E-ISSN: 0000-0000, P-ISSN: 0000-0000
Innovations Midwifery & Child Health Practices (IMCHP), Vol 1, Issue 1 2024 Page 13-19
https://doi.org/10.5281/zenodo.12707628

Contents List Available at Inovasi Data Analisis

Innovations Midwifery & Child Health Practices

Journal Homepage; https://analysisdata.co.id

Exploring Variations in Preeclampsia Incidence Across Maternal Age Groups

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ARTICLE INFO

Article history:
Received 15 May 2024
Received in revised form 25 June 2024
Accepted 29 June 2024

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Keywords: Preeclampsia, Maternal Age, Pregnancy Complications, As-Sifa Hospital, Retrospective Study

ABSTRACT

Purpose: The objective of this study is to examine the relationship between the age of mothers and the occurrence of preeclampsia, with a specific focus on variances among different age groups.
Methods: The study at As-Sifa Hospital used a retrospective method with 320 postpartum mothers to analyze correlations between maternal age and preeclampsia, ensuring comprehensive data integrity and ethical compliance.
Findings: The findings revealed distinct patterns in preeclampsia incidence among maternal age groups. A significant majority (80.0%) of mothers fell within the 20-35 age range, with 16.2% being over 35 years old and a smaller proportion (3.8%) under 20 years old. Preeclampsia was observed in 7.5% of the total sample, predominantly among mothers aged over 35 years. This underscores a pronounced association between advanced maternal age and heightened risk of preeclampsia, highlighting age as a critical factor in maternal health outcomes.
Originality: This study offers crucial insights into how maternal age influences preeclampsia risk at As-Sifa Hospital, Indonesia, using extensive medical records. Such findings are pivotal for tailored interventions, potentially enhancing health outcomes for mothers and newborns.
Advantage for Society: In order to reduce the risks connected with preeclampsia, the study emphasizes the significance of customized prenatal care plans based on mother age. Healthcare professionals can reduce maternal morbidity and mortality by implementing early detection techniques and targeted therapies that target age-related changes in preeclampsia incidence.

1. Introduction

Preeclampsia is a significant complication of pregnancy characterized by hypertension and proteinuria, typically manifesting after 20 weeks of gestation due to vasospasm and endothelial dysfunction (Mattar and Sibai 1999). Globally, it affects approximately 3.9% of pregnancies, posing substantial risks to maternal and fetal health (Fu et al. 2023). This condition remains a leading cause of maternal morbidity and mortality worldwide, necessitating ongoing research to understand its complex etiology and improve clinical management strategies (Document et al. 2015; Fonseca and Ayres de Campos 2021; Geller et al. 2018).

The pathophysiological mechanisms underlying preeclampsia are multifaceted and not fully elucidated (Staff 2019). Current theories suggest immune maladaptation, placental abnormalities, and genetic predispositions contribute to the development of hypertension and proteinuria in affected individuals (Williams and Broughton Pipkin 2011). Clinically, preeclampsia presents with hypertension, often accompanied by edema and proteinuria (Erez et al. 2022). In severe cases, it can progress to eclampsia, characterized by seizures, and potentially fatal complications for both the mother and fetus (Fishel Bartal and Sibai 2022; Hart and Sibai 2013).

Several known risk factors predispose women to preeclampsia. Primigravida, multiple pregnancies (e.g., twins), hydramnios, and pre-existing conditions such as diabetes mellitus and chronic hypertension are established risk factors associated with increased susceptibility to developing preeclampsia (Badria and Amarin 2005; Demissie et al. 2022). Maternal age has also been identified as a significant factor influencing the incidence of preeclampsia,

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with extremes of age both younger than 20 years and older than 35 years—associated with heightened risks (Bobak, 2007).

Young maternal age, defined as less than 20 years, presents unique challenges due to incomplete physical and physiological maturation of reproductive organs. Immature uterine and pelvic structures may not adequately support pregnancy, leading to heightened risks of premature birth, antepartum hemorrhage, and elevated blood pressure (Manuaba, 2007). Conversely, advanced maternal age, typically defined as 35 years or older, introduces age-related physiological changes that contribute to increased risks of hypertension and other pregnancy-related complications (Rochjati, 2007; Ayurai, 2009).

