



Analysis of Causes of Maternal Death in East Java Province, Indonesia

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Abstract

BACKGROUND: The maternal mortality rate is an indicator that reflects the mother's health status, especially the risk of death for the mother during pregnancy and childbirth. Measles, Mumps, and Rubella (MMR) has a close relationship with efforts to increase human development. Therefore, efforts are needed to reduce MMR by identifying the factors that influence MMR.

AIM: The aim of the study was to analyze the factors causing the incidence of Maternal Death in East Java Province.

METHODS: The research design used in this research is a quantitative research using descriptive-analytical. The population of this research is districts/cities in East Java Province, with a sample of 38 districts/cities. The research period starts from August to September 2021. Data analysis using grouping and percentage of cases.

RESULTS: The results of the study found that cases of maternal death in East Java due to postpartum hemorrhage in 2021 were 131 cases. Cases due to hypertension as many as 115 cases. Cases due to infection as many as 25 cases. The incidence of maternal death due to abortion is 1 case. There were 13 cases of maternal death due to blood disorders. There were 6 cases of maternal death due to metabolic disorders — cases of maternal death due to Heart as many as 54 cases. Maternal deaths due to COVID-19 were 793 cases.

CONCLUSION: Factors causing maternal death in East Java Province, namely, hypertension bleeding, infection, abortion, blood disorders, heart metabolic disorders, and COVID-19. The most influential factor in maternal mortality in 2021 is COVID-19.

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Introduction

Measles, Mumps, and Rubella (MMR) is one of the essential focuses listed in the Sustainable Development Goals (SDGs) because the maternal mortality rate can represent the health status of the community in an area [1]. The maternal mortality rate (maternal) and infant mortality rate is one measure of the health progress of a country, especially those related to maternal and child health problems. The maternal mortality rate is an indicator that reflects the mother's health status, especially the risk of death for the mother during pregnancy and childbirth. The data show a downward trend in the MMR indicator (per 100,000 live births) from 390 in 1991 to 230 in 2020, or a decrease of -1.80% per year. Despite the decline, the MMR still has not reached the 2015 Millennium Development Goal (MDG) target, 102, and the 2030 SDGs, less than 70 per 100,000 live births [2]. The IMR indicator shows a downward trend from 68 in 1991 to 24 in 2017 or a decrease of -3.93% per year [3]. In the COVID-19 pandemic, maternal and infant mortality rates have soared. The maternal mortality rate increased by 300 cases from 2019 to around 4400

deaths in 2020, while infant mortality in 2019 was around 26,000 cases, increasing almost 40% to 44,000 cases in 2020 [4]. MMR by the province in Indonesia that the MMR value is shallow is widely spread on the island of Sumatra (2019), and then in 2020, it is spread in Western, Central, and Eastern Indonesia. Provinces with the highest MMR values in 2019 included West Papua, North Kalimantan, Gorontalo, North Maluku, and Central Sulawesi. Meanwhile, the provinces with the lowest MMR are DKI Jakarta, South Sumatra, DI Yogyakarta, North Sumatra, and Bali. In 2020, the highest MMR include the provinces of Bangka Belitung, West Sulawesi, Riau Islands, Aceh, and East Nusa Tenggara. Meanwhile, the provinces with the lowest MMR are North Sumatra, Central Java, Lampung, North Maluku, and South Sumatra [5]. The challenges to the decline in the MMR and IMR are getting stricter with the COVID-19 pandemic in early 2020. COVID-19 causes restrictions on community activities transportation facilities, and fears of being infected can prevent women from getting maternal and child health services in terms of access and quality of services [6].

So it is feared that there will be an increase in maternal and child morbidity and mortality and a decrease

in the coverage of maternal and child health services (MCH), family planning (KB), and nutrition. Java Island is one of the large islands in Indonesia with the largest population. According to the 2020 Population Census conducted by the Central Statistics Agency, the population of Java Island was recorded at 151.59 million of the total population of Indonesia of 270.20 million. That is, 56.10% of Indonesia's population is on the island of Java [7].

