



Risk Factors For Occurring Preeclampsia In Pregnant Women : Literature Review

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Abstract

Preeclampsia is a potentially dangerous pregnancy complication characterized by high blood pressure. This condition usually occurs when the gestational age reaches 20 weeks. Preeclampsia has an impact when pregnant and giving birth also results in postpartum problems due to endothelial dysfunction in various organs. Long-term effects can also occur in babies born to mothers with preeclampsia. With the high rate of preeclampsia in Indonesia and globally, this study aims to determine the risk factors for preeclampsia in pregnant women. The form of this research is Literature Review using a journal search on Google Scholar. The keywords used are Preeclampsia; Cause; and Pregnancy. After being selected, five journals will be reviewed, four journals are cross-sectional studies and one other journal is a case control study. The conclusion of this study The risk factors for preeclampsia in pregnant women include history of hypertension, history of preeclampsia, age, Body Mass Index (BMI), parity, stress, knowledge, completeness of Antenatal care (ANC), diet and exposure to cigarette smoke.

Keywords: Pregnancy; Cause; and Preeclampsia

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1. Introduction

The 2005-2025 National Long Term Development Plan has placed the Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) as indicators of health status and





the success of implementing health development. Furthermore, MMR and IMR are always targets and goals for health development in the Medium Term Development Plan (RPJMN). In the RPJMN V period (2020-2024), the program to accelerate the reduction of maternal mortality was designated as a strategic priority project (major project) in national development priorities (Kemenkes RI, 2020).

Maternal death is a complex event caused by various causes such as bleeding, preeclampsia or eclampsia, and infections or diseases suffered by the mother before or during pregnancy which can worsen the condition of the pregnancy (Susiana, 2019). The Ministry of Health's Health Research and Development Agency explains that the biggest cause of AKI in Indonesia is 32.4% hypertension and/or preeclampsia and 20.3% bleeding. Post Partum (Setyawati et al., 2018).

The prevalence of preeclampsia in developed countries is 1.3% - 6%, while in other countries developing is 1.8% - 18%. The incidence of preeclampsia in Indonesia itself is 128,273/ year or around 5.3%. Globally, preeclampsia is still a problem, 10% of pregnant women throughout the world experience preeclampsia, and it is the cause of 76,000 maternal deaths and 500,000 infant deaths 566 every year (Kemenkes RI, 2020).

Preeclampsia is a disease with signs of hypertension, edema and proteinuria that arise due to pregnancy. Preeclampsia is a potentially dangerous pregnancy complication characterized by high blood pressure. This condition usually occurs when the gestational age reaches 20 weeks (Marmi et al., 2019). This problem is not only because preeclampsia has an impact when the mother is pregnant and giving birth, but also causes postpartum problems due to endothelial dysfunction in various organs, such as the risk of cardiometabolic disease and other complications. Long-term impacts can also occur in babies born to mothers with preeclampsia, such as low birth weight due to premature labor or experiencing stunted fetal growth, thus contributing to the large perinatal morbidity and mortality rates.

