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FACTORS INFLUENCING THE INCIDENCE OF PRE-ECLAMPSIA IN PREGNANT WOMEN IN JEMBER DISTRICT

Siti Kholifah[1], Elok Permatasari[2], Ristya Widi Endah Yani[3]

[1]Master of Public Health Study Program, Postgraduate, Unversity of Jember
[2]Faculty of Public Health, Unversity of Jember
[3]Faculty of Dentistry, University of Jember

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Abstract

Background: Pre eclampsia is a pregnancy complication characterized by high blood pressure that the sistole and diastole exceed 140/90 mm/Hg and protein in the urine (>300 mg/24 hours). Edema (Edema refers to swelling caused by excess fluid trapped in the body's tissues) develops during the 20 weeks of pregnancy until the last day of a week postpartum. This condition is one of the causes of maternal death in the world, including in Indonesia.

Method: This research is an analytical observational quantitative research with a cross-sectional approach.**Result:** Based on the logistic regression test it is concluded that the main factor of the occurrence of pre-eclampsia in pregnant women in Jember are : utilization of health services, consumes of highblood pressure drugs and blood boosting tablet,phisycal activities, health services acces, ANC complience, adequate social support and health care with p value < 0.005.**Conclusion:** Pregant women's knowledge influences their behavior, a proper education and guidance for health checks before and during pregnancy must be given, a support is necessary wether from husband, family and friends, medical team has a very important role in assisting and taking care of mothers and babbies health.

Corresponding author:
Elok Permatasari
Address: Jl. Mastrip No. 6A Jember Jawa Timur
Email: elok@unej.ac.id

Introduction

Jember Regency is the highest regency in East Java regarding the Maternal Mortality Rate (MMR), which is 43 cases in 2024. This Maternal Mortality Rate is spread across 25 Community Health Centers in Jember Regency, namely PKM Ajung, PKM Sukowono and Kalisat each contributing 3 cases and 2 cases each in PKM Mumbulsari, Arjasa, Silo II, Mayang, Sumbersari, Nogosari, Balung, Karangduren, Puger and Pakusari. Furthermore, 1 case in PKM Bangsalsari, Gumukmas, Silo I, Ledokombo, Kasiyan, Kemuningsari, Tanggul, Jelbuk, Jenggawah, Mangli, Banjarsengon, Kencong, and Curahnongko. Of the 43 cases, the highest contributors were preeclampsia (13), hemorrhage (9), pregnancy-related infections (9), non-obstetric diseases (7), and other causes (5) (Jember Health Office, 2024). Pre-eclampsia results in high maternal mortality rates in Jember.

Given that preeclampsia is the leading cause of maternal mortality in Jember, early detection of preeclampsia risk factors is essential. The goal of early detection of preeclampsia risk factors is to identify and identify disorders or symptoms that cause preeclampsia in pregnant women. Symptoms of preeclampsia include increased maternal blood pressure >140/90 mmHg at 20 weeks of gestation or later, proteinuria >300 mg in 24 hours from 20 weeks of gestation, or a dipstick >1 if no clots are detected within 24 hours.

Valentine., et., al., 2022, in their journal (Environment Research and Public Health), adopted the WHO theory that risk factors for preeclampsia include individual characteristics, lifestyle behaviors, psychosocial environments, and antenatal health. Individual characteristics include age, education, occupation, income, pregnancy status, and ethnicity. Lifestyle behavioral factors include smoking, consumption of hypertension medication, alcohol consumption, consumption of iron tablets, physical activity, and ANC behavior. Psychosocial environmental factors include social support. The final factor is prenatal care, which includes utilization of health services, access to health services, and adequate health care. This study aims to analyze the risk factors for preeclampsia in pregnant women in Jember Regency. It is hoped that this study can identify the many risk factors that cause preeclampsia and which factors most influence the incidence of preeclampsia in pregnant women in Jember Regency.