The reality is that the MMR in Java is still relatively high at 247 [8]. Many factors can cause death in pregnant women, one of which is due to the lack of examinations on pregnant women carried out by trained medical personnel (midwives, doctors, and specialists) so that many cases with pregnancy complications are not detected [9]. Several studies say that the cause of the high incidence of maternal mortality is inequality in the use of antenatal care (ANC) and unskilled delivery assistance [10], [11]. In addition, heart disease and a history of other diseases tend to contribute to the incidence of maternal mortality [12]. In addition to pregnancy complications and obstetric complications, factors that influence maternal mortality include Infection, pregnancy poisoning, complications due to prolonged labor, birth trauma, lack of awareness of mothers to get ANC, and limited knowledge of mothers about the dangers of high-risk pregnancies [13].

Factors that do not support health services also significantly affect maternal mortality, namely, the low coverage of delivery assistance by health workers, the referral mechanism from the Puskesmas to the hospital is not good [14]. East Java Province is included in the six regions contributing to Indonesia's highest maternal mortality rate or 50%. MMR giving birth in East Java (East Java) is currently recorded at 97.39/100,000 live births. This figure is lower than the provincial target of 102/per 100,000 live births. Since the population of East Java is very large, namely 38 million people, the absolute value of death is relatively high, although the numbers are smaller than in other provinces. Therefore, this study analyzes the Maternal Mortality Factors in East Java Province.

Methods

The research design used in this research is a quantitative research using descriptive-analytical. The data in this study are secondary data obtained from the results of the AKI recapitulation of the East Java Provincial Health Office. The data consist of causes of maternal death, which are summarized in 38 districts and cities in the province of East Java. The population of this research is districts/cities in East Java Province, with a sample of 38 districts/cities. The research period starts from August to September 2021. Data analysis using grouping and percentage of cases. This research has met the ethical requirements of research.

Results and Discussion

Factors causing maternal death in east java province

Maternal death due to postpartum hemorrhage

Postpartum hemorrhage is the highest cause of death in pregnant women. The leading cause is the open blood vessels in the uterus, where the placenta attaches when the mother is still carrying blood [15]. Postpartum bleeding is dangerous because it threatens the mother's life during childbirth. Postpartum hemorrhage is also at risk for pregnant women with rare blood group conditions, a history of blood disorders, or postpartum hemorrhage in previous births [16].

Maternal death in East Java due to postpartum hemorrhage in 2021 was high. Most cases of maternal death occurred in Jember Regency as many as nine people and Surabaya City as many as eight people (Figure 1). Bleeding must make the body weak because of the large amount of blood wasted from the body. As an emergency measure, the mother received a blood transfusion. In some cases, the bleeding can make the mother anemic, so it takes much rest to recover [17] entirely to speed up recovery by prescribing iron-boosting vitamins and folic acid.

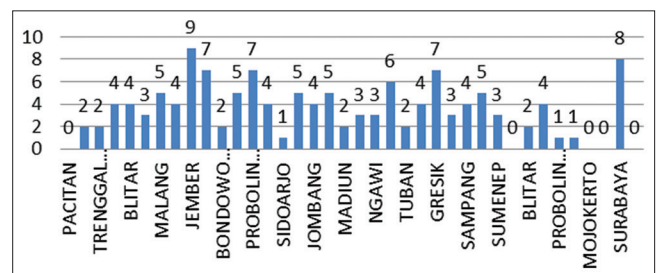


Figure 1: Maternal death due to bleeding

Death due to hypertension

Hypertension or high blood pressure will be the leading cause of premature death worldwide by 2020; the WHO estimates that at least 1.13 billion people worldwide suffer from hypertension [18]. Data from the World Health Organization (WHO) in 2015 showed that around 1.13 billion people in the world have Hypertension, meaning that 1 in 3 people in the world is diagnosed with hypertension. The number of people with hypertension continues to increase every year; it is estimated that in 2025 there will be 1.5 billion people affected by hypertension, and it is estimated that every year 9.4 million people die from hypertension complications. Riskesdas 2018 stated that the prevalence of Hypertension based on measurement results in the population aged 18 years was 34.1 %, the highest was in South Kalimantan (44.1%), while the lowest was in Papua (22.2%) [19].