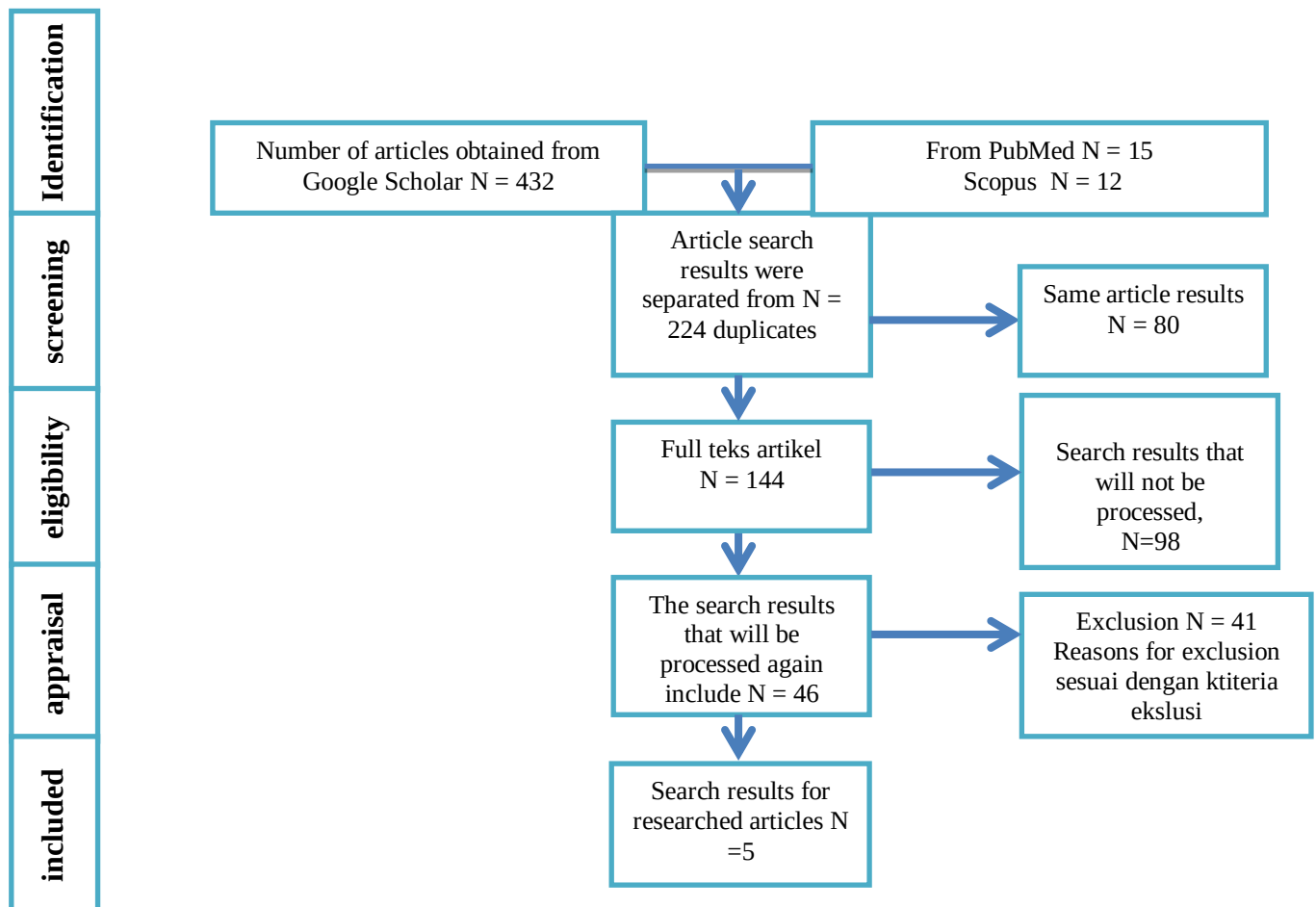
Behind that, the actual cause of preeclampsia is still a mystery (Plows et al., 2018). With the still high rate of preeclampsia in Indonesia and globally. Many factors may act as causes of preeclampsia. Based on these reasons, this literature review was carried out to look at the factors that cause the risk of preeclampsia in pregnant women.





2. Research Method

The form of this research is literature review. The literature search source was carried out by searching journals via Google Scholar, Pubmet, and Scopus. When searching for journals, the keywords used are: Preeclampsia; Reason; and Pregnancy. From the search results on Google Scholar, 4320 journals were obtained according to the keywords used. The journals reviewed are filtered journals published in the last 5 years 2018-2023, full text and is a research journal on the occurrence of preeclampsia in Indonesia. Based on these provisions, five journals were obtained which will be taken for this literature review. Journals published in addition to Indonesian and English.



3. Results And Discussions

a. Results





From this study regarding guidance and counseling, school environment systematic, sexual, the results obtained from the findings of 6 journals were in line with research.

No	Author	Title	Method	Result
1	(Rakhmawati & Wulandari, 2021)	Which Factors Affect Pre Eclampsia in Pregnant Women at the Banyuanyar Community Health Center, Surakarta	Cross sectional	There is a significant impact knowledge of preeclampsia, history of hypertension, completeness of ANC and IMT
2	(Darmawan, 2021)	Analysis of factors associated with 6 incidents of preeclampsia for pregnant women at Rsia Sitti Kharga 1 period August October 2019	Cross sectional	There is a relationship significant between maternal age, history hypertension, and previous history of maternal preeclampsia against the incidence of preeclampsia.
3	(Amalina et al., 2022)	Factors that Influencing Events Preeclampsia in Mothers Pregnant	Cross sectional	There is a connection to preeclampsia with parity, history of hypertension, dietary habits, exposure cigarette smoke, stress with preeclampsia.
4	(Mariati et al., 2022)	Which Factors Associated with The incidence of preeclampsia Trimester Pregnant Women III	Cross sectional	It was found that there was a relationship between age, parity and maternal BMI with incidence of preeclampsia
5	(Ahmad & Nurdin, 2019)	Risk factors for occurrence preeclampsia at RSIA SITI KHADIJAH Gorontalo	Case Control	the most influential factor against the incidence of preeclampsia is a history of preeclampsia

b. Discussions

In this literature review, 3 journals were found that examined the relationship between preeclampsia and a history of hypertension. Among them (Rakhmawati & Wulandari, 2021) with a p value of $0.014 < 0.05$, (Darmawan, 2021) $p = 0.000 < 0.05$ and (Amalina et al., 2022) with $p = 0.001$ which indicates a relationship between a history of hypertension and the occurrence of preeclampsia.





