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# Perinatal Outcomes in Pregnancy with Preeclampsia and Eclampsia

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**Abstract**

One of the causes of infant mortality is preeclampsia in pregnancy. The impact of pregnancy with preeclampsia and eclampsia on perinatal outcomes is associated with increased perinatal mortality and morbidity in developing and developed countries. To determine the perinatal condition of pregnancies with preeclampsia and eclampsia in developing and developed countries based on literature studies. This literature study was done to determine the perinatal condition. The external keywords used were perinatal, preeclampsia, eclampsia. The method used literature review research methods and data collection strategies using PEOS obtained from previous research journals that had been collected as many as 22 journals, consisting of 17 international journals and 5 national journals. The variable was perinatal outcomes in pregnancy with preeclampsia and eclampsia. Based on 22 reviewed journals, 19 journals from developing countries and 3 journals from developed countries were found, which stated that the majority of perinatal outcomes were asphyxia. The majority of perinatal outcomes found in developing and developed countries are asphyxia, while other perinatal outcomes found include: low birth weight (LBW), fetal distress, intrauterine fetal death (IUFD), intrauterine growth restrictions (IUGR), and perinatal mortality.



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## INTRODUCTION

The most common causes of infant mortality are intrapartum complications, accounting for as much as 28.3%, respiratory and cardiovascular disorders (21.3%), low birth weight and premature birth as much as 19%, congenital abnormalities as much as 14.8%, and infection as much as 7.3% (Menteri Kesehatan Republik Indonesia, 2020). Many causes of infant mortality and risk factors for infant mortality include genetic problems such as chromosomal abnormalities, single gene syndromes and mutations, birth defects, infections, fetal-maternal bleeding, preeclampsia in pregnancy, diabetes, obesity, advanced maternal age, kidney disease, thyroid disease, antiphospholipid syndrome, and uterine anomalies (Queenan et al., 2021). Causes of infant mortality include preeclampsia in pregnancy, which has complications in pregnancy of 5-15% (Prawirohardjo, 2014). Hypertensive disorders complicate up to 10% of pregnancies and remain a contributor to maternal and perinatal morbidity and mortality. Hypertensive disorders during pregnancy include chronic hypertension, gestational hypertension, preeclampsia, chronic hypertension with superimposed preeclampsia, HELLP syndrome, and eclampsia (Phelan, 2018). The infant mortality rate (IMR) is a sensitive indicator that is used as a measure of the success of achieving health development as well as the achievement of the human capital index (Menteri Kesehatan Republik Indonesia, 2020).Infant mortality is a very difficult medical and emotional challenge for health workers and families. Pregnancy loss or infant death occurs in approximately 12% of clinically recognized pregnancies (Queenan et al., 2021).

In 2019, the infant mortality rate in Indonesia was 20,244 infant deaths. Of those, 16,156 deaths occurred in the first six days of life. The cause of death was at most 7,150 deaths due to low birth weight, followed by asphyxia as the second largest cause with 5,464 infant deaths (Kementerian Kesehatan Republik Indonesia, 2019). Based on a report from the East Java Provincial Health Office in 2020, there were 3,614 infant deaths, the most common cause of death, namely low birth weight, followed by 844 deaths caused by asphyxia (East Java Provincial Health Office, 2020). Meanwhile, from the data from the Kediri Health Office, there were 163 infant deaths, namely at least 60 cases caused by low birth weight, followed by asphyxia, namely 54 cases in 2020 (Dinas Kesehatan Provinsi Jatim).