The consequences of preeclampsia can be severe and far-reaching. Maternal complications include premature birth, renal dysfunction (Bisson et al. 2023), and in extreme cases, maternal mortality (Ngene and Moodley 2024; Yagel, Cohen, and Goldman-Wohl 2022). Fetal outcomes are also significantly impacted, with preeclampsia contributing to intrauterine growth restriction, oligohydramnios, and increased neonatal morbidity and mortality (Bokslag et al. 2016; Gruslin and Lemyre 2011). Effective management and prevention of preeclampsia are critical to mitigating these risks and improving outcomes for both mother and child (Louis et al. 2022).

In Indonesia, the incidence of preeclampsia has been documented to vary between 1.0% and 1.5% in certain hospital settings from 1970 to 2000, reflecting regional and temporal fluctuations (Denantika O et al., 2015). This variability underscores the importance of localized studies to understand specific risk factors and optimize maternal health interventions. Given the complexity and variability of preeclampsia, this study aims to investigate the relationship between maternal age and the incidence of preeclampsia at As-Sifa Hospital. By focusing on this specific hospital setting, the research seeks to provide insights into how maternal age influences preeclampsia risk within a local context, thereby informing targeted healthcare strategies and improving maternal and neonatal outcomes.

This research is essential not only for advancing scientific understanding but also for guiding clinical practices aimed at preventing, diagnosing, and managing preeclampsia effectively. By identifying maternal age as a potential modifiable risk factor, healthcare providers can tailor antenatal care and interventions to mitigate preeclampsia risks and optimize maternal and fetal health outcomes.

2. Methods

This study was carried out at As-Sifa Hospital, Indonesia, using a correlational research design and a retrospective technique. The sample comprised 320 postpartum moms who delivered in March 2023, and a complete sampling procedure was employed to encompass all eligible individuals. Preeclampsia incidence was the dependent variable, whereas maternal age was the independent variable. The data were obtained from medical records using a checklist and underwent editing, coding, scoring, and tabulating to guarantee the accuracy and consistency of the data.

The chi-square test was used to analyze the statistical relationship between the age of the mother and the occurrence of preeclampsia. The significance level was chosen at 5% ($p < 0.05$). As-Sifa Hospital Ethics Committee granted ethical permission, guaranteeing adherence to moral guidelines for studies involving human subjects. The preservation of data confidentially and compliance with data protection standards were upheld. Possible constraints encompass the study's retrospective character, which could result in poor or inconsistent recordkeeping, as well as the limited applicability of the study's findings to the specific population and situation under investigation.

3. Result and Discusion

The table above illustrates the distribution of respondents by occupation. The majority of respondents were homemakers, constituting 61.6% (197 individuals). Those working in the private sector represented 18.8% (60 individuals). Both farmers and government employees each accounted for 6.6% (21 individuals each), and

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entrepreneurs also made up 6.6% (21 individuals) of the total respondents. The total number of respondents was 320.

Table 1: Respondent Characteristics Based on Occupation

No.	Occupation	Number of Respondents	Percentage (%)
1	Homemaker	197	61.6
2	Farmer	21	6.6
3	Private Sector	60	18.8
4	Government Employee	21	6.6
5	Entrepreneur	21	6.6
	Total	**320**	**100**

Data Source: Observation processed by the author 2024

The table above illustrates the distribution of respondents based on parity. Primigravida mothers, or those experiencing their first pregnancy, comprised 34.4% (110 individuals) of the respondents. Multigravida mothers, who have had multiple pregnancies, made up 65.6% (210 individuals). The total number of respondents was 320.

