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The Relationship Of Preeclampsy With Premature Events : Literature Review

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ABSTRACT

Increased blood pressure during pregnancy up to ≥140/90 accompanied by proteinuria or Other organ failure is called preeclampsia. Preeclampsia is a manifestation of hypertension in pregnancy which occurs in 2–8% of pregnancies worldwide . Premature birth is defined as birth before 37 weeks of gestation (20-37 weeks) or with a fetal weight of less than 2500 grams. Objective from review literature This is to determine the relationship between preeclampsia and the incidence of prematurity . Using the literature review method with the PRISMA Flow Diagram principles. Article or journal scientific downloaded from PubMed , Portals Garuda, And Google Scholar with standard SYNTA IV and V. Key words in the search for this article are preeclampsia, birth, prematurity . Got it 1 5 0 articles in search results. All articles were selected based on the inclusion criteria obtained 20 research articles that will be reviewed. The results of the study show that there is a relationship between pre-eclampsia and the incidence of preterm labor.

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INTRODUCTION

Increased blood pressure during pregnancy up to ≥140/90 accompanied by proteinuria or Other organ failure is called preeclampsia. Preeclampsia is a manifestation of hypertension in pregnancy which occurs in 2–8% of pregnancies worldwide. Preeclampsia can develop into severe preeclampsia if proper therapy is not received. Severe preeclampsia is an increase in blood pressure during pregnancy to ≥160/100 mmHg accompanied by one of the following criteria: thrombocytopenia; kidney disorders; liver disfunction; pulmonary edema; headache of new onset that does not improve with treatment and is not a symptom of the differential diagnosis; visual disturbances; and impaired fetal growth. Severe preeclampsia can cause other pregnancy complications, such as eclampsia, HELLP syndrome, postpartum hemorrhage and preterm labor (Widjaja C et al, 2024)

The incidence of preeclampsia in developing countries is approximately seven times higher than in developed countries (average 2.8% of live births 0.4%) . Preeclampsia affects 5-8% of all pregnancies, and causes many complications in the mother and fetus to such an

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extent that 50,000 women worldwide die from preeclampsia and its complications every year (Andi NA et al, 2022). Apart from that, at the 2019 National Health Working Meeting (Rakerkesnas), Achadi stated that as many as 75% of the main causes of maternal death were due to severe postpartum bleeding, postpartum infections, high blood pressure during pregnancy (preeclampsia/eclampsia), prolonged/obstructed labor, and unsafe abortion, while the main causes of neonatal death are prematurity, asphyxia, infection and birth defects (Safitri A et al, 2021).

Preeclampsia is believed to cause uteroplacental ischemia which can reduce the supply of oxygen and nutrients to the fetus which can disrupt fetal growth and even cause fetal death in the womb. The incidence of preeclampsia is 7-10% of pregnancies. In the first pregnancy, there is the formation of "Human Leucocyte Antigen Protein G" in modulating the immune response, so that the mother rejects the product of conception (the placenta) or there is maternal intolerance to the placenta, resulting in preeclampsia (Haslan H et al, 2022).

Premature birth is defined as birth before 37 weeks of gestation (20-37 weeks) or with a fetal weight of less than 2500 grams. According to WHO, there were 15 million premature births in 2018. Prematurity is 5-10% in developed countries such as Europe, North America, parts of South America and Australia, but 10-30% in Africa and Southeast Asia (Ferafy et al, 2023) .

Prevention or early diagnosis can reduce the incidence and reduce morbidity and mortality. To be able to make an early diagnosis, regular pregnancy monitoring is needed by paying attention to weight gain, blood pressure, and urine examination to determine proteinuria. The incidence of preeclampsia can be prevented by providing advice on diet, getting enough rest and antenatal supervision (Nuriza IA et al, 2020).

Based on description on Which where The problem that occurs in preterm birth is not only perinatal death, but also premature babies are often accompanied by abnormalities, both short and long term, such as Respiratory Distress Syndrome (RDS), Necrotizing Enterocolitis (NEC), neurologic disorders, and so on. The purpose of this literature review is to determine the relationship between preeclampsia and the incidence of prematurity.