The estimated number of hypertension cases in Indonesia is 63,309,620 people, while the death rate in Indonesia due to hypertension is 427,218 deaths. Hypertension occurs in the age group 31–44 years (31.6%), age 45–54 years (45.3%), and age 55–64 years (55.2%). From the prevalence of hypertension of 34.1%, it was known that 8.8% were diagnosed with hypertension and 13.3% of people diagnosed with hypertension did not take medication, and 32.3% did not take medication regularly. This shows that most people with hypertension do not know that they are hypertension, so they do not get treatment.

Maternal deaths in East Java due to hypertension in 2021 were 115 cases. Most cases of maternal death occurred in Jember Regency as many as 15 people and Sampang as many as 11 people (Figure 2). Hypertension is called the silent killer because it is often without complaints, so the patient does not know he has hypertension and is only known after complications occur. Target organ damage due to complications of hypertension will depend on the magnitude of the increase in blood pressure and the duration of the undiagnosed and untreated blood pressure condition [20].

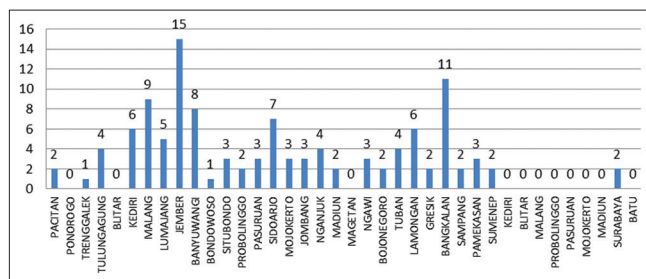


Figure 2: Death due to hypertension

The body's targeted organs include the brain, eyes, heart, kidneys, and they can also affect peripheral arteries. Hypertension can be prevented by controlling risky behaviors such as smoking, unhealthy diets such as fewer vegetables and fruit, excessive sugar, salt, and fat, obesity, lack of physical activity, excessive alcohol consumption, and stress. Riskesdas 2018 data on residents aged 15 years and over obtained data on risk factors such as the proportion of people who eat fewer vegetables and fruit by 95.5%, the proportion of lack of physical activity 35.5%, the proportion of smoking 29.3%, the proportion of central obesity 31%, and the proportion of general obesity is 21.8%. The data above show an increase when compared to the 2013 RISKESDAS data.

Death due to infection

The maternal mortality rate who died during childbirth in Indonesia is still high, namely, around 359 mothers who died out of 100,000 births. This number is still far from the government's target in accelerating the achievement of the MDG target, which is to reduce the maternal mortality rate to 102/100 thousand live births in 2015. Infection can occur if bacteria enter a

pregnant woman's body and her body cannot fight back. Some infections can lead to maternal death after delivery [21], [22]. Pregnant women infected with group B Streptococcus bacteria can experience sepsis (blood infection). This sepsis can then attack the immune system and cause severe problems to death. Sometimes, sepsis can cause blood clots in pregnant women, blocking blood flow to critical maternal organs, such as the brain and Heart [23]. This can then lead to organ failure and even death.