Table 2: Respondent Characteristics Based on Parity

No.	Parity	Number of Respondents	Percentage (%)
1	Primigravida	110	34.4
2	Multigravida	210	65.6
	Total	**320**	**100**

Data Source: Observation processed by the author 2024

The table above illustrates the distribution of respondents by education level. The highest percentage of respondents, 58.1% (186 individuals), had completed high school (SMA). The lowest percentage, 6.3% (20 individuals), had completed only elementary school (SD). Other respondents had completed junior high school (SMP), making up 27.2% (87 individuals), and higher education (PT), accounting for 8.4% (27 individuals). The total number of respondents was 320.

Table 3: Respondent Characteristics Based on Education

No.	Education Level	Number of Respondents	Percentage (%)
1	Elementary School (SD)	20	6.3
2	Junior High School (SMP)	87	27.2
3	High School (SMA)	186	58.1
4	Higher Education (PT)	27	8.4
	Total	**320**	**100**

Data Source: Observation processed by the author 2024

The table above illustrates the distribution of respondents based on maternal age. The majority of respondents, 80.0% (256 individuals), were between 20 and 35 years old. The smallest group, comprising 3.8% (12 individuals),

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consisted of mothers younger than 20 years old. Those older than 35 years made up 16.2% (52 individuals). The total number of respondents was 320.

Table 4: Respondent Characteristics Based on Maternal Age

No.	Age Group	Number of Respondents	Percentage (%)
1	< 20 years	12	3.8
2	20 – 35 years	256	80.0
3	> 35 years	52	16.2
	Total	**320**	**100**

Data Source: Observation processed by the author 2024

The table above illustrates the frequency distribution of childbirth cases due to preeclampsia at As-Sifa Hospital. A total of 24 respondents (7.5%) experienced preeclampsia, while 296 respondents (92.5%) did not have preeclampsia. The total number of respondents was 320.

Table 5: Preeclampsia Cases at As-Sifa Hospital

No.	Classification of Preeclampsia	Number of Respondents	Percentage (%)
1	Preeclampsia	24	7.5
2	Non-preeclampsia	296	92.5
	Total	**320**	**100**

Data Source: Observation processed by the author 2024

According to the table, there were 2 mothers (0.6%) under the age of of 20, 15 mothers (4.7%) between the ages of 20 and 35, and 7 mothers (2.2%) above the age of 35 out of a total of 320. Age is the length of time that a person has been alive, starting from birth until the present moment. As individuals grow older, they experience a rise in maturity and strength, which results in more advanced cognitive abilities and improved overall functioning (Padila, 2014: 104). Age has a huge impact on pregnancy and labor. The age range typically believed to have a lower risk for pregnancy and childbirth is between 20 and 35 years. During this period, the uterus is fully equipped for pregnancy, and the mental state is sufficiently developed to handle the responsibilities of caring for both the baby and oneself. In contrast, those who are younger than 20 years old or older than 35 years old have a higher risk during pregnancy and childbirth, which can have negative effects on both the health of the mother and the newborn, potentially leading to illness and death.

The data reveals that the largest proportion of moms, including 80.0% or 256 individuals, fell within the age range of 20-35 years. In contrast, 16.2% or 52 mothers were over the age of 35, and a smaller percentage of 3.8% or 12 mothers were below the age of 20. Because pregnancies are more likely to occur in the 20–35 age range, this age group has a greater prevalence of pregnancies. Nevertheless, as women grow older, the occurrence of delivery becomes more frequent, thereby elevating the likelihood of preeclampsia. This is attributed to physiological alterations in the reproductive organs and a decline in the flexibility of the birth canal. Moreover, studies suggest that women who are 35 years or older have a higher likelihood of developing preeclampsia. Based on obstetric principles, women who are 35 years old or older have a greater likelihood of experiencing negative pregnancy outcomes, such as preeclampsia. Preexisting illnesses like hypertension, which are more common as people age, increase this risk. Therefore, it is imperative to highlight the need of regular prenatal exams and complete antenatal care in order to reduce these risks and ensure the well-being of both the mother and the newborn.