Methods

This research is a non-experimental study. The design of this research is a quantitative observational analytic study with a cross-sectional approach, namely a type of research that aims to analyze the correlation between exposure or risk factors (independent) with consequences or effects (dependent). The population in this study were pregnant women in Jember district with inclusion criteria: Pregnant women with gestational age > 20 weeks (2nd and 3rd trimester), Pregnant women who undergo routine ANC checks, Pregnant women registered in the cohort of pregnant women and pregnant women who are willing to be respondents in 5 health centers in Jember Regency with the highest number of pregnant women, namely Sumberbaru health center, Bangsalsari health center, Ajung health center, Mumbulsari health center and Sumbersari health center June from June 2 to July 2, 2025. The sampling method used in this study is Proportionate Random Sampling, namely researchers took samples randomly and proportionally from each predetermined health center, there were 102 respondents. In this study, the data used were primary data and secondary data. The primary data in this study were respondent identity and questionnaire data. Pregnant women's answers to risk factors for preeclampsia in Jember Regency, which in this case include smoking, alcohol consumption, consumption of hypertension medication, consumption of iron tablets, physical activity, ANC behavior, social support, utilization of

health services, access to health services and adequate health care. Secondary data is supporting data to complement the primary data obtained indirectly. Secondary data in this study are in the form of a register of pregnant women's visits, a cohort book of pregnant women and a KIA (Maternal and Child Health) book owned by pregnant women. The data collection procedure was carried out by distributing questionnaires containing questions to be answered by respondents, namely pregnant women in the second and third trimesters in Jember Regency. Validity testing uses the Pearson Correlation approach to test the validity of questionnaire statements. Reliability measurements are carried out using the Cronbach Alpha (α) statistical test. Data analysis is carried out using a logistic regression test, namely to predict the influence between variables.

Results

From the locus data used in this study, 102 pregnant women were identified, with 54 having preeclampsia and 48 without preeclampsia. Hypothesis testing used logistic regression. This hypothesis testing aims to determine the extent of influence of the independent variable on the dependent variable. Significance values can be obtained from the logistic regression test.

Table 1. Test of the Influence of All Indicators on the Incidence of Pre-eclampsia

Variabel	Score	% Kontribusi	Sig. (p)
Health Service Utilization	54,542	13,5	0,000
Medication Consumption	50,929	12,6	0,000
Iron Fortification Tablet Consumption	50,745	12,6	0,000
Physical Activity	46,178	11,4	0,000
Health Service Access	44,437	11	0,000
ANC Compliance	40,062	9,9	0,000
Social Support	39,929	9,8	0,000
Adequate Health Care	34,058	8,4	0,000
Age	3,820	1	0,042
Pregnancy Status	3,450	0,9	0,045
Education	2,950	0,8	0,048
Income	2,780	0,7	0,049
Ethnicity	0,354	0,1	0,552
Occupation	0,278	0,08	0,598
Smoking Habits	0,165	0,05	0,684
Alcohol Consumption	0,000	0	1,000
Total	**403,725**	**100%**	—

Based on the results of a logistic regression analysis of the 16 variables studied, 12 variables were found to have a significant influence on the incidence of preeclampsia ($p < 0.05$). These variables include: health service utilization, medication consumption, iron supplementation tablet consumption, physical activity, access to health services, adherence to antenatal care visits, social support, adequate health care, and demographic factors such as age, pregnancy status, education, and income. Among these variables, health service utilization contributed the largest to the incidence of preeclampsia, at 13.5%, followed by medication consumption and iron supplementation tablet consumption, each contributing 12.6%. These findings indicate that health services and dietary behavior during pregnancy play a crucial role in preventing the risk of preeclampsia.

Meanwhile, variables such as ethnicity, occupation, smoking habits, and alcohol consumption showed very small contributions (less than 0.3%) and were not statistically significant ($p > 0.05$). Thus, it can be concluded that these four variables did not significantly influence the incidence of preeclampsia in this population. These results indicate that preeclampsia prevention interventions should focus on improving access to and the quality of maternal health services, as well as education about healthy lifestyles during pregnancy.

Discussion

The majority of preeclampsia cases, 79.6%, occurred in mothers over 35 years of age. This indicates that advanced age is a strong risk factor for preeclampsia.

This descriptive interpretation reinforces the finding that the older the mother, particularly in the age group over 35, the greater the risk of

preeclampsia. This is due to decreased physiological function and an increased risk of hypertension with age.