If a pregnant woman suffers from hypertension, it is very likely that during pregnancy the mother will experience preeclampsia because during pregnancy the mother's blood pressure can increase, causing preeclampsia (Silaban & Rahmawati, 2021). History of hypertension is a mother who has experienced hypertension before pregnancy or before 20 weeks of gestation. Mothers who have a history of hypertension are at greater risk of experiencing preeclampsia (Sukmawati et al., 2018).

Hypertension that has been suffered since before pregnancy has resulted in disruption/ damage to the body's important organs and, with pregnancy, the body's work will become more difficult, which can result in even more severe disruption/damage with the emergence of edema and proteinuria (Sabgustina & Anjani, 2018).

In this literature review, 2 journals were found that examined the relationship between preeclampsia and knowledge. Among them (Nisa et al., 2018) p value = 0.00 ($p > 0.05$), (Rahmawati & Wulandari, 2021) p value = 0.036. In line with research conducted by (Simanjuntak et al., 2023), a relationship between knowledge and the incidence of preeclampsia was found. Mothers with insufficient knowledge about preeclampsia are at risk of developing preeclampsia during pregnancy. Knowledge about pregnancy and pregnancy problems is very important, because by having knowledge about pregnancy, they can know and deal with the signs and symptoms of the problems they are experiencing. Apart from that, with good knowledge, pregnant women can be protected from anxiety in facing pregnancy problems so that a good level of health can be achieved for pregnant women (Setyawati et al., 2018).

In this literature review, 1 journal was found that examined the relationship between pre-eclampsia and diet, namely (Amalina et al., 2022) $p = 0.003$ QR < 15.79 which means there is a relationship between diet and the incidence of preeclampsia. Diet is a method or effort to regulate the amount and type of food with descriptive information including maintaining health, nutritional status, preventing or helping cure disease (Idha Lestari Putri, 2022). Maintaining a diet during pregnancy is aimed at preventing preeclampsia. Not consuming fruit, not going on a salt diet, not limiting/





frequently consuming foods that contain fat, salted foods and not limiting/ frequently consuming caffeine such as coffee can increase blood pressure which can cause preeclampsia. Maintaining a good diet, namely reducing consumption of fatty foods, salt intake and increasing consumption of fruit and vegetables is a way to avoid preeclampsia (Almaida, 2021).

In this literature review, there is 1 journal that examines the relationship between ANC completeness and the incidence of preeclampsia in mothers, namely (Rakhmawati & Wulandari, 2021). The p value was $0.027 < 0.05$, meaning there is a relationship between completeness of ANC for preeclampsia in pregnant women. Antenatal Care (ANC) is Pregnancy checks aim to monitor the progress of the pregnancy, ensure the well being of the mother and the growth and development of the fetus. Improving and maintaining the physical, mental and social health of mothers and babies (Yanuaringsih et al., 2022). A pregnant mother should receive at least 4 antenatal services during her pregnancy, namely once in the first trimester, once in the second trimester and twice in the third trimester to monitor the condition of the mother and fetus periodically (Primadevi & Indriyani, 2022). In the results of research (Saraswati & Mardiana, 2016) that the completeness of ANC is related to the incidence of preeclampsia and it is confirmed by the Ministry of Health, the Directorate of Health Promotion and Community Empowerment, that through antenatal examinations can prevent the development of preeclampsia, because one of the aims of antenatal examinations is to self-identify. any complications or complications that occur during pregnancy.

In this literature review, there is 1 journal that examines the relationship between stress and the incidence of preeclampsia in pregnant women namely research (Amalina et al., 2022) revealed the influence of stressful events on the incidence of preeclampsia in pregnant women (p value = 0.004) with an Odd Ratio of 4.103. Stress is a condition that occurs due to changes in the environment which are considered to be something that threatens or damages a person's mental balance (Pusparini et al., 2021). One of the risk factors for preeclampsia is stress. Preeclampsia is triggered because stress activates the hypothalamus, then releases a chain of biochemical events





which results in a rush of adrenaline and non-adrenaline into the system and after that is followed by the hormones cortisol and CRH which will cause muscle tension leading to vasoconstriction or contraction of the muscle walls which will block blood flow. Then blood pressure will increase, heart rate will increase and blood circulation in the utero-placenta will decrease, resulting in placental hypoxia and endothelial dysfunction, resulting in hypertension, edema, and increased proteinuria in the mother, which are signs of preeclampsia. If stress is experienced continuously, the body remains in a psychologically active state with excessive stress hormones adrenaline and cortisol, the increase in cortisol will paralyze the immune system. So that pregnant women's bodies become vulnerable to various diseases and disorders such as preeclampsia. So that pregnant women with stress can tend to increase the risk of preeclampsia (Pusparini et al., 2021).

