Suboptimal Care on Maternal Near-Miss Cases: A Study from s Tertiary Referral Hospital in East Java, Indonesia

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Abstract

Maternal near-miss cases shared the same characteristics as maternal mortality cases. Through analysis of those cases, it is expected that the factors which influence the maternal health care quality will be more detailed and enlighten the way to more focused effort to decrease maternal morbidity and mortality.

To present the profile of substandard management that was found in maternal near-miss cases in a tertiary referral hospital in East Java, Indonesia, in January-August 2020.

This research is descriptive retrospective research on maternal near-miss cases. The data was collected from the medical records of the patients presented to the emergency room of a tertiary hospital.

There were 451 near-miss cases among the 1,526 cases of mothers who were referred to the hospital. Most of the near-miss cases with suboptimal services came from provincial capitals, and 82 obstetricians sent the highest number of referrals. Based on the data collected, sub-optimal care for near-death cases was carried out in antenatal care in as many as 87 cases, followed by delays in referrals, and the least was suboptimal care in emergency management.

Substandard maternal management was found in almost all classifications of maternal near-miss cases that were referred to a tertiary hospital in east Java, Indonesia, in 2020. That management comprised of substandard antenatal care management, which is Unidentified history of illness before pregnancy, Unidentified risk factors and pregnancy complications, Inadequate management on the medical condition during pregnancy, deficient compliance patient due to various reasons, a financial problem which was not solved during antenatal care and lack of knowledge of the patient of an emergency condition. The second substandard management was maternal emergency diagnosis and management, and the last was a late referral. Most health providers with substandard management come from the ob-gyn specialist and then first and secondary health care facilities (private midwives, primary health care, clinics, and secondary hospitals). This kind of substandard management should be noticed and addressed by all health care providers, professional organizations, policymakers, and others related to minimize the risk of maternal mortality and morbidity due to that substandard management.

Clinical article (J Int Dent Med Res 2021; 14(4): 1727-1735)

Keywords: Maternal, near-miss, referral, antenatal.

Received date: 18 September 2021   **Accept date:** 02 November 2021

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Introduction

Indonesia is still struggling to reduce the maternal mortality rate (MMR). Based on the Indonesian Basic Health Survey, 359 maternal deaths per 100,000 live births in 2012. Then, in 2015, it decreased to 305. This figure is still far from the Sustainable Development Goals target

set by WHO for 2030, 70 maternal deaths per 100.000 per live birth. Various attempts have been made to reduce MMR, but there must be challenges occur in the way that until now, they have not been successful. MMR is a sensitive indicator describing the degree of public health in a country. High MMR shows the gap in access to health services, with data on 99% of maternal deaths occurring in developing countries, including Indonesia[1].

A pregnant woman with complications in pregnancy has a diverse background, environment, and pathophysiology. Some of these pregnant women can survive (near-miss cases), and others must end in death[2,3]. Studying near-miss cases is as meaningful as maternal death cases, or even more so because of the more significant number. Maternal near-miss can be defined as the case of pregnant women giving birth who survived a life-threatening condition during pregnancy, childbirth, or within 42 days postpartum and is currently considered a new indicator to assess obstetric quality care[4,5].

Near miss maternal case reviews can provide quantitative analysis that is statistically more reliable and shows a comprehensive healthcare system function profile. As we all know, the Maternal Mortality Rate has not shown a significant decrease to date[6]. AMP (Maternal Perinatal Audit) has a vital role in analyzing the factors that influence maternal death. However, AMP has many obstacles and weaknesses, including limited funds, data incomplete data, non-uniform understanding, and considerable mental burden associated with death. A study of near-miss maternal cases or Maternal Near-miss Case Review (maternal NMCR) is expected to be a solution that can overcome these weaknesses. The program, launched by the World Health Organization in 2004, is a criteria-based audit that aims to improve health services and maternal and infant outcomes[7,8].