METHOD

This research uses a *literature review method.* Literature obtained by means reviewing scientific articles or journals downloaded from *PubMed* , Garuda Portal and *Google Scholars* with SINTA IV and V standards are listed in Figure 1. Articles were screened based on provisions including articles published in 20 20 - 202 4 , article Which published can downloaded in a way *full text* And own access open, as well as discussing the relationship between preeclampsia and the incidence of prematurity, key in search article between other Preeclampsia, birth, premature.

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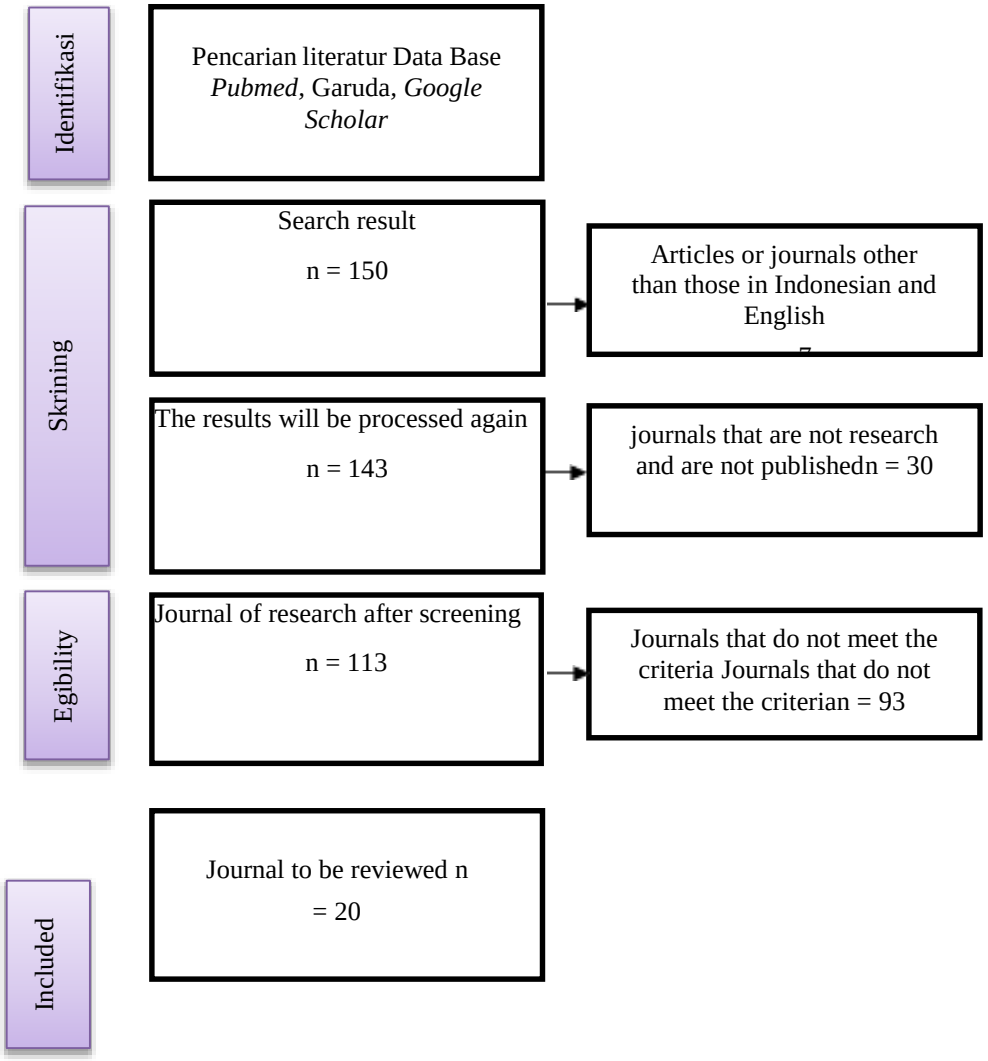

Figure 1 . PRISMA Flow Research Articles on the Relationship between Preeclampsia and Premature Events

RESULTS

150 articles found in search results. All articles were included in the search And filtering Then filtered with based on Language Indonesia And English, method, indexed by Sinta IV and V and published in the journal. 20 research articles will be reviewed consisting of 4 *PubMed* articles and 1 6 articles from *Google Scholar* used in study This.