The impact of pregnancy with preeclampsia and eclampsia is associated with increased maternal and perinatal mortality and morbidity due to reduced uteroplacental blood flow, placental abruption, and premature birth. Recent evidence suggests that preeclampsia is an endothelial disorder. Thus, in some patients, the disease may manifest in the form of capillary leakage, fetal growth restriction, reduced amniotic fluid, or a spectrum of abnormal laboratory tests with multiple organ dysfunction (Queenan et al., 2021). Pregnancy with preeclampsia carries an increased risk of developing end-organ damage, including placental abruption and eclampsia. In addition, pregnancies with preeclampsia have pregnancy complications including fetal growth restriction, premature birth, and stillbirth (Sperling, 2020). Stunting is a long-term effect of babies born prematurely and not growing optimally (Rohsiswatmo & Amandito, 2019). Prof. Dr. RD Kandou Manado conducted research at the general hospital center from January 1 to December 31, 2016, with a total of 65 respondents.The results of the study in pregnancy with PEB showed that perinatal outcomes included perinatal mortality as much as 4.6%, IUGR as much as 6.2%, LBW as much as 35.4%, asphyxia as much as 7.7%, fetal distress as much as 20%, and prematurity as much as 26.2% (Kalam et al., 2017).

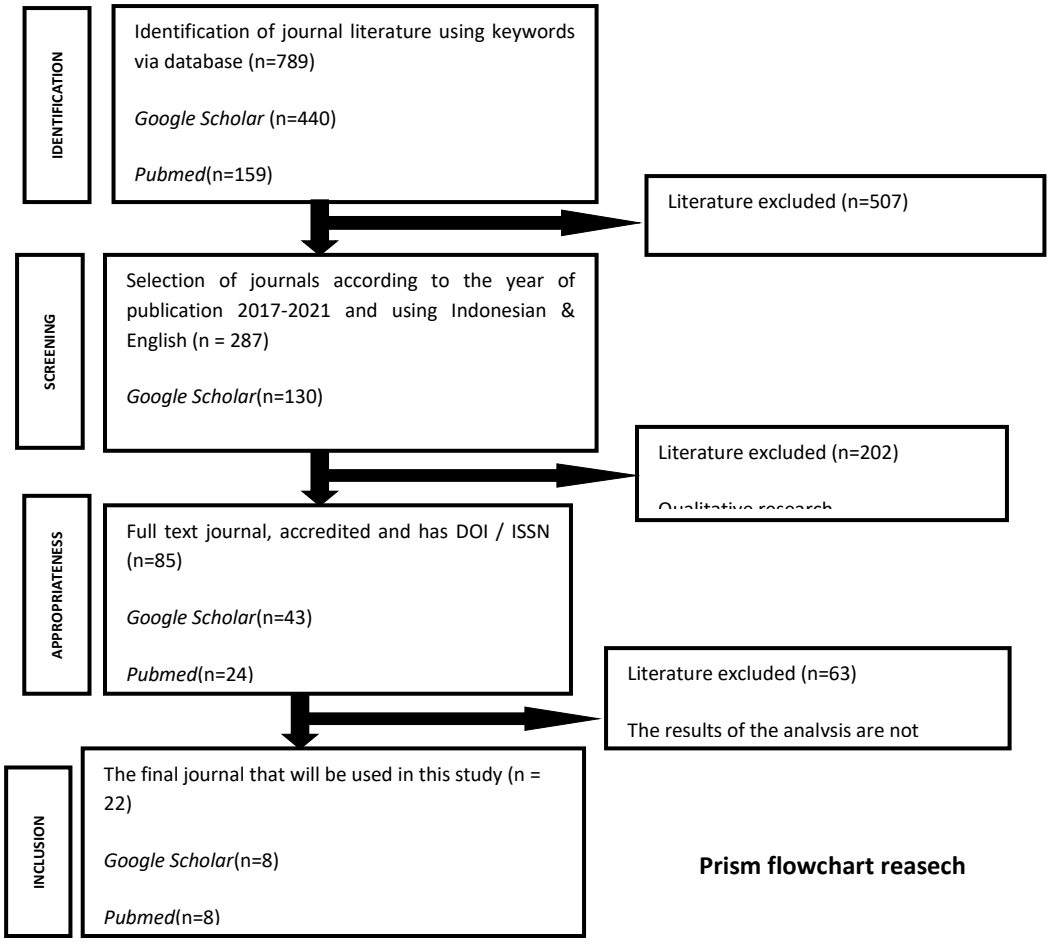
Research conducted at the Kalisat Hospital (Florencia et al., 2019) in 2019 with 49 respondents found that 48.0% had moderate asphyxia, 42.7% had mild asphyxia, and 9.3% had severe asphyxia. Research in New York conducted in 2011–2018 with 664 respondents got baby outcomes of 31.9% by entering the NICU, 26.2% low birth weight, 16.9% Apgar 1 score, and 5.0% having an Apgar 5 score (Asemota et al., 2020). The government's strategy for reducing MMR and IMR is to carry out health development in 2020–2024. As follows: continuous improvement of services to mothers and babies in public and private health facilities through an integrated and continuous referral system starting from antenatal care checks and increasing the coverage and quality of antenatal and postnatal services for mothers and newborns, such as immunization. Efforts to reduce neonatal and infant