It is expected that a more in-depth analysis of near-miss cases will provide a broader understanding of the handling of maternal cases in Indonesia and provide a more substantial reference for officeholders in determining strategic and targeted policies aimed at reducing the maternal mortality rate. Therefore, based on the above explanations, this study aims to identify the characteristics of maternal near-miss cases that occurred in Dr. Soetomo General Hospital in Surabaya.

Materials and methods

The research was conducted at Dr. Soetomo General Hospital, an academic hospital and referral center for health services in eastern Indonesia. This research was developed following the research roadmap at Universitas Airlangga, which is in line with the Airlangga Academic Health System (AHS) program.

Data were collected retrospectively from January to August 2020. Data were collected that focused on suboptimal antenatal care, adherence to standard operational procedures (SOP), and referral patterns. The inclusion criteria were all cases of Nearmiss referral to RSDS based on predetermined time susceptibility and the exclusion criteria, namely all referral cases that ended in death and cases with a history of routine ANC at RSUD Dr. Soetomo. The data collection procedure was done using a total sampling technique. In near-miss cases that enter our data, we conduct in-depth discussions and send back referral letters containing information related to patients; management carried out at our hospital and suggestions for improvement for referring health facilities/health workers.

This research has passed the ethical test process and has been declared to have passed the ethics committee at Dr. Soetomo General Hospital, Surabaya, with ethical number: 0343/LOE/301.4.2/II/2021.

Results

In January- August 2020, there are 451 near-miss cases among 1526 maternal cases that were referred to Dr. Soetomo Hospital, according to WHO and Waterstone classifications. Waterstone classification is used in this research considering the significant incidence of preeclampsia/eclampsia and how they caused maternal morbidity and mortality in Indonesia's population. Hence, we included all patients with severe preeclampsia in near-miss cases classifications. In January-August 2020, we identified 146 patients with suboptimal maternal care referred to Dr. Soetomo hospital; 124 among them are near-miss cases. There are 73 severe preeclampsia cases and 7 eclampsia cases; among those patients, 2 cases came up with HELLP syndrome. The other cases are 6 with severe bleeding, 5 with severe sepsis. The

classification of near-miss cases based on Waterstone and WHO near-miss classification can be seen in table 1.

Criteria	Number of cases (total nearmiss cases)	Percentages (%)
Severe postpartum haemorrhage	6 (11)	54.5
Severe pre-eclampsia	73 (277)	26.4
Eclampsia	7 (18)	38.9
Sepsis or severe systemic infection	5 (11)	45.4
Ruptured uterus	0 (5)	0
Severe complications of abortion	0 (0)	0
Interventional radiology	0 (0)	0
Use of blood products	4 (54)	7.4
Renal dysfunction	4 (26) *	15.3*
Laparotomy	6 (12)	50
Cardiovascular dysfunction	19 (54)	35.2
Respiratory dysfunction	3 (5)	60
Hepatic dysfunction	1 (4)	25
Neurological dysfunction	0 (0)	0
Uterine dysfunction	0 (0)	0

Table 1. Nearmiss Cases with suboptimal care which referred to Dr Soetomo Hospital on January-August 2020.

*all renal dysfunction cases are complications of severe bleeding and severe preeclampsia.

Source of Reference Cases

Most of the near-miss cases with suboptimal care came from the capital of province, Surabaya. Only 22 cases originated outside the city of Surabaya. (Figure 1, 2, 3, 4)
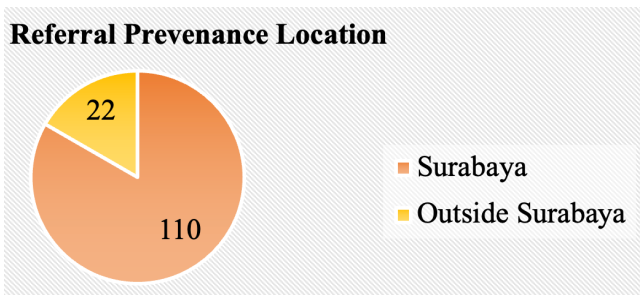

Figure 1. The Referral Prevenance Location of Near-miss Case Patients with Suboptimal Care.

