hospitalisation/oxygen therapy if they are infected with COVID-19 (Villar et al., 2021).

The indicator of the length of stay is closely related to existing health service facilities. Currently, there is no specifically-designated COVID-19 hospital for pregnant women. So pregnant women still find it difficult to get help when infected with COVID-19. It is also quite hard to get help for consultation and treatment to the problem of childbirth needs in the pandemic era that causes cases of pregnant women dying. For example, in Boyolali, 18 pregnant women in Boyolali died from COVID-19, with most cases occurring in Nogosari and Sambi Districts. In Nogosari District, with 585 pregnant women, 23 pregnant women were affected by COVID-19, and 5 died. Meanwhile, in Sambi District, the number of pregnant women was 384, 14 were affected by COVID-19, and 5 died. Cases of pregnant women exposed to the Coronavirus require special handling by skilled health workers handling COVID-19 and adequate health facilities. In Boyolali, only one hospital is used as a reference for treating pregnant women affected by COVID-19, namely the Pandan Arang Regional General Hospital (RSPA) Boyolali, which is quite far from the area. So emergency handling often occurs that is less than optimal because the condition of

the patient when he arrives is already critical (Anggraeni et al., 2023). In addition, there are already evidence-based policies regarding COVID-19 in pregnant women, including the CDC (Centers for Diseases Control and Prevention), which states that pregnant women will experience more severe conditions than women who are not pregnant and thus require hospitalization, intensive care, or ventilator and other breathing apparatus (Nana et al., 2022).

A retrospective observational cohort study of pregnant and postpartum women with COVID-19 admitted to the BYL Nair Charitable Hospital, a COVID-19 referral hospital in the Mumbai Metropolitan Area, reports: The number of pregnant and postpartum women admitted to batch one was 1,143 and in batch 1 the second as many as 387 cases. Severity, ICU care and maternal mortality rates were higher in the second wave. The majority of maternal deaths are due to COVID-19 pneumonia and respiratory failure (Mahajan et al., 2021). In our study, 50 cases of death occurred in the ICU, 34 patients came to the hospital in severe condition and 53 cases were moderately ill.

A Brazilian study included 2284 hospitalised pregnant and postpartum women with severe COVID-19, those who: had received two doses of the COVID-19 vaccine had a 46% reduction in the odds of ICU admission, an 81% reduction in the likelihood of invasive ventilation support, and an 80% reduction in the likelihood of death compared to those who did not receive the COVID-19 vaccination (de Freitas Paganoti et al., 2022). Our study reported that out of 95 maternal deaths, 94 had never been vaccinated and one case had been vaccinated once.

Weaknesses in this study, it did not report the total number of pregnant women with COVID-19 who were admitted to the referral hospital, both those who were treated later healthy and those who died. The types of patient comorbidities have also not been reported in detail, such as hypertension, diabetes mellitus, lung disease, heart disease, and others. This allows future research to be carried out with more complete data.

Conclusion

In this study, we found that most patients treated at the referral hospital for COVID-19 in Central Java were aged 20-35 years, most of the patients had never received a COVID-19 vaccination and mostly died in the ICU.

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