mortality, service quality, and service coverage must be optimized, including a systematic and structured referral system starting from first-level health facilities and advanced-level referral health facilities, as well as efforts to increase human resource competence, which includes neonatal and child care services. babies (Menteri Kesehatan Republik Indonesia, 2020). Regarding the impact caused by pregnancy with preeclampsia and eclampsia on perinatal outcomes, of course, preventive efforts are urgently needed so that preeclampsia does not have a bad effect on perinatal outcomes, while at the same time emphasizing MMR and IMR, which are still high in developing and developed countries. Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 97 of 2014, a pregnant woman needs to obtain antenatal care at the midwife's independent practice, then integrated antenatal services are carried out at the Puskesmas.

Antenatal care examination services during pregnancy can be performed at least six times, namely 2 times during the 1st trimester, 1 time during the 2nd trimester, and 3 times during the 3rd trimester. With a minimum of 2 examinations by an obstetrician during the first visit in the 1st trimester and at the time of the 5th visit in the 3rd trimester (Menteri Kesehatan Republik Indonesia, 2020). This policy applies when pregnant women are required to have their pregnancy checked regularly at health facilities so that health workers can monitor the development and condition of the mother and fetus. This monitoring includes monitoring of routine medication and monitoring of blood pressure of pregnant women with preeclampsia so that the fetus can be maintained until term gestational age.

## METHOD

This research was a type of literature study or literature review with systematic research Mapping study design. The data used secondary data selected through predetermined criteria so that the journals obtained were in line with the topic to be studied regarding "Perinatal Outcomes in Pregnancy with Preeclampsia and Eclampsia". The inclusion and exclusion criteria in this study were, inclusion criteria: 1. year of publication 2017-2021, 2. articles use Indonesian and English, 3. accredited and have ISSN or DOI and Articles can be accessed in full text. And the exclusion criteria : 1. journals are not focused on research, 2. qualitative research design, 3. journal is a literature review, 4. the results of the analysis are not according to the topic.




**Prism flowchart reasech**

The data collection strategy uses PEOS with the literature obtained, namely journals published in the last 5 years, with a total of 5 national journals and 17 international journals. Journals accessed via *databases include Google Scholar, Pubmed, Science Direct,* and SINTA.

## RESULT

The characteristics obtained include the characteristics of the study, the characteristics of the respondents, and the results of the perinatal outcome review.

**Table 1:** Publication Year

| Category | N | % |
|---|---|---|
| **Publication Year** | | |
| 2017 | 6 | 27.2 |
| 2018 | 3 | 13.7 |
| 2019 | 6 | 27.2 |
| 2020 | 5 | 22.8 |
| 2021 | 2 | 9.1 |
| **Total** | **22** | **100** |

Based on Table 1 is visible that the majority of journals used are 2017 and 2019 respectively. Each as many as 6 journals (27.2%).