Referral Feedback

Dr. Soetomo Hospital, as a top referral in east Indonesia, sent feedback to all patients as they were discarded from the hospital. However, as there was evidence that suboptimal care was given to the patient, feedback was sent not only to the referrer but also to all health care providers that were involved and provided suboptimum care from the beginning of the pregnancy (from the first antenatal care up until the patient was referred to Dr. Soetomo Hospital). In January-August 2020, the highest number of feedbacks
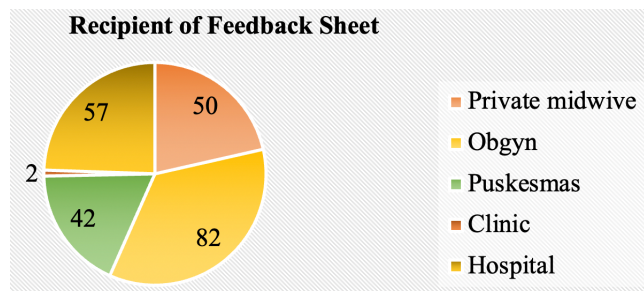
were sent to 82 obstetricians, as follows:

Figure 2. Maternal Care Provider Who Provided Suboptimal Care.

Suboptimal Care on Near-miss Cases

Based on the data collected, the sub-optimal care on near-miss cases was done in antenatal care in as many as 87 cases, followed by late referral, and the least was suboptimal care on emergency management. The details can be seen in the following figure.
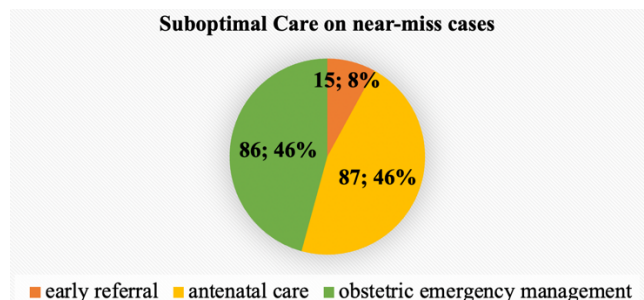

Figure 3. Type of Suboptimal Care which were given to Near Miss Cases.

The suboptimal maternal healthcare is described below:

1. **Antenatal Care**
   a) **Unidentified history of illness before pregnancy**

Of all 31 patients with congenital heart disease referred to Dr. Soetomo Hospital in January-August 2020, we identified inadequate maternal health care in 11 of them. Three patients with VSD, 5 with ASD, 1 patient with TOF, and 2 with PDA. Only 2 of those patients with congenital heart disease were identified during ANC in primary health care. The rest were only identified when they had already experienced symptoms like dyspnea or were referred to the hospital for another aim, like having ultrasound examinations.

A patient with a history of hyperthyroid

before being pregnant was only identified when she experienced symptoms of thyroid crisis. The two patients came with a history of lung TB before pregnancy. One of them has a history of unfinished medication and has never been identified in primary health care; the other one was not identified until she got dyspnea due to lung atelectasis, with the occurrence of mitral stenosis too. Two cases with pregestational DM failed to be identified during ANC. Both cases ended up with IUFD, and one of them with diabetic ketoacidosis. One of them still got herself a DM medicine in her early pregnancy, but primary health care was not aware of this situation. One patient has a history of primary biliary cirrhosis and had a splenectomy in 2014, but providers in primary health care never identified it. She had ANC at a private midwife until 5 months pregnant. Then she was hospitalized twice due to hematemesis and anemia.