This is explained in research by (Holden and Ayers 2016; Ray et al. 2022) that pregnant women over 35 are at risk of developing preeclampsia. However, this differs from what Febriyanti et al. reported in 2024 in their study, which found that 86 cases, or approximately 67.7%, of preeclampsia were found in the 20-35 age group at Dr. H. Chasan Boesorie Regional Hospital. This study showed a P-value of 0.042, indicating a significant association between maternal age and preeclampsia.

a. The Influence of Pregnancy Status on the Incidence of Preeclampsia

Preeclampsia cases occurred in primiparous mothers (first-time births), accounting for 55.6%, or approximately 30 pregnant women. Primiparous mothers are exposed to the chorion for the first time, where the immunological mechanism of blocking antibody formation, carried out by HLA-G (Human Leucocyte Antigen G) against placental antigens, has not yet fully developed, disrupting the process of trophoblast implantation into the mother's decidual tissue. Utami reported a different finding in 2023, stating that 23 pregnant women, or approximately 65.7%, experienced preeclampsia and were multiparous. This study showed a P-value of 0.045, indicating a significant association between maternal age and preeclampsia.

The majority of preeclampsia cases were found in mothers with low levels of education, particularly elementary school graduates (51.9%), representing approximately 28 pregnant women out of a total of 54 preeclampsia cases. These findings indicate that the lower a mother's education level, the higher the likelihood of preeclampsia. This may be due to mothers' limited understanding of health information, the importance of regular prenatal checkups, and healthy lifestyle practices during pregnancy. Conversely, mothers with higher levels of education tend to have better access to information, which can support informed health decisions, resulting in a lower risk of preeclampsia.

This is in line with research by Inggit Primadevi in 2024, which found that pregnant women with low levels of education (especially those with elementary school education) are at higher risk of preeclampsia compared to those with higher levels of education. In this study, the P-Value was 0.048 so that $P < 0.05$, which means there is a significant relationship between maternal education and pre-eclampsia.

The majority of preeclampsia cases (72.2%) occurred in self-employed women. This study aligns with research by Humairoh, Amelia, and Rosyidah (2021), which showed that bivariate analysis showed a p-value ($P>0.05$), indicating no relationship between occupation and the incidence of preeclampsia.

This contrasts with research by Arifah (2024), which found that a pregnant woman's employment status influenced her anxiety levels and readiness for pregnancy. Researchers assume that both working and unworking mothers are at risk of preeclampsia because pregnancy itself brings significant changes to the mother's body that can affect the blood vessel system and immune response. This study shows a P-Value of 0.598, so $P> 0.05$, which means there is no significant relationship between maternal occupation and preeclampsia.

The majority of preeclampsia cases (94.4%), or 51 pregnant women, occurred in respondents with incomes below Rp2,838,642. Income can be a determining factor in the incidence of preeclampsia, as it affects access to nutrition, medical care, and other health services. Frank I. Olotu et al. (2020) reported in their research that pregnant women with high incomes practice poor or unhealthy lifestyles that lead to overweight or obesity, which can lead to preeclampsia.

Based on this income factor, researchers argue that mothers with low incomes are less able to meet their daily needs. They will have difficulty meeting

their nutritional needs, unable to afford side dishes, vegetables, or even milk or supplements to meet their nutritional needs. Pregnant women are concerned about anemia and Chronic Energy Deficiency Syndrome (KEK), which can negatively impact both mother and baby. This study showed a P-Value of 0.049, indicating a significant relationship between income and preeclampsia.

Preeclampsia cases were most prevalent among pregnant women from the Madurese ethnic group, accounting for 40 cases, or 74.1% of the 54 cases. The study results indicated that the majority of respondents were Madurese, a finding the researchers believe is due to their ethnicity and the Madurese language they speak daily. A 2023 study by Rivaldi Indra et al. found that the majority of pregnant women from the Madurese ethnic group actually prefer foods with high salt (salty) or savory foods. Salty foods can trigger high blood pressure, which ultimately leads to preeclampsia.

Maryuni 2024 wrote in her research that pregnant women in rural areas understand their pregnancy better in a cultural context than pregnant women in urban areas because pregnant women in rural areas still strongly adhere to value systems, customs and culture that are influenced by the sociodemographic and sociocultural characteristics of the community, while pregnant women in urban areas understand pregnancy from a theoretical definition, where in urban areas it is easier to access various pregnancy information both from mass media or social media. In this study, the P-Value value is 0.052 so that P <0.05, which means there is a significant relationship between the mother's tribe/ethnicity and pre-eclampsia.

The majority of respondents (88.2%) were non-smokers, representing 90 pregnant women. To categorize light, moderate, and heavy smokers, the researchers used the Brinkman index, which is calculated by multiplying the number of cigarettes smoked per day by the duration of smoking. Pre-eclampsia has various causes. According to Paramitasari (2014), one risk factor for pre-eclampsia is unhealthy lifestyle habits, such as smoking.