**Table 2:** Publication Country

| Category | N | % |
|---|---|---|
| **Publication Country** | | |
| Indonesia | 7 | 31.9 |
| India | 5 | 22.9 |
| Ethiopia | 2 | 9.2 |
| China | 1 | 4.5 |
| Nepal | 1 | 4.5 |
| Nigeria | 1 | 4.5 |
| Kazakhstan | 1 | 4.5 |
| Zimbabwe | 1 | 4.5 |
| Dutch | 1 | 4.5 |
| Israel | 1 | 4.5 |
| France | 1 | 4.5 |
| **Total** | **22** | **100** |

It can be seen that the majority of the journals used are from Indonesia, as many as 7 journals (31.9%).

**Table 3:** Research Design

| Category | N | % |
|---|---|---|
| **ResearchDesign** | | |
| Cross-sectional | 2 | 9.1 |
| Retrospective cross-section | 2 | 9.1 |
| Retrospective observational descriptive | 1 | 4.5 |
| Retrospective descriptive | 3 | 13.6 |
| Retrospective descriptive cohort | 1 | 4.5 |
| Retrospective cohort | 2 | 9.1 |
| Prospective non-comparative observation | 1 | 4.5 |
| Retrospective observation | 1 | 4.5 |

| | | |
|---|---|---|
| Prospective | 4 | 18.2 |
| Retrospective | 5 | 22.8 |
| **Total** | **22** | **100** |

The majority of the study design used was retrospective (22.8%).

**Table 4:** Research Instruments

| **Category** | **N** | **%** |
|---|---|---|
| **ResearchInstruments** | | |
| Questionnaire | 2 | 9.1 |
| Live check | 1 | 4.5 |
| Medical records | 17 | 77.3 |
| No description | 2 | 9.1 |
| **Total** | **22** | **100** |

The majority of research instruments are medical records, there are 17 journals (77.3%).

**Table 5: Age Characteristics**

| **Category** | **N** | **%** |
|---|---|---|
| **Age** | | |
| 17-35 Years | 15 | 68.2 |
| >35 Years | 4 | 18.2 |
| No description | 3 | 13.6 |
| **Total** | **22** | **100** |

Based on Table 5 is shown that the majority of mothers are of productive age, namely 17-35 years as much as 15 journals (68.2%).

**Table 6:** Characteristics of Parity

| **Category** | **N** | **%** |
|---|---|---|
| **Parity** | | |
| Nullipara | 1 | 4.5 |
| Primipara | 7 | 31.8 |
| Multipara | 8 | 36.4 |
| No description | 6 | 27.3 |
| **Total** | **22** | **100** |

The majority of parity found was multipara as many as 8 journals (36.4%).

**Table 7:** Perinatal Outcome Review Results

| **Category** | **N** | **%** |
|---|---|---|
| **Developing country** | | |
| Asphyxia | 1 7 | 27.5 |
| LBW | 15 | 24.2 |
| Fetal Distress | 3 | 4.8 |
| IUFD | 4 | 6.4 |
| IUGR | 9 | 14.5 |
| Perinatal Death | 14 | 22.6 |
| **Total** | **62** | **100** |
| **Developed countries** | | |
| Asphyxia | 2 | 28.6 |
| LBW | 1 | 14.3 |
| IUFD | 1 | 14.3 |

| | | |
|---|---|---|
| IUGR | 1 | 14.3 |
| Perinatal Death | 2 | 28.6 |
| **Total** | **7** | **100** |

Table 7 shows that the majority of perinatal outcomes are asphyxia, as seen from 22 journals found 19 journals (86.4%) who had asphyxia.

## DISSCUSION

### Perinatal outcomes in pregnant women with preeclampsia or eclampsia in developing countries

Based on 7 articles studied in developing countries, namely Indonesia, perinatal outcomes include asphyxia, LBW, IUGR, perinatal mortality, IUFD, and fetal distress. The majority of perinatal outcomes in Indonesia is asphyxia. In previous studies, it was stated that antenatal care for pregnant women with preeclampsia needs to be carried out more intensively so that complications for the mother and fetus can be prevented. Screening to reduce the risk of IUGR and preterm delivery should be performed routinely, with early intervention if necessary. The management of newborns at advanced maternal age needs special attention to avoid the risk of perinatal infection, asphyxia, and perinatal death (Tyas et al., 2020).