In their previous pregnancy, six patients with preeclampsia were never screened for high risk for preeclampsia, and providers did not give them low dose aspirin or the correct dose of calcium to prevent it. Four of them had severe preeclampsia in their current pregnancy. The other two had eclampsia and other complications like lung edema and sepsis. One patient in her second pregnancy had a stroke 4 years ago, did not go to the doctor, and never took any medicine after that first attack. Her first pregnancy was already 11 years ago. Since she was aware of her pregnancy, she went to a midwife practice with blood pressure 130/90 and was given nifedipine by the midwife. She never had any other ANC contact. She was never consulted nor referred to the hospital until she got a second infark stroke in 25/26 weeks of gestational age.

b) Unidentified risk factor and pregnancy complication

Among 77 patients with severe preeclampsia included in this research, 46 patients did not get the preeclampsia risk factor screening during ANC. Hence, they did not have the chance to get low dose aspirin and high dose of calcium to prevent preeclampsia. Three patients with a new case of lung TB during pregnancy were included in this research. They experienced coughing for more than 2 weeks during pregnancy, but none of the first or secondary health care providers suspected this. Two of them had pneumonia symptoms, were then referred to a tertiary hospital, and were found to have new cases of lung TB. One of them already had a lung abscess when referred. There is also a problem with HIV screening. A 19-year-old unmarried patient was diagnosed with HIV only after breathing failure due to secondary infection (pneumocystis carinii) in 24 months pregnant. Then she got into labor, and the baby was born in 900 grams.

c) Inadequate management on medical condition during pregnancy

One patient diagnosed with hydatidiform mole had never been checked for ßhcg quantitative level before nor after curettage. The patient constantly has vaginal bleeding afterward, twice hospitalized due to severe anemia, then referred to tertiary hospital after another ob-gyn suspected the patient of choriocarcinoma with a hemoglobin level of 3g/dl. The patient had planned for embolization in a tertiary hospital since she was only 26 years old, with no living child. However, before the embolization schedule, the patient experienced massive bleeding and must go for a hysterectomy. One patient was diagnosed with HIV, but even after she was diagnosed in this pregnancy, she had never been given ARV. She was only advised to deliver the baby to the hospital. Patients with chronic hypertension who get blood pressure >180/100 in primary health care only got referral letters to the hospital. One of them had no further symptoms, and she never showed up in the hospital until 4 months later due to contraction with crisis hypertension.

The other patient has ANC in primary healthcare and was never referred to the hospital until she was given contraction and stillbirth due to placental abruption. One patient already treated for chronic hypertension in a secondary hospital had never been checked for organ function. Her blood pressure seemed to be unresponsive to the antihypertension, but nothing more has been done. In the end, only after the patient had a cesarean section was she found to have abnormal renal and liver function, which could be a complication of preeclampsia. Furthermore, we knew about her hyperthyroid history before her pregnancy, only after she was referred to a tertiary hospital.

d) There are patients with bad compliance

One patient in a remote district in east java only had one antenatal care during her 9 months pregnancy in 13/14 weeks of gestational age. Her pregnancy ended in neglected labor and IUFD with a giant baby.

e) Patients still have problems on financing

There is one patient rejected from being referred to the hospital due to financial problems. The case is a patient with twice previous cesarean who was in labor with anemia and hypoalbuminemia.

f) Patient didn't have knowledge about maternal emergency symptoms

One patient did not feel aware of preeclampsia complications that still can occur in the postpartum period. She only went to the hospital after two days of lung edema and respiratory distress.

2. Maternal Emergency Diagnosis and Management

There are 80 health providers in this category and still dominated by postpartum hemorrhage and preeclampsia. Among them, 42 health care providers gave suboptimal Preeclampsia management to 37 patients. The providers did not become aware of severe preeclampsia during antenatal care on six patients. One of them is a nurse who gave antihypertension drugs that is not standard in pregnancy because the nurse in his private practice was not even aware that the patient was pregnant at that time. One patient was only diagnosed with HT + dyspnea and was given a referral letter to the hospital, diagnosed with severe PE and lung edema. Three patients were diagnosed with severe preeclampsia during ANC in primary health care, and the providers only gave referral letters to the hospital.