The data presented in the table indicates that among a total of 320 moms, 24 of them (7.5%) had preeclampsia, while the remaining 296 mothers (92.5%) did not have this condition. When pregnancy progresses beyond 20 weeks, edema, proteinuria, and hypertension usually appear (Varney, 2007: 645). This is the hallmark of preeclampsia. Improper management of this issue can result in significant difficulties for both the mother and the infant. Based on the data, it is evident that preeclampsia impacted 24 mothers, which accounts for 7.5% of the total.

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Among these cases, the majority were multigravida mothers, totaling 200 (62.5%), while the minority were primigravida mothers, totaling 120 (37.5%). Preeclampsia presents a substantial risk to the health of both the mother and the newborn, and if not properly managed, can lead to catastrophic consequences. The research indicates that older moms (>35 years) have a higher incidence of preeclampsia (Jahromi and Husseini 2008). This is attributed to less physical resilience and an increased prevalence of hypertension and other coexisting medical conditions (Blanc et al. 2020).

Healthcare practitioners have a vital role in the management and prevention of preeclampsia through the provision of dietary guidance, ensuring sufficient rest, and delivering frequent antenatal care. These approaches aid in the prompt identification and treatment of pregnancies with a high risk of complications, hence decreasing rates of illness and death among both mothers and newborns. The study examines the correlation between the age of mothers and the occurrence of preeclampsia in the maternity ward at As-Sifa Hospital, Indonesia. The data from the table indicates that out of the 320 respondents, 2 (0.6%) of the mothers under 20 years old developed preeclampsia, whereas 10 (3.1%) did not. Among the individuals aged 20-35, a total of 15 moms (4.7%) encountered preeclampsia, while 241 (75.3%) did not. Out of the individuals who were 35 years or older, 7 moms (2.2%) developed preeclampsia, while 45 (14.1 percent) did not. Maternal age and the frequency of preeclampsia are substantially correlated, as indicated by the chi-square analysis value (χ^2) of 337.47, which is much higher than the critical value of 5.991. The research indicates that there is a higher likelihood of preeclampsia in mothers who are 35 years of age or older. This is attributed to physiological changes in the reproductive systems and the higher occurrence of hypertension along with other disorders that come with advancing age. Research has shown that older maternal age is linked to increased risks of preeclampsia, as evidenced by studies conducted (Sheen et al. 2018).

In order to reduce these dangers, it is essential for pregnant women, particularly those who are at a greater risk, to regularly consult with healthcare professionals, such as doctors and midwives (Lee, Holden, and Ayers 2016; Ray et al. 2022). Family support is crucial in promoting mother well-being by offering both emotional and physical assistance throughout pregnancy (Alderdice, McNeill, and Lynn 2013). Healthcare providers should provide instruction on the timely identification of difficulties, nutritional guidance, sufficient rest, and the significance of routine prenatal examinations (Lu et al. 2006). Promptly directing patients to specialized healthcare facilities in the event of difficulties is crucial to guarantee prompt and efficient treatment. These findings emphasize the significance of thorough prenatal care and ongoing monitoring to avoid and handle preeclampsia, thereby enhancing the health outcomes of both the mother and the newborn.

4. Conclusion

This study highlights the substantial impact of maternal age on the probability of developing preeclampsia, as demonstrated in a wide range of moms. Elderly moms are exposed to increased risks as a result of physiological alterations and possibly preexisting conditions, whereas younger mothers may experience difficulties associated with physical and mental development. Comprehensive prenatal care, which involves consistent monitoring and supportive treatments, is essential for mitigating these risks and preserving the health and welfare of both the mother and the newborn. Future research should further investigate the intricate interaction of elements that contribute to preeclampsia in order to improve prevention measures and treatment options.

References

Alderdice, Fiona, Jenny McNeill, and Fiona Lynn. 2013. "A Systematic Review of Systematic Reviews of Interventions to Improve Maternal Mental Health and Well-Being." *Midwifery* 29(4):389–99. doi: https://doi.org/10.1016/j.midw.2012.05.010.

Badria, Layla Francis, and Zouhair Odeh Amarin. 2005. "Pre-Eclampsia: Is It a Different Disease in Primiparous and Multiparous Women?" *Archives of Gynecology and Obstetrics* 273(1):26–31. doi: 10.1007/s00404-005-0035-9.