ANC can be performed from the beginning, improving coverage and quality of antenatal and postnatal services for mothers and babies (Ministry of Health of the Republic of Indonesia, 2020). This is in line with research (Wijayanti & Marfuah, 2019), which states that the majority of respondents who do not comply with ANC compliance experience preeclampsia.

Research conducted in developing countries from 5 subsequent articles, namely India, stated that the perinatal outcomes of pregnancies with preeclampsia or eclampsia include asphyxia, low birth weight, IUGR, perinatal mortality, and IUFD. The most common perinatal outcomes in India are asphyxia and low birth weight. Research conducted (Pillai, 2017) mentioned that although prevention of preeclampsia and eclampsia is not possible, it is very important to recognize the symptoms and early signs of preeclampsia and eclampsia so that complications can be avoided. The provision of quality antenatal health care services, increased patient awareness of warning symptoms, investigations, timely delivery and intensive monitoring in the intrapartum and postpartum periods have the potential to improve maternal and perinatal outcomes. Education and empowerment of women and accessible health care, especially for the community, Maternal training on the importance of care during pregnancy and strengthening of neonatal intensive care can lead to improved maternal knowledge and perinatal outcomes (Patnaik et al., 2019). It was revealed that regular ANC examinations can detect signs of preeclampsia, so proper treatment is needed. Early detection of preeclampsia rarely causes complaints, so early detection requires good observation (Cunningham, F.G, 2010). Preeclampsia must be detected and needs proper treatment before it causes eclampsia and other complications (Yunita et al., nd).

Ethiopia is a developing country that has perinatal outcomes for mothers with preeclampsia and eclampsia including low birth weight, perinatal mortality, asphyxia, and IUGR. LBW and perinatal death are often found as perinatal outcomes. Research (Melese et al., 2019) suggests that the higher a woman's educational status, the lower the unfavorable perinatal outcome of preeclampsia/severe eclampsia. With good educational status, mothers tend to increase health care seeking behavior, including having adequate follow-up antenatal care, which can improve perinatal outcomes. This is in line with previous research regarding the relationship between education and maternal compliance in conducting ANC examinations. The result is higher respondents who have higher education and are in compliance with ANC visits (Wulandatika, 2017).

The next developing country is China. The outcomes found in this country include asphyxia, LBW, and fetal distress. The results of the research conducted (Li et al., 2018). It has been suggested that preeclampsia is a risk factor for adverse pregnancy outcomes. For better management of preeclampsia, it is necessary to increase knowledge to better identify patients with preeclampsia with an increased risk of adverse outcomes.

Healthcare related factors explain the increased risk of adverse outcomes. These include lack of detection and equipment in maternity hospitals, lack

of training on certain technologies, and ineffective coordination between different levels of health care (Khader et al., 2018). Efforts that can be made are by early detection of signs of preeclampsia before the onset of clinical symptoms of preeclampsia with various examinations. This is attempted through ANC examination by identifying and monitoring pregnancies that have high risk and treating them in order to reduce complications of disease and death. Setyarini and Suprapti (2016)

Research conducted in developing countries, namely Nepal, revealed that perinatal outcomes were asphyxia, LBW, and perinatal mortality. The results of the study indicate that patients who do not receive regular antenatal check-ups, lack health education, and lack access to health care services, measures to reduce the time required for patients to reach a tertiary care center should be a priority to reduce maternal and fetal mortality and morbidity. being in the womb (Pradhan et al., 2019).