Five providers did not give MgSO4 injections before referring, although there was no contraindication. One of them is a midwife; the rest are ob-gyn in secondary hospital. One of the providers gave a substandard dose of MgSO4. Eclampsia happens in one case during hospitalization in a secondary hospital. The providers gave four patients with lung edema MgSO4; two of them had respiratory failure afterward. One of them did not even get a diuretic. Six patients treated with severe preeclampsia and conservative management were sent home after having lung maturation injections. Ten patients came to the emergency ward of a hospital, then sent to another hospital without a proper referral; either they were aware of the severe preeclampsia condition or not. Same story with 2 patients with suspected covid19 infections with various problems like in labor and PROM. There are five patients with postpartum hemorrhage (PPH) who got substandard management in the secondary hospital. One of them had not been diagnosed with internal bleeding post-cesarean. The rest of them did not adequately evaluate to find the cause of PPH and were poorly managed before getting referred. Poor management includes inadequate resuscitation and vaginal tampons to stop the bleeding caused by uterine atonia.

3. Maternal Referral

Forty-eight patients should be referred in their very early pregnancy due to their high-risk pregnancies. However, they are only referred to a hospital at the end of the second or third trimester. Those risks are hyperthyroid, chronic hypertension, heart disease, twin pregnancy, extreme obesity, previous cesarean sections, and pregestational DM. Few interventions should be done in order to prevent complications for both mother and fetus.

Discussion

For many years, since the Obstetrics and Gynaecology Department of Universitas Airlangga opened for residency programs in 1951 with Dr. Soetomo Hospital as its main teaching hospital, every case referred to this tertiary hospital was discussed in depth residence and senior staff, mainly in residence reports every morning. We discuss all aspects of maternal services delivered to the patient from the beginning of her maternity journey or even earlier when she got any medical condition before the pregnancy. Apart from discussing the management we provide in our hospital, we often identified suboptimal management in primary and secondary health care facilities during antenatal care or when any emergencies occurred. Usually, we send feedback about the patient's condition and management in Dr. Soetomo

hospital to the referrer or the facility where the patient will have the next consultation, and it was not in Dr. Soetomo hospital due to various causes. Only after 2019 that we started sending feedback to primary and secondary hospitals in which suboptimal management was identified from the first antenatal care until the emergency referral to Dr. Soetomo hospital. We hope it can push forward the improvement of maternal healthcare.

Some patients have a history of medical illness that they already knew before they were pregnant, but somehow it was too late for the provider to acknowledge it until complications arose. Having information about the patient's past medical history is a crucial part of quality antenatal care, moreover for patients with congenital heart disease, TB, hyperthyroid, history of stroke, hepatic cirrhosis, DM, and history of preeclampsia in a previous pregnancy. Maternity units in Indonesia were already provided with a structured form for this purpose, including in the KIA (mother and child health) handbook published by the health ministry and distributed to every district by health offices. So there is significant curiosity about how this essential thing was overlooked. The integrated antenatal care model in Indonesia makes the first antenatal care the most prolonged contact for patients. In this contact (K1), providers should obtain more information about the patient, including medical history, family history, general assessment, obstetric assessment, laboratory test, TT vaccination, nutrition assessment, and also giving counseling on nutrition, contraception, ANC, a sign of labor and how to ask for help, breast care, how to take care of a newborn, and other health counseling. A load of primary health care in Indonesia, especially in East Java, with a total population of 39.886.288 people in 2020, in a 42.922 km2 area, with 7.929.796 couples of childbearing age 627.901 pregnant women1 could be a burden.