Bisson, Courtney, Sydney Dautel, Easha Patel, Sunitha Suresh, Patricia Dauer, and Sarosh Rana. 2023.

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"Preeclampsia Pathophysiology and Adverse Outcomes during Pregnancy and Postpartum." *Frontiers in Medicine* 10(March):1–10. doi: 10.3389/fmed.2023.1144170.

Blanc, Judite, Azizi Seixas, Tiffany Donley, Omonigho Michael Bubu, Natasha Williams, and Girardin Jean-Louis. 2020. "Resilience Factors, Race/Ethnicity and Sleep Disturbance among Diverse Older Females with Hypertension." *Journal of Affective Disorders* 271:255–61. doi: https://doi.org/10.1016/j.jad.2020.03.148.

Bokslag, Anouk, Mirjam van Weissenbruch, Ben Willem Mol, and Christianne J. M. de Groot. 2016. "Preeclampsia; Short and Long-Term Consequences for Mother and Neonate." *Early Human Development* 102:47–50. doi: https://doi.org/10.1016/j.earlhumdev.2016.09.007.

Demissie, Moreday, Gebeyaw Molla, Adamu Tayachew, and Fikrselassie Getachew. 2022. "Risk Factors of Preeclampsia among Pregnant Women Admitted at Labor Ward of Public Hospitals, Low Income Country of Ethiopia; Case Control Study." *Pregnancy Hypertension* 27:36–41. doi: https://doi.org/10.1016/j.preghy.2021.12.002.

Document, Unedited, U. S. E. Comment, Featureemail To, and The Epmm. 2015. "Strategies toward Ending Preventable Maternal Mortality (EPMM)." 6736(2013):1–4.

Erez, Offer, Roberto Romero, Eunjung Jung, Piya Chaemsaithong, Mariachiara Bosco, Manaphat Suksai, Dahiana M. Gallo, and Francesca Gotsch. 2022. "Preeclampsia and Eclampsia: The Conceptual Evolution of a Syndrome." *American Journal of Obstetrics and Gynecology* 226(2, Supplement):S786–803. doi: https://doi.org/10.1016/j.ajog.2021.12.001.

Fishel Bartal, Michal, and Baha M. Sibai. 2022. "Eclampsia in the 21st Century." *American Journal of Obstetrics and Gynecology* 226(2, Supplement):S1237–53. doi: https://doi.org/10.1016/j.ajog.2020.09.037.

Fonseca, Andreia, and Diogo Ayres de Campos. 2021. "Maternal Morbidity and Mortality Due to Placenta Accreta Spectrum Disorders." *Best Practice & Research Clinical Obstetrics & Gynaecology* 72:84–91. doi: https://doi.org/10.1016/j.bpobgyn.2020.07.011.

Fu, Ru, Yihui Li, Xiaogang Li, and Weihong Jiang. 2023. "Hypertensive Disorders in Pregnancy: Global Burden From 1990 to 2019, Current Research Hotspots and Emerging Trends." *Current Problems in Cardiology* 48(12):101982. doi: https://doi.org/10.1016/j.cpcardiol.2023.101982.

Geller, Stacie E., Abigail R. Koch, Caitlin E. Garland, E. Jane MacDonald, Francesca Storey, and Beverley Lawton. 2018. "A Global View of Severe Maternal Morbidity: Moving beyond Maternal Mortality." *Reproductive Health* 15(1):98. doi: 10.1186/s12978-018-0527-2.

Gruslin, Andrée, and Brigitte Lemyre. 2011. "Pre-Eclampsia: Fetal Assessment and Neonatal Outcomes." *Best Practice & Research Clinical Obstetrics & Gynaecology* 25(4):491–507. doi: https://doi.org/10.1016/j.bpobgyn.2011.02.004.

Hart, Laura A., and Baha M. Sibai. 2013. "Seizures in Pregnancy: Epilepsy, Eclampsia, and Stroke." *Seminars in Perinatology* 37(4):207–24. doi: https://doi.org/10.1053/j.semperi.2013.04.001.