These changes in lifestyles lead to behavioral changes. This finding differs from Wikstrom et al., who found that smoking during pregnancy, but not using tobacco, carries a small risk of pre-eclampsia. This study showed a P-value of 0.684, indicating that P > 0.05 indicates no significant association between maternal smoking and pre-eclampsia.

The majority of preeclampsia cases (90.7%), or 49 cases. Pre-pregnancy use of hypertension medication significantly influences the incidence of preeclampsia. This means that pregnant women with a history of hypertension who have been taking hypertension medication before pregnancy have a lower risk of developing preeclampsia than pregnant women with a history of hypertension who have not taken hypertension medication before pregnancy (Rivaldy, 2023). A 2023 study by Satish C. Padhan also found that a history of chronic hypertension increases the risk of preeclampsia by 13.37%.

The researchers' opinion is also possible because pregnant women with a history of hypertension and diligently take their medication understand the impact and effects of taking hypertension medication before pregnancy to ensure proper blood pressure control. In this study, the P-Value was 0.000, so P < 0.05, which means there is a significant relationship between taking hypertension medication and pre-eclampsia.

The majority of respondents did not consume alcohol (96.1%). The results of this study differ from research by Khadija Akter in 2021, which stated that pregnant women who drank alcohol at least three times a week during pregnancy were twice as likely to experience pre-eclampsia. The researcher assumed that all respondents were pregnant women in rural areas where drinking alcohol is still strongly considered bad or taboo for women in society. In this study, the P-Value was 1.000, so P> 0.05, which means there is no significant relationship between alcohol consumption habits and pre-eclampsia.

Respondents who did not take iron supplements and experienced preeclampsia were 74.1% (40 pregnant women). A 2024 study found that pregnant women who did not take iron supplements had a 4.46% greater risk of developing preeclampsia compared to those who did.

Another important role of folic acid is in the formation of one-third of red blood cells. Regular consumption of folic acid can reduce the risk of complications in pregnant women with preeclampsia. This study showed a P-value of 0.000, indicating a P <0.05, indicating a significant association between iron supplement consumption and preeclampsia.

Respondents who did not engage in physical activity and experienced preeclampsia were 83.3% (45 pregnant women). A 2024 study at the Asera Community Health Center in North Konawe found a significant correlation between physical activity and the incidence of preeclampsia.

Pregnant women who walked at least 15 minutes per day were 16% less likely to develop preeclampsia compared to those who did not walk. Physical activity during pregnancy can affect muscle and joint function, improve blood circulation, improve heart function, promote a healthy and fresh body, reduce the risk of high blood pressure, and alleviate common pregnancy complaints such as leg swelling, back pain, and fatigue. This study showed a P-value of 0.000, indicating a P <0.05, indicating a significant association between physical activity and preeclampsia.

Preeclampsia cases (81.5%) or 44 pregnant women occurred in women who did not adhere to the ANC schedule (not according to standards). This is in line with Titus's 2023 study, which found that pregnant women who do not understand the importance of ANC check-ups tend to believe that pregnancy is a natural process that does not require medical supervision unless symptoms arise.

Research in Ghana indicates that poor-quality ANC is associated with anemia in pregnancy, and pregnant women who begin ANC after the first trimester are at a higher risk of receiving poor-quality ANC services compared to pregnant women who attend their first visit in the first trimester. In this study, the P-Value was 0.000 so that P < 0.05, which means there is a significant relationship between ANC behavior and pre-eclampsia.

A total of 79.6%, or 43 pregnant women with preeclampsia, were categorized as having insufficient social support. This is in line with research by Novi Anggraeni in 2024, which stated that the reason mothers did not seek prenatal care was because they had to wait for their husbands or family members to take them to the checkup. Researchers believe that husband and family support significantly influences the completion of prenatal care. This support makes pregnant women feel happy and cared for, which in turn influences their commitment to maintaining their pregnancy.

This study showed a P-value of 0.000, indicating a P <0.05, indicating a significant relationship between social support and preeclampsia.

The majority of pregnant women who experienced preeclampsia were from the group with insufficient utilization of health services, namely 48 pregnant women (88.9%). A 2024 study from Bangladesh by Ananya Dutta Mou et al. explained that pregnant women who consulted a doctor or health professional regularly during pregnancy had a lower risk of developing preeclampsia compared to pregnant women who never visited a doctor or health professional.