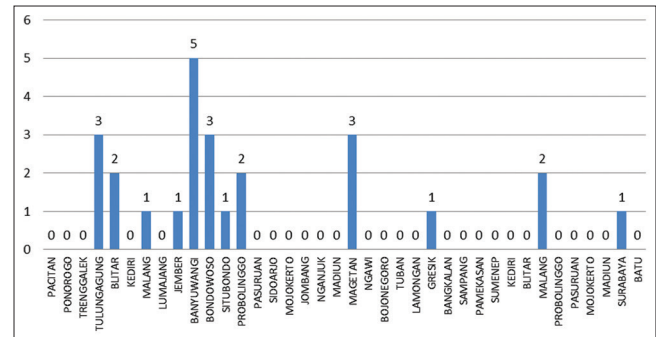


Figure 3: Maternal death due to infection

Cases of maternal death in East Java due to Infection in 2021 were high. Most cases of maternal death occurred in Bayuwangi Regency as many as five people, Bondowoso 3 people, and as many as three people (Figure 3). Women can develop infections from unsafe abortions, unhealthy deliveries, or prolonged labor. In addition, the lack of understanding and information about how to clean the feminine area or body care after childbirth can put the mother at risk of Infection. If this Infection is not treated correctly, it can cause the mother's death during childbirth.

Death due to abortion

Risk factors for Abortion according to maternal characteristics include age, parity, history of previous abortion, psychosocial economic status, education, and occupation [24]. According to the IDHS in 2012, the incidence of Abortion in Indonesia was 1.6 %. Abortion in Indonesia occurs in women under the age of 20 years, and about 2.3 million abortions occur every year in Indonesia. The causes of Abortion itself are pretty diverse, including the condition of the mother's womb, maternal psychology, chromosomal abnormalities, consumption of drugs, parity, marital status, economic status, and age [25].

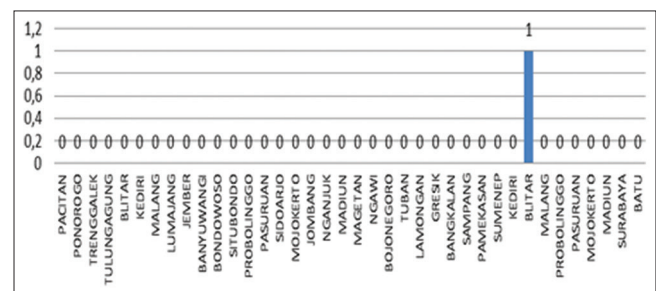


Figure 4: Death due to abortion

The case of maternal death in East Java due to Abortion in 2021 is 1 case. This case occurred in Blitae district as many as one person (Figure 4). The first cause of abortion is the abnormal growth of the products of conception, which is the most common cause of abortion at gestational age before 8 weeks. Some of the factors that cause this disorder include chromosomal/genetic abnormalities, the environment in which the products of conception are attached that are not good or not perfect. Judging from the conditions and handling, abortion is classified into six types. These include complete Abortion, incomplete abortion, insipient abortion, imminent abortion, missed abortion, and habitual abortion. For prevention, Moms need to carry out a comprehensive and detailed examination.

Death due to blood disorders

Blood disorders or blood disorders occur in one or several parts of the blood to affect the amount and function [26]. Blood disorders can be acute or chronic that contains both liquid and solid substances. The liquid part is called blood plasma. More than half of the blood is blood plasma. At the same time, the solid part is the blood cells consisting of red blood cells, white blood cells, and blood platelets (platelets). Blood disorders can occur when there is a problem with one or more blood functions in the body [27].

In most cases, the disorder is passed down in families. Parents pass on abnormal genes to their children, resulting in specific genetic mutations that can lead to several conditions, such as sickle cell anemia, hemophilia, and certain thrombophilias. This disorder occurs due to various causes that can occur at any time. Diseases can affect organs and tissues that support blood drugs to nutritional deficiencies, the most common causes. In addition, genetic factors can also increase the risk of this disorder, one of which is a blood cancer. Therefore, annual examinations need to be done for early diagnosis.