Jahromi, Bahia Namavar, and Zahra Husseini. 2008. "Pregnancy Outcome at Maternal Age 40 and Older." *Taiwanese Journal of Obstetrics and Gynecology* 47(3):318–21. doi: https://doi.org/10.1016/S1028-4559(08)60131-X.

Lee, Suzanne, Des Holden, and Susan Ayers. 2016. "How Women with High Risk Pregnancies Use Lay Information When Considering Place of Birth: A Qualitative Study." *Women and Birth* 29(1):e13–17. doi: https://doi.org/10.1016/j.wombi.2015.07.010.

Louis, Judette M., Jacqueline Parchem, Arthur Vaught, Martha Tesfalul, Anthony Kendle, and Eleni Tsigas. 2022. "Preeclampsia: A Report and Recommendations of the Workshop of the Society for Maternal-Fetal Medicine and the Preeclampsia Foundation." *American Journal of Obstetrics and Gynecology* 227(5):B2–24. doi: https://doi.org/10.1016/j.ajog.2022.06.038.

Lu, Michael C., Milton Kotelchuck, Jennifer F. Culhane, Calvin J. Hobel, Lorraine V Klerman, and John M. Thorp. 2006. "Preconception Care Between Pregnancies: The Content of Internatal Care." *Maternal and Child Health Journal* 10(1):107–22. doi: 10.1007/s10995-006-0118-7.

Mattar, Farid, and Baha M. Sibai. 1999. "PREECLAMPSIA: Clinical Characteristics and Pathogenesis." *Clinics in Liver Disease* 3(1):15–29. doi: https://doi.org/10.1016/S1089-3261(05)70051-9.

Ngene, Nnabuike Chibuoke, and Jagidesa Moodley. 2024. "Preventing Maternal Morbidity and Mortality from Preeclampsia and Eclampsia Particularly in Low- and Middle-Income Countries." *Best Practice & Research Clinical Obstetrics & Gynaecology* 94:102473. doi: https://doi.org/10.1016/j.bpobgyn.2024.102473.

Ray, Ashleigh E., Kate N. Jeffrey, Pooja H. Nair, Quynh D. Vu, Felicia King, and Virginia Schmied. 2022. "'You're a

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"High-Risk" Customer': A Qualitative Study of Women's Experiences of Receiving Information from Health Professionals Regarding Health Problems or Complications in Pregnancy." *Women and Birth* 35(5):e477–86. doi: https://doi.org/10.1016/j.wombi.2021.12.002.

Sheen, Jean-Ju, Jason D. Wright, Dena Goffman, Adina R. Kern-Goldberger, Whitney Booker, Zainab Siddiq, Mary E. D'Alton, and Alexander M. Friedman. 2018. "Maternal Age and Risk for Adverse Outcomes." *American Journal of Obstetrics and Gynecology* 219(4):390.e1-390.e15. doi: https://doi.org/10.1016/j.ajog.2018.08.034.

Staff, Anne Cathrine. 2019. "The Two-Stage Placental Model of Preeclampsia: An Update." *Journal of Reproductive Immunology* 134–135:1–10. doi: https://doi.org/10.1016/j.jri.2019.07.004.

Williams, Paula J., and Fiona Broughton Pipkin. 2011. "The Genetics of Pre-Eclampsia and Other Hypertensive Disorders of Pregnancy." *Best Practice & Research Clinical Obstetrics & Gynaecology* 25(4):405–17. doi: https://doi.org/10.1016/j.bpobgyn.2011.02.007.

Yagel, Simcha, Sarah M. Cohen, and Debra Goldman-Wohl. 2022. "An Integrated Model of Preeclampsia: A Multifaceted Syndrome of the Maternal Cardiovascular-Placental-Fetal Array." *American Journal of Obstetrics and Gynecology* 226(2, Supplement):S963–72. doi: https://doi.org/10.1016/j.ajog.2020.10.023.

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