Other studies have also shown that the level of health insurance coverage influences the level of health service utilization and encourages increased utilization of maternal health services, including examinations by health professionals, education, nutrition, and other services during pregnancy, labor, and the postpartum period to reduce the risk of complications such as infection, bleeding, hypertension, obstructed labor, preeclampsia, premature birth, and others. In this study, the P-

Value was 0.000, so P < 0.05, which means there is a significant relationship between the use of health services and pre-eclampsia.

Of the 51 pregnant women with preeclampsia, the majority (94.4%) had difficult access to health services. The results of this study differ from those described by Zafasia et al. in their 2022 study, where they found that the p-value of distance from home to health facilities was 0.836 (p>0.05), indicating no effect of distance from home or travel time on the incidence of preeclampsia.

According to the researchers' assumptions, adequate health facilities and infrastructure are also essential for achieving a healthy state. One of the obstacles to achieving a healthy state is delays in reaching health facilities due to distance, transportation, roads, and costs. This study showed a P-value of 0.000, indicating a significant association between access to healthcare and preeclampsia.

The majority of respondents (58.8%) were categorized as having inadequate healthcare and experienced preeclampsia (83.3%), or 45 pregnant women. Nindi Izzati et al. (2024) wrote that the relatively low level of education among the productive age group, inadequate infrastructure, and uneven transportation make the emergency referral process slow, especially at night or during the rainy season.

Furthermore, most families are unprepared for obstetric emergencies. Many husbands and families still consider pregnancy and childbirth to be natural events that do not require optimal healthcare. This study showed a P-value of 0.000, indicating a significant association between adequate healthcare and preeclampsia.

Based on the analysis of the 16 variables studied, 12 variables were found to have a significant effect on the incidence of preeclampsia (p < 0.05). These variables include: utilization of health services (p: 0.000), consumption of hypertension medication (p: 0.000), consumption of iron tablets (p: 0.000), physical activity (p: 0.000), access to health services (p: 0.000), adherence to ANC visits (p: 0.000), social support (p: 0.000), adequate health care (p: 0.000), and demographic factors such as age (p: 0.042), pregnancy status (p: 0.045), education (p: 0.048), and income (p: 0.049). Among all these variables, utilization of health services contributed the most to the incidence of preeclampsia, namely 13.5%, followed by consumption of medication and iron tablets with a contribution of 12.6% each. These findings indicate that aspects of health services and consumption behavior during pregnancy play an important role in preventing the risk of preeclampsia. Meanwhile, variables such as ethnicity (p: 0.052), occupation (p: 0.598), smoking habits (p: 0.684), and alcohol consumption (p: 1.000) showed a very small contribution (less than 0.3%) and a statistically insignificant significance value (p > 0.05). Thus, it can be concluded that these four variables do not have a significant influence on the incidence of preeclampsia in this population. These results indicate that preeclampsia prevention interventions should focus on improving access to and the quality of maternal health services, as well as education about healthy lifestyle behaviors during pregnancy.

Conclusions and Recommendations

Based on the results of the research that has been conducted, the conclusion that can be given is the analysis of individual characteristic factors on the incidence of pre-eclampsia in pregnant women in Jember Regency consisting of age, pregnancy status, education, income, occupation and ethnicity/tribe. For the analysis of lifestyle behavioral factors on the incidence of pre-eclampsia in pregnant women in Jember Regency consisting of smoking behavior, alcohol consumption behavior, consumption of hypertension medication, consumption of iron tablets, physical activity and ANC behavior. Analysis of psychosocial environmental factors on the incidence of pre-eclampsia in pregnant women in Jember Regency is

social support and finally is the analysis of prenatal care factors on the incidence of pre-eclampsia in pregnant women in Jember Regency namely utilization of health services, access to health services, and adequate health care). For the analysis of the risk factors that play the most role in the incidence of pre-eclampsia in pregnant women in Jember Regency, namely utilization of health services, consumption of hypertension medication, consumption of iron tablets, physical activity, access to health services, ANC compliance, social support and adequate health care.