Meanwhile, 82,3% of the population is already financed by national insurance. Pregnant women should get their antenatal care in 960 primary health care in East Java, then be screened for low or high risk of pregnancy. This load will vary in every district due to the difference in total population (Figure 4), health care facilities, health providers (doctors, nurses, specialists), and geographic conditions. Therefore, when half of these patients already

know about their medical condition before getting pregnant or are at least aware of the symptoms they had before pregnancy, then providers who were taking care of them overlooked these conditions, many sides and factors should be discussed. Obtaining an accurate medical history is crucial for a patient's management, both diagnosis and medical. It depends on an effective communication skill[10,11]. When people are given time to speak with minimum interruption, they will share their perspectives. Previous research has shown that this is a way to achieve better outcomes[12]. Poor quality history allows essential information about past medical history, past pregnancy complications history, or family history to be overlooked[13].
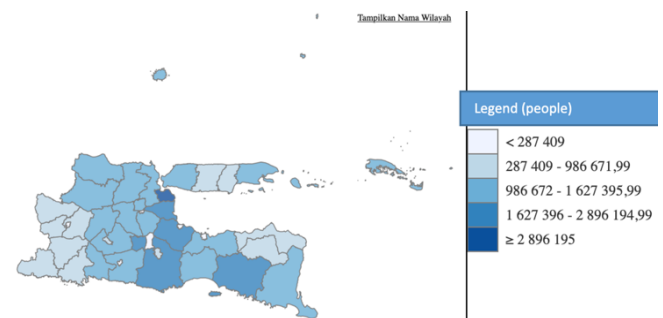

Figure 4. Total population in east Java (2020)[9].

One of the primary purposes of ANC is to identify the risk factor, prevent and early detect complications. Preeclampsia is still one of the most common causes of maternal death in Indonesia. Hence, preeclampsia risk factor screening has a significant deal to do during ANC in all patients. ACOG recommends giving low-dose aspirin (81mg/day) and should be initiated 16 weeks before delivery[14]. A high dose of calcium (1,5-2g elemental calcium/day) is recommended by WHO. Preeclampsia risk factor screening should be provided to all pregnant women. In most preeclampsia near-miss cases, the screening was not proceeded by the health providers. The screening did not need more tools, so it is either about the provider's knowledge or commitment to do this, beyond all other boundaries they have in the process[5,15].

In order to eliminate the incidence of HIV to less than 1 case per 100.000 live births, performing universal HIV prenatal testing in early pregnancy, providing antiretroviral therapy (ART), scheduling the cesarean delivery for HIV positive women with high viral loads at 34-36 weeks gestational age, and giving appropriate ART for

infants and avoidance of breastfeeding needs to be done. When the screening is too late, those women lose the chance to prevent transplacental transmission, even could die from its complications. The government is already aware of situations where TB and HIV cases are constantly increasing in the last decade, with a significant increase of HIV total cases in 2015 to 2016 was about 33%, and 2016 to 2017 was 17% increase[16]. In 2017, the government set up a minister of health regulations to eliminate HIV, syphilis, and Hepatitis B virus' mother to child transmission. This includes mandatory screening during early pregnancy, which the government fully supports[1].

Many regencies in Indonesia have few desert islands nearby. Those islands are only connected to the central part of the regency by boat, which is not daily. In contrast, the regency itself is 4 to 5 hours away from the tertiary hospital. In these kinds of areas, we need strategies to overcome three delays of maternal services there. In such circumstances, surveillance plays a significant role in maternal services. The surveillance should adequately detect all reproductive-aged couples and all pregnant women. So, this is where the birth preparedness and complication readiness (BP/CR) concept is needed the most. Providers must understand the importance of high-risk pregnancy screening, early referral, early complication diagnosis, and proper management of minimum service standards. When such circumstances are successfully built, no other patient will be suffering from the same complications in the future. Providers should help all patients to have their support system.