According to the World Health Organization (WHO), early detection of high-risk pregnancy and childbirth by antenatal care during pregnancy can reduce maternal mortality and monitor the condition of the fetus to detect abnormalities that may exist or will arise during pregnancy so that they are quickly identified and treated before they adversely affect pregnancy (Hlongwane et al., 2021).

In Nigeria, the perinatal outcome study included asphyxia and perinatal mortality. In the article that has been researched, it is argued that pregnant women should also be educated and supported for early antenatal care to facilitate early detection and management of pre-eclampsia, and that referral systems should be strengthened within the health care system to improve access of women with preeclampsia to medical services that are needed. Research results (Olowokere et al., 2017). Improving the competence of nursing staff and other healthcare workers in early detection and management of pre-eclampsia using an evidence-based approach is also important to ensure better management outcomes. Early detection and management of preeclampsia can be incorporated into mandatory continuing professional development programs, in particular for nurse-midwives. According to (PERMENKES RI, 2014), the quality of service and patient safety in every service activity carried out on an ongoing basis must be considered in health facilities.

Research (Nurgaliyeva et al., 2020) It is internationally recognized that Kazakhstan has problems with environmental pollution fueled by thriving heavy industry and mining as well as by the past activity of the Semipalatinsk nuclear test site.

Research (American, 2019) suggests that genetic and environmental risk factors for the incidence of preeclampsia are still poorly known. From the data and other research results, it is stated that there is a tendency for genetic and environmental risk factors to be associated with the incidence of preeclampsia in pregnant women. Research (Pedersen et al., 2014) suggests a relationship between environmental pollution and an increased risk of pre-eclampsia. The results of this study showed an increased risk of pre-eclampsia for all air pollutants. In addition, exposure to air and noise pollution, which is affected by road traffic, can increase the risk of pre-eclampsia. Research conducted in a developing country, i.e., Zimbabwe, found problems in low resource settings. There are few health workers who are not trained to recognize and manage serious maternal and fetal complications early enough to prevent poor perinatal outcomes. There is also the issue of inadequate equipment and facilities and resources. To overcome these figures on the health of mothers, fetuses, and newborns, the government's focus is still on developing the economy so people can access health care easily. (Ngwenya, 2017).

There should be antenatal care services that are affordable and where mothers are taught about the dangers of preeclampsia/eclampsia so that they can detect it early and come to the hospital early. This will help prevent complications and death. Neonatal care facilities need to be improved to improve the outcome of the unit. Neonatal health must be placed on the global agenda and receive the same attention as maternal health. Global efforts must involve development assistance and channel funds for women's and newborn health issues (Ngwenya, 2017) . In line with research (Sari & Ardiyanti, nd), the success of early detection can be achieved if all health workers working in antenatal care master it. Therefore, factors related to the management of early detection of preeclampsia so that the incidence of death due to delay in knowing the problem can be avoided are discussed.

Researchers assume that the majority of perinatal outcomes found in developing countries are asphyxia. Based on 19 journals originating from developing countries, the researchers found factors that affect perinatal outcomes in developing countries include ANC examination, early detection,

maternal education, inadequate resources, and environmental pollution. Researchers assume that health monitoring, prevention, and early detection of pregnant women are mandatory, with the hope of suppressing adverse perinatal outcomes. These risk factors can be overcome by doing adequate monitoring during pregnancy and maximizing care during the delivery process, which is expected to maintain the welfare of the baby being treated.

**Perinatal outcomes in pregnant women with preeclampsia and eclampsia in developed countries**

Research conducted in developed countries, namely the Netherlands, suggests that perinatal outcomes in pregnancy with preeclampsia and eclampsia include low birth weight and perinatal mortality. Previous attempts to address this problem were in the Netherlands, where the risk of maternal complications was affected by delaying treatment in women with preeclampsia (Van Esch et al., 2017). The goals of treatment for mothers with preeclampsia are to prevent seizures, prevent intracranial bleeding, prevent disruption of vital organ functions, and give birth to healthy babies (Prawirohardjo, 2014). According to research conducted (Imelda & Putriana, 2018), the initial management and treatment of severe preeclampsia and eclampsia should be further improved so that it does not become a complication of eclampsia.