Table 1. Study Results Article

No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
1.	Khoiriyah UH , Aini I, Purwanti T.	Relationship between Preeclampsia	Correlational analytics	From the research results, it was	Pre eclampsia, Preterm

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No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
		and Preterm Delivery		found that there was a relationship between pre-eclampsia and the incidence of preterm labor.	Labor
2.	Widjaja CR, Suparman E, Wantania JJ.	Relationship between Severe Preeclampsia and Preterm Delivery at RSUP Prof. Dr. RD Kandou Manado Period 2021–2022	Case control	From the research results, there is a significant relationship between severe preeclampsia and the incidence of preterm labor at Prof. Hospital.	Severe preeclampsia; premature birth; long-term labor
3.	Nuriza Al, Na'im S, Hidayah A	Relationship Preeclampsia with Premature labor in Jombang Regional General Hospital on June in The Year 2019 th	Non-experimental observational with correlational design or retrospective analytical survey approach	There is a relationship between preeclampsia and premature birth at Jombang District Hospital.	Preeclampsia, Premature Labor.
4.	Nopalia P, Purwanti H, et al	The Relationship between Preeclampsia and Preterm Delivery	Retrospective	From the research results, mothers who experience preeclampsia have a 7.8 times greater	Preeclampsia, Labor, Preterm, Term

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No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
				risk of experiencing preterm labor compared to mothers who do not experience preeclampsia.	
5.	Komariah AL, Sunanto, Hanifah I	The Relationship between Preeclampsia and Premature Incidence Rates	Observational analytics	There is a relationship between preeclampsia and the number of premature events at the Paiton Health Center in 2021.	Preeclampsia; birth; premature
6.	Lisonkova S, Bone JN, et al.	Incidence and risk factors for severe preeclampsia, hemolysis, elevated liver enzymes, and low platelet count syndrome, and eclampsia at preterm and term gestation: a population-based study	Retrospective	From the research results , the risk of severe preeclampsia decreases in term pregnancies, the risk of eclampsia increases in term pregnancies,	E chlampsia, HELLP syndrome, premature pregnancy, risk factors, severe preeclampsia
7.	An H, Jin M, et al.	Impact of gestational hypertension and pre-eclampsia on	Cohort	Pre-eclampsia is associated with a higher risk of premature	Preeclampsia; birth; premature

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No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
		preterm birth in China: a large prospective cohort study		birth. Early onset gestational hypertension and pre-eclampsia are associated with a more severe risk than later onset conditions.	
8.	Safitri A, Djaiman SP	Association of Hypertension in Pregnancy with Premature Birth: Metaanalysis	Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)	From the research results that pregnancy with hypertension still provides quite a lot of opportunities for premature birth, so it is necessary to improve services and education related to antenatal care (ANC) for pregnant women and their families.	Pregnancy; hypertension; premature; meta-analysis
9.	Matyas M, Hasmasanu M, et al	Early Preeclampsia Effect on Preterm Newborns Outcome	Case Control	This study shows that early preeclampsia increases the risk of complications	Preeclampsia; newborn baby; prematurity; respiratory disorders; intraventricul

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No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
				in premature neonates.	ar hemorrhage
10.	Habibah GN, Hadi EN	The relationship between preterm labor and preeclampsia among women giving birth at Sumedang District Hospital	Analytical survey	In research, it was found that there was a relationship between preterm labor and preeclampsia in women giving birth at Sumedang District Hospital.	Preterm labor; preeclampsia; mother giving birth
11.	Koesdinar AP, Effendi J, Sari AK	Maternal Age, Parity, and Pregnancy Interval as a Risk of Preterm Delivery in Pregnant Women with Preeclampsia at Al-Ihsan Hospital Bandung in 2021	Observational analytics	The results of the analysis of the relationship between maternal age, parity, and pregnancy interval with the occurrence of preterm labor in preeclampsia sufferers showed a p value of 0.21, 0.61, 0.67 (> 0.05) which shows that there is no significant relationship between maternal age and parity. ,	Pregnancy Interval, Parity, Preeclampsia, Age.