A national program in Indonesia aims to increase the BP/CR of a mother's support systems, including husbands, family, and whole community components, so that everybody could be aware of a pregnant women's situation and ready to help them. This program is already included in the safe motherhood program. It consists of essential information about the mother, including the location where she lives, her identity, her due date, the plan of a health care provider who will help the labor, her companion during labor, the facility, potential blood donor, transportation, and financial support that she used. The program called P4K includes this information on a sheet of stickers that should be put in front of the women's houses. It means that financial support should not be a problem during their last trimester. Providers must address this matter during their early pregnancy. Moreover, Indonesia has national insurance that also provides financial support for pregnancy. A mother who still has a financial problem and cannot be referred during an emergency is not accepted[17].

There are probable factors involved in the delay in referring high-risk patients from primary to secondary/tertiary health care. Whether the health provider was unaware of the risk or patient's situation with lack of information and education makes them reluctant to go to the hospital. The patient did not experience any symptoms during antenatal care in primary health care. So, this is where communication should take charge more. From the health providers, knowledge and skill on identifying and diagnose are essential because this situation has the same profiles as maternal mortality, which could be a consequence of missed or delayed diagnosis in pregnancy[18].

Patients' education and information should include the risk they have in the puerperium period due to their risk during pregnancy, especially for those at a high risk of having preeclampsia/eclampsia. It can occur up to 6 weeks after delivery.[10] Pathogenesis of postpartum preeclampsia has similarity with preeclampsia that occurs during the antepartum period in its plasma angiogenic profiles[19,20]. Moreover, it could be associated with significantly increased complications such as peripartum cardiomyopathy (PPCM) that leads to chronic heart failure or death in the peripartum period[21]. When the patient did not inform well, they will not be aware of the emergency condition and delay seeking care and reaching health care facilities. Substandard obstetric emergency management in primary and secondary health care facilities is still found in most near-miss cases. This substandard management is found in preeclampsia, PPH, hydatidiform mole, PROM, Covid-19 infection, placenta accreta, and dystocia. Preeclampsia and PPH become two significant problems in maternal mortality in Indonesia. There is already a clear standard of management and referral system for such conditions. Moreover, substandard management mostly happens in hospitals. This should increase awareness that hospital health care quality remains a problem in maternal health[22].

Conclusions

Substandard maternal management was found in almost all classifications of maternal near-miss cases that were referred to a tertiary hospital in east Java, Indonesia, in 2020. That management comprised of substandard antenatal care management, which is the unidentified history of illness before pregnancy, unidentified risk factors and pregnancy complications, inadequate management on the medical condition during pregnancy, deficient compliance patient due to various reasons, a financial problem which was not solved during antenatal care and lack of knowledge of the patient of an emergency condition. The second substandard management was maternal emergency diagnosis and management, and the last was a late referral. Most health providers with substandard management come from ob-gyn specialists and then first and secondary health care facilities (private midwives, primary health care, clinic, and secondary hospital). This kind of substandard management should be noticed and addressed by all health care providers, professional organizations, policymakers, and others related to minimize the risk of maternal mortality and morbidity due to that substandard management.

Declaration of Interest

Authors declare there is no competing of interest in this research.