Israel is one of the developed countries that has perinatal outcomes in pregnancy with preeclampsia and eclampsia, including asphyxia and IUGR. Antenatal screening carried out in Israel minimizes adverse events for perinatals (Weitzner et al., 2020). Screening in antenatal care in normal pregnancy is carried out at least six times, namely twice in the first 3 months, once in the second 3 months, and three times in the third 3 months of pregnancy. (Ministry of Health RI, 2020). Quality ANC services are an effective activity for efforts to reduce maternal and child morbidity and mortality (Marniyati et al., nd). France had perinatal outcomes including asphyxia, IUFD, and perinatal mortality. In research (Lacobelli et al., 2017), It was found that the majority of pregnant women had several risk factors for preeclampsia, including pre-existing morbidity, which also represented risk factors for cardiovascular disorders (hypertension, diabetes, obesity, kidney disease, and hypercholesterolemia) that affected perinatal outcomes. Risk factors for preeclampsia include obesity (BMI greater than 30 kg/m2), hypertension or pre-existing kidney disease, preeclampsia or eclampsia, diabetes mellitus or gestational diabetes (Queenan et al., 2021). In line with the results of research (Saraswati & Mardiana, 2016), there is a relationship between factors such as age, gravida, history of heredity, antenatal examination, history of preeclampsia, and history of hypertension on the incidence of preeclampsia in pregnant women.

The need for an active role for health workers and collaboration between health workers and pregnant women so that pregnant women can carry out routine pregnancy checks to prevent complications during pregnancy and childbirth caused by preeclampsia (Ahmad & Nurdin, 2019). Researchers assume that the majority of perinatal outcomes found in developed countries are asphyxia and perinatal death. Factors affecting perinatal outcomes found in developed countries include antenatal screening, delay in preeclampsia care, and maternal risk factors. Researchers concluded from 3 journals originating from developed countries that antenatal screening needs to be optimized by preventing complications and adequate monitoring during pregnancy and childbirth in the hope of maintaining the welfare of the babies being treated and reducing the impact of adverse perinatal outcomes.

**Research limitations**

The types of articles used are still heterogeneous. Differences in study design, sampling technique, data collection techniques, and instruments used in data collection may cause differences in research results. Several journals are still discussing various other variables while researchers only focus on perinatal outcomes in pregnancy with preeclampsia and eclampsia.

## CONCLUSION

Perinatal outcomes in several developing countries (Indonesia, India, Ethiopia, China, Kazakhstan, Nepal, Nigeria, and Zimbabwe) include: asphyxia, low birth weight, *fetal distress*, IUFD, IUGR, and perinatal death. The majority of perinatal outcomes in developing countries are asphyxia. Perinatal outcomes in several developed countries (Netherlands, Israel, France) include:

asphyxia, perinatal mortality, LBW, IUFD, and IUGR. The majority of perinatal outcomes are perinatal asphyxia and death.

## SUGGESTION

1. **For profession**
   For health workers, especially midwives, it is hoped that they can create applications to facilitate monitoring of pregnancy with preeclampsia and eclampsia so as to minimize the negative impact on perinatal outcomes.
2. **For pregnant women,**
   Pregnant women are expected to pay more attention to their pregnancy with assistance from health workers, especially midwives.
3. **For the next researcher**
   Can be used as a reference to be studied with efforts to prevent adverse effects on perinatal outcomes in pregnancies with preeclampsia and eclampsia.

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## CONFLICTS OF INTEREST

The authors declare that there is no conflict interest with the topics or any associated objects upon the publication of this research.

## AUTHOR CONTRIBUTION

In this research the first author acts as a correspondent who is responsible for the research process up to publication by writing articles that have been adapted to journal guidelines. The second author assisted in data collection and data processing. The third author assisted in the research process and assisted in translation

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