References

Andoko, D., Hendrik, H., Moningkey, S., Soeryani, R. W., & Sungono, V. (2024). Factors Influencing the Occurrence of Preeclampsia in Pregnant Women at Primary Care Clinic. *Review of Primary Care Practice and Education (Kajian Praktik Dan Pendidikan Layanan Primer)*, *7*(1), 6. https://doi.org/10.22146/rpcpe.97566

Asmarita Jasda, Romalina, R., & Elsa Gusrianti. (2022). Risk Factors for Severe Pre-Eclampsia in Pregnant Women in Riau Islands 2019. *International Journal of Social Science*, *1*(1), 49–56. https://doi.org/10.53625/ijss.v1i1.3707

Awor, S., Abola, B., Byanyima, R., Orach, C. G., Kiondo, P., Kaye, D. K., Ogwal-Okeng, J., & Nakimuli, A. (2023). Prediction of pre-eclampsia at St. Mary's hospital lacor, a low-resource setting in northern Uganda, a prospective cohort study. *BMC Pregnancy and Childbirth*, *23*(1), 1–10. https://doi.org/10.1186/s12884-023-05420-z

Ayele, A. D., & Tilahun, Z. A. (2022). Determinants of pre-eclampsia among women attending delivery services in public health institutions of Debre Tabor Town: a case–control study. *Reproductive Health*, *19*(1), 1–8. https://doi.org/10.1186/s12978-022-01463-1

Aziz, F., Khan, M. F., & Moiz, A. (2024). Gestational diabetes mellitus, hypertension, and dyslipidemia as the risk factors of preeclampsia. *Scientific Reports*, *14*(1), 1–7. https://doi.org/10.1038/s41598-024-56790-z

Babore, G. O., Aregago, T. G., Ermolo, T. L., Nunemo, M. H., & Habebo, T. T. (2021). Determinants of pregnancy-induced hypertension on maternal and foetal outcomes in Hossana town administration, Hadiya zone, Southern Ethiopia: Unmatched case-control study. *PLoS ONE*, *16*(5 May 2021), 1–16. https://doi.org/10.1371/journal.pone.0250548

Bergman, K., Svanvik, T., Basic, C., Rosengren, A., Zverkova Sandström, T., Celind, J., Sjöland, H., Wikström, A. K., Schaufelberger, M., & Thunström, E. (2024). Heart disease in pregnancy and risk of pre-eclampsia: a Swedish register-based study. *Open Heart*, *11*(1), 1–11. https://doi.org/10.1136/openhrt-2024-002728

Care, A., Di, K., Kerja, W., & Bernung, P. (n.d.). *Factors Related To K4 Antenatal Care Visits In The Working Area Of Bernung Public Health Center In Pesawaran Regency*,

Cleopatra, A. B., Fitriangga, A., & Fahdi, F. K. (2018). Factors related to the use of e-cigarettes in the west Pontianak Region. *Repositori Institusi Poltekkes Kemenkes Bandung*, *013*, 1–10.

Dahir, O., Mohamud, S., Abdinoor, A., Dahir, G., & Abdinur, H. (2020). Associated Factors with Pre-eclampsia Among Pregnant Women Attending Antenatal Care in SOS Hospital Mogadishu, Somalia: A Hospital-based Study. *Central African Journal of Public Health*, *6*(6), 326. https://doi.org/10.11648/j.cajph.20200606.12

Dewi, S. C., Hadiningsih, E. F., Masyita, G., & Risnawati, R. (2024). Risk Factors for Pre-Eclampsia in Pregnant Women at RSUD dr. ABDUL Rivai Berau. *Journal of Midwifery and Nursing*, *6*(2), 486–495. https://doi.org/10.35335/jmn.v6i2.5011

Dorothy, K. (2023). Determinants of Pre-Eclampsia Incidence among Pregnant Women in Antenatal Care at Fortportal Regional Referral Hospital. *INOSR Experimental Sciences*, *12*(2), 158–171. https://doi.org/10.59298/inosres/2023/2.12.1000

Hikmawati, Purnamasari, N. I., & Rahmawati. (2021). Faktor Risiko Kejadian Pre Eklampsi

Pada Ibu Hamil. *Jurnal Ilmiah Obsgin*, *13*(3), 2863–2877. http://journal.um-surabaya.ac.id/index.php/JKM/article/view/2203

Info, A., History, A., Info, A., & Artikel, S. (2024). *3047-6127 (online)*. *11*(1), 13–19.

Izati, N. (2024). *Exploring Variations in Preeclampsia Incidence Across Maternal Age Groups*. *1*(1), 13–19.