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No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
				and pregnancy interval with the occurrence of preterm labor in preeclampsia sufferers at Al-Ihsan Regional Hospital	
12.	Yuanita F	Factors Influencing the Incidence of Preterm Birth at Banyuasin Regional Hospital in 2017-2018	Quantitative analytics	In the research, it was found that there was a significant relationship between PEB and preterm birth. Based on the results of the analysis, it was also obtained that the value of OR = 2.667 means that mothers who experienced PEB had a 2.667 times chance of having a preterm birth compared to respondents who did not have PEB.	Preterm Birth, Age, Parity, Anemia, PEB and KPD
13.	Pragitara CF, Etika R, et al	Risks of preterm birth and low Apgar	Retrospective analytics	Research shows that preeclampsia	Preeclampsia, premature birth, Apgar

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No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
		score among preeclamptic women		can put pregnant women at risk of giving birth to premature babies and newborns with low Apgar scores.	score
14.	Friedman SA, Schiff E, et al	Neonatal outcome after preterm delivery for preeclampsia	Cohort	In research it was found that maternal preeclampsia had a negative impact after birth on babies born at 24 to 35 weeks of gestation.	Preeclampsia; birth; premature
15.	Anindya F, Sukowati EG, Fatmawati W	Preeclampsia correlates with maternal and perinatal outcomes in Regional Public Hospital, Madiun, Indonesia	Observational analytics	A significant relationship was found between preeclampsia with or without severe symptoms on maternal outcomes, namely the birth process, and perinatal outcomes, namely IUGR, LBW, preterm birth.	Preeclampsia; maternal outcomes; perinatal outcomes; maternal death
16.	AE's son, Hasibuan HS, Fitriyati Y	The Relationship between Preterm	Non-experimental study	There is a significant relationship between	Preterm, severe preeclampsia, fetal

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No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
		Delivery in Severe Preeclampsia and Fetal Outcome in AT Iskam RSU Your Hope is Tegal		preterm labor accompanied by severe preeclampsia and fetal outcome.	outcome.
17.	Dewi AK, Maulana AM, Putra RA	The Relationship between Preeclampsia and Parity and the Incidence of Premature Parturition in Banyumas District Hospital for the Period January to December 2017	Observational analytics	In the research, it was found that there was no relationship between preeclampsia and parity on the incidence of premature birth.	Preeclampsia, Parity, Premature Parturition
18.	Anggraini R	Relationship between Maternal Age and Preeclampsia with Premature Labor in Mothers Giving Birth at RSUP DR. Mohammad Hoesin Palembang	Analytical survey	In the research, it was found that there was a significant relationship between preeclampsia and the incidence of premature labor in Wing A, Obstetrics Room, RSUP Dr. Mohammad Hoesin	Premature Labor, Maternal Age, Preeclampsia

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No.	Name Writer	Title Article	Design Study	Results	Factor Determinant
				Palembang 2008.	
19.	Kusumawati W, Krisnawati L	The relationship between preeclampsia and the incidence of preterm labor in women giving birth	Retrospective	The results of this study show that there is no relationship between preeclampsia and preterm labor.	Preeclampsia, Labor, Preterm Labor, Maternity.
20.	Carolin BT, Widiastuti I	Factors Associated with the Incidence of Preterm Birth at Muhammadiyah Hospital Taman Puring Kebayoran Baru South Jakarta Period January - June 2017	Case control	The results of this study show that there is a relationship between preeclampsia and preterm birth at Muhammadiyah Hospital Taman Puring Kebayoran Baru, South Jakarta.	Premature Birth, Age, Anemia, PROM, History of Previous Premature Birth

Discussion

Based on 20 articles, a relationship has been found between preeclampsia and the incidence of prematurity.

Preeclampsia

Preeclampsia is a clinical syndrome during pregnancy (after 20 weeks of gestation) which is characterized by an increase in blood pressure (>140/90 mmHg) in women whose blood pressure was normal before 20 weeks of gestation (Royani I et al, 2022). Blood pressure measurements in preeclampsia are measured twice with an interval of 4 hours accompanied by proteinuria exceeding 300 mg in the urine for 24 hours. Based on the symptoms, preeclampsia can be divided into mild preeclampsia and severe preeclampsia (Utari D et al, 2022).