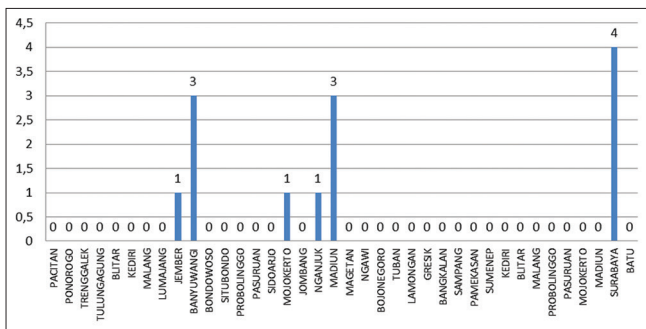


Figure 5: Death due to blood disorders

Cases of maternal death in East Java due to blood disorders are in 2021. Most cases of maternal death occurred in Surabaya as many as four people, Madiun and Bayuwangi as many as three people (Figure 5). Symptoms of blood disorders vary, depending on

which blood components are affected. Symptoms of red blood cell disorders can include fatigue, shortness of breath, impaired concentration, muscle weakness, heart palpitations [28]. Symptoms of white blood cell disorders include being easily infected or contracting disease, getting tired quickly, losing weight drastically, feeling uncomfortable. Signs of platelet disorders can include easy bruising, bleeding that is difficult to stop, nosebleeds, or easy bleeding gums. Treatment for blood disorders depends on the type of disorder that occurs. If the blood disorder is anemia due to a lack of certain nutrients (e.g., iron, folic acid, or Vitamin B12), then providing these nutrients will overcome the anemia. If the red blood cells are too low, a red blood cell transfusion will need to be given. Blood disorders occur due to tumors/cancer, so chemotherapy needs to be done to overcome them. In addition, if leukemia is the cause, a bone marrow transplant can be performed after chemotherapy is complete. If the blood disorder is due to an autoimmune disease, administering drugs to suppress the immune system, such as corticosteroids and immunosuppressants, can correct it.

Death due to metabolic disorders

Metabolic disorders are medical disorders that affect energy production in the human body's cells [29]. In aeneral, genetic disorders result in disturbances in metabolism so that enzymes that play a role in cell metabolism processes are lost or damaged. When a person experiences a metabolic disorder, the metabolic processes in the body are disrupted so that the production of energy needed to carry out various body functions is also disrupted. Metabolic disorders are most often caused by genetic disorders in families [30]. This genetic disorder affects the endocrine glands' performance in producing enzymes used in metabolic processes. As a result, the amount of enzyme produced will be reduced or even not produced. Loss or damage to digestive enzymes also causes toxic substances in the body not to be excreted and accumulate in the bloodstream. This condition can affect the function of organs in the body.

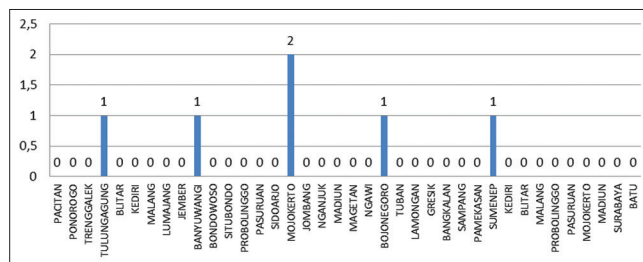


Figure 6: Death due to metabolic disorders

Cases of maternal death in East Java due to metabolic disorders in 2021 were high. Most cases of maternal death occurred in Mojokerto as many as two people, Tulung Agung, Bayuwangi, and Sandeep, each as many as one person (Figure 6). Treatment of

metabolic disorders depends on the type of metabolic disorder suffered. Symptoms experienced by patients with metabolic disorders depend on the type of metabolic disorder suffered. Some of the common symptoms that arise include pain in the abdomen, weakness, fatigue, lethargy, weight loss, lack of appetite, and vomiting. Some other types can be treated by maintaining a diet. However, there are several efforts that people with metabolic disorders can take, such as: Avoiding the consumption of foods that are difficult for the body to process usually, Replacing enzymes lost from the body by taking supplements to replace these enzymes so that metabolic processes can improve, and a special diet that can be consulted with a doctor or nutritionist in advance [31].