Jurnal 4 Siregar. (n.d.).

Khanum, H. (2021). Prevalance of Pre-Eclampsia and Factors Responsible among Third Trimester Pregnant Women in Hospital of Dhaka. *Biomedical Journal of Scientific & Technical Research*, *33*(4). https://doi.org/10.26717/bjstr.2021.33.005445

Kunci, K. (2024). *Hubungan Pengetahuan dan Perilaku Merokok pada Mahasiswa Fakultas Teknik Universitas Khairun Ternate Muhamad Saleh Universitas Khairun Ternate , Indonesia PENDAHULUAN Di Indonesia , tembakau menjadi salah satu penyebab utama terhadap angka kematian dan ke*. *2*(12), 1–15.

Lee, K., Brayboy, L., & Tripathi, A. (2022). Pre-eclampsia: a Scoping Review of Risk Factors and Suggestions for Future Research Direction. *Regenerative Engineering and Translational Medicine*, *8*(3), 394–406. https://doi.org/10.1007/s40883-021-00243-w

Mayo, S. I., Sibgha, H., Mayo, A., Mah, H., Mayo, N., & Fida, H. T. (2023). *Prevalence of The Risk Factors Associated with Pre-eclampsia and Eclampsia Disorders in a Tertiary Care Hospital of Lahore, a cross sectional study*. 1–14.

Musdalifah, M. (2024). Analysis of Factors Causing Pre-Eclampsia-Related Events at Mokopido Hospital. *Jurnal Indonesia Sosial Sains*, *5*(02), 308–313. https://doi.org/10.59141/jiss.v5i02.1007

Mustary, M., Syam, A., Riskiyani, S., Erika, K. A., Moedjiono, A. I., & Lubis, M. (2024). *Review article Preeclampsia : Etiology , Pathophysiology , Risk Factors , Impact and Prevention : A Narrative Review*. *53*(11), 2392–2403.

Noor, R., Nulanda, M., Syamsu, R. F., M.Hamsah, & Efendy, R. A. (2024). Faktor Risiko Yang Berhubungan Dengan Kejadian Preeklamsia Pada Ibu Hamil Di RSIA Siti Khadijah 1 Makassar Tahun 2020-2021. *INNOVATIVE: Journal Of Social Science Research*, *4*(2), 6421–6434.

Padhan, S. C., Pradhan, P., Panda, B., Pradhan, S. K., & Mishra, S. K. (2023). Risk Factors of Pre-eclampsia: A Hospital-Based Case-Control Study. *Cureus*, *15*(7). https://doi.org/10.7759/cureus.42543

Regita, A., Khayati, Y. N., Studi, P., Program, K., Kesehatan, F., Waluyo, U. N., & Preeklamsia, R. (2024). *Riwayat Pre-eklampsia , Usia dan Paritas Ibu Meningkatkan Resiko Pre-eklampsia , Studi Case Control di RSUD*. *6*(2), 230–240.

Satishbabu, B. K., Sandeep, V. R., Ravi, R. B., & Shrutinag, R. (2010). Jurnal 12. In *Indian Journal of Pharmaceutical Sciences* (Vol. 72, Issue 6, pp. 738–744).

Seputar, J., & Kesehatan, I. (2024). *Jurnal Bidan Srikandi*. 7–12.

Simoncic, V., Deguen, S., Enaux, C., Vandentorren, S., & Kihal-Talantikite, W. (2022). A Comprehensive Review on Social Inequalities and Pregnancy Outcome—Identification of Relevant Pathways and Mechanisms. *International Journal of Environmental Research and Public Health*, *19*(24). https://doi.org/10.3390/ijerph192416592

Subroto, G., Arifianto, & Retnaningsih, D. (2022). Hubungan Derajat Berat Merokok (Indeks Brinkman) Dengan Derajat Obstruksi Pada Pasien PPOK Stabil Di RSPAW Salatiga. *Jurnal NERS Widya Husada*, *9*(3), 1–9.

Wu, K., Yin, B., Li, S., Zhu, X., & Zhu, B. (2022). Prevalence, risk factors and adverse perinatal outcomes for Chinese women with intrahepatic cholestasis of pregnancy: a large cross-sectional retrospective study. *Annals of Medicine*, *54*(1), 2966–2974. https://doi.org/10.1080/07853890.2022.2136400