There are 2 journals that examine the relationship between parity and the incidence of preeclampsia, including (Amalina et al., 2022) with ($p=0.002$) and (Mariati et al., 2022) with p value=0.000 which means there is a relationship between parity and the incidence of preeclampsia in pregnant mother. Parity it self is the number of children the mother has produced. Parity is one of the risk factors associated with the emergence of preeclampsia. When compared with multiparas, the incidence of preeclampsia in nulliparas is higher, especially for young nulliparas. The effect of parity is greater because almost 20% of nulliparas experience hypertension before, during delivery, or the postpartum period than multiparas apparently due to exposure to the chorialis villi for the first time. Parity is one of the risk factors associated with the emergence of preeclampsia (Transyah, 2018). The more frequently a mother gives birth to children, the greater the risk of experiencing preeclampsia because the mother experiences excessive stretching of the uterus, causing excessive ischemia which can cause preeclampsia, whereas in the first pregnancy, it is the first experience for the mother's body organs to adjust to pregnancy so that they are more at risk of experiencing preeclampsia (Agustina et al., 2022).





In this literature review, 2 journals were found that examined the relationship between preeclampsia and the age of pregnant women, including (Darmawan, 2021) with a p value = 0.592 and with (Mariati et al., 2022) p value = 0.000 which proves that there is a definite relationship between maternal age and the incidence of preeclampsia. Age is an important part of reproductive status. Age is related to increasing or decreasing body work, thus affecting a person's health status. The best pregnancy is when the woman's age is in the range of 20-35 years. At 35 years, a degenerative process occurs which results in structural and functional changes in the peripheral blood vessels, making it more susceptible to preeclampsia. (Laura et al., 2021)

In this literature review, there is 1 journal that examines the relationship between exposure to cigarette smoke and the incidence of preeclampsia in pregnant women, namely research (Amalina et al., 2022) which reveals the influence of exposure to cigarette smoke on the incidence of preeclampsia in pregnant women with a p value = 0.003. Pregnant women who are exposed to cigarette smoke are 2 times more likely to experience preeclampsia compared to those who are not exposed to cigarette smoke (Nisa et al., 2018). Various ingredients contained in cigarette smoke are dangerous for the health of the mother and fetus, such as carbon monoxide and nicotine. Carbon monoxide has a higher affinity for binding Hb compared to oxygen. This causes placental ischemia resulting in endothelial dysfunction which triggers an increase in vascular permeability resulting in preeclampsia. Nicotine in tobacco products stimulates the nervous system to release chemicals that can constrict blood vessels and cause high blood pressure and preeclampsia in pregnant women.

There are two journals that examine the relationship between BMI and the incidence of preeclampsia in pregnant women, including (Mariati et al., 2022) with a p value of 0.013 and (Rakhmawati & Wulandari, 2021) with a p value = 0.000 which indicates a relationship between BMI and the incidence. preeclampsia in pregnant women. Body Mass Index is a risk factor that causes preeclampsia. Excessive BMI is associated with decreased organ perfusion due to vasospasm and endothelial activation. In pregnant women, endothelial dysfunction occurs which is caused by





excessive BMI or obesity. Preeclampsia occurs through the mechanisms of hyperleptinemia, metabolic syndrome, inflammatory reactions and increased oxidative stress which leads to endothelial damage and dysfunction. Apart from that, decreased production and secretion of nitric oxide causes an imbalance of vasoconstrictor and vasodilator factors, this will increase maternal blood pressure.

In the literature review, there are 2 journals that examine the relationship between a history of preeclampsia and the incidence of preeclampsia in mothers, including (Darmawan, 2021) with a p value = 0.021 and (Ahmad & Nurdin, 2019) with a p value = 0.001 Which means there is connection history preeclampsia with the incidence of preeclampsia in pregnant women. History of preeclampsia anxiety occurs. This anxiety can cause an increase in the mother's blood pressure because the body will respond to anxiety which is characterized by an increase in the hormone adrenaline, thereby triggering preeclampsia. Another theory suggests that pregnant women with a history of preeclampsia have an inherited tendency, preeclampsia as a disease passed down to a child or sister. A history of preeclampsia in a previous pregnancy is one of the supporting factors for the occurrence of preeclampsia in pregnancy.

4. Conclusion

Risk factors for preeclampsia in pregnant women include history of hypertension, history of preeclampsia, age, BMI, parity, stress, knowledge, completeness of ANC, diet and exposure to cigarette smoke. A history of hypertension was the risk factor most discussed in this study.

5. Compliance with ethical standards

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Disclosure of conflict of interest

All authors of this article declare that there are no competing interests.





Statement of informed consent

Every action we take as authors is a mutual agreement or consent.

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