References

1. Kesehatan K, Indonesia R. Profil Kesehatan Indonesia 2020 [Internet]. Kementrian Kesehatan Republik Indonesia. 2021. 139 p. Available from: https://pusdatin.kemkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Profil-Kesehatan-Indonesia-Tahun-2020.pdf
2. Tunçalp Ö, Hindin MJ, Souza JP, Chou D, Say L. The prevalence of maternal near miss: A systematic review. BJOG An Int J Obstet Gynaecol. 2012;119(6):653–61.
3. Prasetyo B, Winardi B, Pranadyan R, Erlin H, Damayanti MACL, Yusuf M, et al. Increasing of early high-risk pregnancy detection with proactive intervention in Bangkalan District, Madura Indonesia. J Glob Pharma Technol. 2009;12:26–31.
4. World Health Organizations. The WHO near-miss approach for maternal health. 2011;
5. Verschueren KJC, Lachmi R. Applicability of the WHO maternal near-miss tool : A nationwide surveillance study in Suriname. 2020;10(2):1–14.
6. Aguiar C de A. Collective memories of women who have experienced maternal near miss: health needs and human rights. Cad Saude Publica. 2016;32(9).
7. Easter A, Howard LM, Sandall J. Mental health near miss indicators in maternity care: a missed opportunity? A commentary. Bjog. 2018;125(6):649.
8. Izzati D, Dewi ER, Rahmawati NA, Sari VR, Azmi AZ, Prasetyo B. Self-concept Factor Influencing Antenatal Provider Selection : A Qualitative Study from Indonesian Midwives. 2021;9:163–7.
9. Dinas Kesehatan Provinsi Jawa Timur. Profil Kesehatan Provinsi Jawa Timur 2019. Dinas Kesehat Provinsi Jawa Teng [Internet]. 2020;1–123. Available from: www.dinkesjatengprov.go.id
10. Rahman A, Tasnim S. Twelve tips for better communication with patients during history-taking. ScientificWorldJournal. 2007;7:519–24.
11. Prasetyo B, Winardi B, Pranadyan R, Erlin H, Damayanti MACL, Yusuf M, et al. Increasing of Early High-Risk Pregnancy Detection with Proactive Intervention in Bangkalan District, Madura Indonesia. J Glob Pharma Technol. 2020;12(6).
12. Haidet P, Paterniti DA. Building a history rather than taking one: A perspective on information sharing during the medical interview. Arch Intern Med. 2003;163(10):1134–40.
13. Mahmood MA, Hendarto H, Laksana MAC, Damayanti HE, Suhargono MH, Pranadyan R, et al. Health system and quality of care factors contributing to maternal deaths in East Java, Indonesia. PLoS One. 2021;16(2):e0247911.
14. LeFevre ML. Low-dose aspirin use for the prevention of morbidity and mortality from preeclampsia: US Preventive Services Task Force recommendation statement. Ann Intern Med. 2014;161(11):819–26.
15. Pattinson R, Say L, Souza JP, Broek N van den, Rooney C. WHO maternal death and near-miss classifications. Bull World Health Organ. 2009;87:734-734A.
16. Omotayo MO, Dickin KL, O'Brien KO, Neufeld LM, De Regil LM, Stoltzfus RJ. Calcium supplementation to prevent preeclampsia: translating guidelines into practice in low-income countries. Adv Nutr. 2016;7(2):275–8.
17. Wardhana MP, Gumilar KE, Rahmadhany P, Dewi ER, Laksana MAC. INA-CBGs claim versus total hospital cost: A vaginal delivery investigation at Airlangga University Academic Hospital, Indonesia. J Public health Res. 2020;9(4).
18. Dewi ER, Wittiartika ID. Deteksi Dini Diabetes Mellitus Gestasional pada Pelayanan Antenatal di Praktik Mandiri Bidan (PMB) dalam Mendukung Gerakan Masyarakat Sehat (GERMAS) di Indonesia. Midwives Lead W with Qual Care. 2018;187.
19. Singh S, Murthy GVS, Thippaiah A, Upadhyaya S, Krishna M, Shukla R, et al. Community based maternal death review: lessons learned from ten districts in Andhra Pradesh, India. Matern Child Health J. 2015;19(7):1447–54.

20. Matthys LA, Coppage KH, Lambers DS, Barton JR, Sibai BM. Delayed postpartum preeclampsia: an experience of 151 cases. Am J Obstet Gynecol. 2004;190(5):1464–6.
21. Rana S, Lemoine E, Granger JP, Karumanchi SA. Preeclampsia: pathophysiology, challenges, and perspectives. Circ Res. 2019;124(7):1094–112.
22. Laksana MAC, Habibie PH, Wardhana MP, Erza K, Gumilar MY, Rahmadhany P, et al. Situation Report: Maternal Health Management during COVID-19 Pandemic at Soetomo General Hospital and Universitas Airlangga Academic Hospital, Surabaya Indonesia. Syst Rev Pharm. 2020;11(8):467–71.