Death due to heart

Pregnancy with heart disease is included in the high-risk category because it endangers the safety of the life of pregnant women. Based on the severity of heart disease is classified into several levels. Even women are not allowed to get pregnant in situations where the heart has a severe functional failure, such as acute myocardial infarction, pulmonary Hypertension, Marfan syndrome, and Eisenmenger syndrome. Due to heart disease in pregnancy, there is an increase in heart rate in pregnant women, and the longer the heart will experience fatigue [32]. Finally, the delivery of oxygen and nutrients from the mother to the fetus through the placenta is disrupted, and the amount of oxygen received by the fetus will decrease over time. The fetus has growth disorders and a lack of oxygen. As a result, pregnant women have the potential to experience miscarriage and premature birth (birth before term).

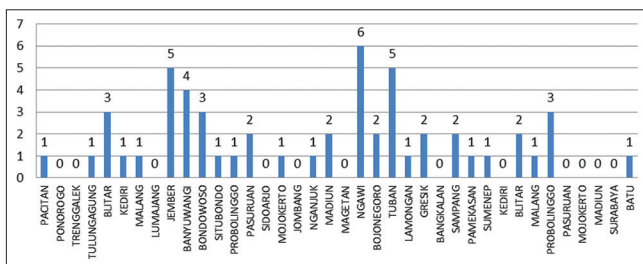


Figure 7: Maternal death due to heart

Cases of maternal death in East Java due to heart disease in 2021 are 54 cases. Most cases of maternal death occurred in Ngawi as many as six people, Tuban and Jember, each with five people (Figure 7). Pregnancy with heart disease is included in the high-risk category because it can endanger the safety of pregnant women and fetuses. Because of this, it is necessary to have the supervision of a gynecologist and a specialist in heart disease. Mothers with a history of heart disease and experiencing pregnancy can aggravate the work of the heart, so regular antenatal checks are needed.

Death due to COVID-19

Based on data from the Indonesian Obstetrics and Gynecology Association (POGI), there were 536 pregnant women exposed to Covid-19 in the April 2020-April 2021 period [33]. As many as, 3% of them died. This data are data before the spike in COVID-19 cases in Indonesia, which occurred in June-July 2021 due to the Delta variant attack. There were 2179 maternal deaths, and almost 18% were deaths due to COVID-19. This means that pregnant women contribute enough to increase the mortality rate.

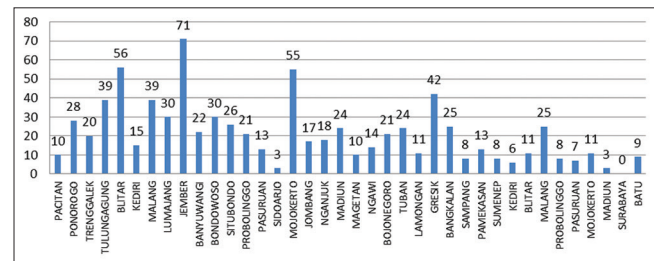


Figure 8: Death due to COVID

Maternal deaths in East Java due to COVID-19 in 2021 were 793 cases. Most cases of maternal death occurred in Jember as many as 71 people, Blitar 56 people, Mojokerto 55 people, and Gresik as many as 42 people (Figure 8). Based on the Centers for Disease Control and Prevention report, pregnant women positive for COVID-19 are at higher risk for preterm birth (delivery of a baby earlier than 37 weeks) and stillbirth. In addition, pregnant women who are positive for COVID-19 are also at a higher risk of experiencing other pregnancy complications. While there is no pandemic under normal conditions, the average maternal mortality rate is approximately three deaths for every 1000 pregnant women. So the number of maternal deaths during this pandemic is very high (reaching) 10 times.

Conclusion

Factors causing maternal death in East Java Province, namely, hypertension bleeding, infection, abortion, blood disorders, heart metabolic disorders, and COVID-19.

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