The achievement of a fairly high increase in maternal deaths due to preeclampsia shows that there are signs and symptoms that pregnant women are not aware of.

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Symptoms of preeclampsia are hypertension, edema, proteinuria, blurred vision, headache and pain in the epigastrium (Kurniawati D et al, 2023).

The pathophysiology of preeclampsia is still uncertain, there are two factors that should be suspected to be the cause of preeclampsia, namely placental factors (poor placental perfusion produces factors that cause clinical manifestations of preeclampsia) and maternal factors, such as elderly mothers, chronic hypertension, kidney disease, diabetes mellitus. , obesity, and multiple pregnancies. However, the onset and course of preeclampsia remains unpredictable (Hinelo K et al, 2021).

Premature

WHO defines preterm birth as birth that occurs before the gestational age reaches 37 weeks from the first day of a woman's last menstrual period (LMP). Preterm labor can be classified into spontaneous preterm labor and iatrogenic preterm labor (termination). Preterm birth due to termination of pregnancy often occurs due to complications in pregnancy, such as placenta accreta and preeclampsia/eclampsia (Widjaja C et al, 2024).

A number of risk factors are associated with premature birth, namely a history of premature birth, underweight, obesity, diabetes, hypertension, smoking, infection, maternal age, genetics, multi-fetal pregnancy, pregnancies that are too close together, placental disorders, and premature PROM. (Drastita PD et al, 2022).

The physical morbidity of premature babies can impact later stages of development, including learning disabilities, hearing and vision problems. Ultimately, this morbidity also becomes a psychological and financial burden for the baby, mother and family (Sari IM et al, 2021).

Relationship between Preeclampsia and Premature Events

Based on the theory, it explains that the incidence of premature birth is influenced by preeclampsia/eclampsia due to blood vessel spasm. Decreased blood flow to the placenta results in impaired placental function. Sudden arteriolar spasm can cause severe asphyxia. If spasm lasts a long time it will disrupt growth fetus. If there is an increase in the tone and sensitivity of the uterus to stimulation, it can cause premature labor. With high hypertension, fetal growth will be disrupted, with shorter hypertension, fetal distress and even death can occur due to lack of oxygen. Increased uterine tone and sensitivity to stimulants are often found in preeclampsia and eclampsia, making it easy for premature parturition to occur (Khoiriyah UH et al, 2021).

Research conducted by Widjaja CR et al, found that there was a significant relationship between severe preeclampsia and preterm labor. Pregnant women with severe preeclampsia are 2.539 times more likely to experience preterm labor than mothers without severe preeclampsia (Widjaja C et al, 2024).

This is in accordance with the theory which states that a fetus conceived by a mother with preeclampsia will living in the womb with less nutrition and oxygen. This situation can occur because of the blood vessels channeling blood to the placenta is narrowed. Due to poor nutrition, fetal growth will be hampered so that there will be babies with low birth weight and preterm birth (Hbibah GN, 2022).

The occurrence of spasm of arteriolar blood vessels leading to important organs in the

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body can cause reduced blood flow to the retroplacenta, causing disruption in the exchange of nutrients, CO2 and O2 which causes asphyxia and even death of the fetus in the womb. Sudden arteriolar spasms cause severe asphyxia and even fetal death, while long-lasting spasms can disrupt fetal growth. Preeclampsia basically occurs in uteroplacental artery insufficiency which causes placental ischemia. In ischemia, the formation of free radicals (toxins) occurs which results in disruption of prostaglandin metabolism and increases vascular sensitivity, this affects the softening reaction of the cervix, causing preterm labor contractions and prematurity (Hbibah GN, 2022).

CONCLUSION

Based on the results above , it was concluded that there was a relationship between preeclampsia and premature labor. Suggestion For researchers there is a need for further research on the causes of preeclampsia. Not only researching the relationship between preeclampsia and the incidence of preterm labor but also researching other factors that influence preeclampsia.

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