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Determinants of preeclampsia events in housewives in the maternity wards of hospitals and health centers

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Abstract

Preeclampsia is one of the leading causes of maternal morbidity and mortality, influenced by various clinical and social risk factors. Occupational status as a housewife is suspected to play a role in increasing vulnerability to preeclampsia through interactions with biomedical determinants and healthcare services. This study aims to analyze the determinants of preeclampsia in housewives based on a synthesis of ten national and international research articles with various study designs, including cross-sectional, case-control, cohort, and systematic review. Research results indicate that biomedical factors such as chronic hypertension, obesity, and gestational diabetes have the highest association with the occurrence of preeclampsia. The risk increases significantly when these conditions occur in housewives. In addition, low adherence to antenatal care (ANC) nearly triples the risk, highlighting the importance of early detection during pregnancy. Socioeconomic factors and low education also increase the risk due to limited access to health services and low health literacy. Psychosocial factors such as stress and age over 35 also contribute to increased vascular vulnerability during pregnancy. Overall, the occurrence of preeclampsia in housewives is multifactorial and results from the interaction of biomedical, social, and healthcare determinants. Therefore, a comprehensive prevention approach is needed through strengthening screening in primary care, improving ANC adherence, family-based health education, and controlling metabolic risk factors from early pregnancy.

Keywords: Preeclampsia; Housewife; Biomedic Factors; Antenatal Care (Anc); Socioeconomic Determinants

1. Introduction

Preeclampsia is one of the most complex hypertensive disorders of pregnancy and has serious impacts on the health of both mother and baby, characterized by blood pressure ≥140/90 mmHg after 20 weeks of gestation with target organ abnormalities, including proteinuria. International epidemiological evidence shows that preeclampsia still occurs in approximately 2%–8% of pregnancies across various populations and is a major cause of maternal and perinatal morbidity and mortality globally (1)(2). A recent systematic review reported a global prevalence of 4.43% (95% CI: 3.73–5.20%) and emphasized that risk factors such as obesity, diabetes mellitus, long interpregnancy intervals, and chronic hypertension are significantly correlated with the occurrence of preeclampsia, underscoring the multifactorial nature and heterogeneity of this condition in the context of the global population (3)(4).

The latest data estimates that the incidence of preeclampsia in Indonesia is around 5.3%, equivalent to approximately ±128,273 cases per year, with a significant contribution to maternal mortality (5). Analytical studies in several healthcare facilities in Indonesia during 2023–2024 show that biological factors such as maternal age, parity, history of previous preeclampsia, obesity, and interpregnancy interval significantly contribute to cases of severe preeclampsia

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(6)(7). These findings indicate that classic clinical determinants are still relevant, but the variation in incidence rates between regions suggests the presence of other contextual factors that require further exploration.

The pathophysiological mechanism of preeclampsia involves endothelial dysfunction, abnormal placental implantation, oxidative stress, as well as a pro-inflammatory response that contributes to systemic vasoconstriction and impaired tissue perfusion (8). However, empirical research over the past five years has expanded this understanding by highlighting non-biomedical determinants such as socio-economic status, quality of nutrition, health literacy, access to antenatal care (ANC) services, and environmental exposure as factors that modulate risk. Behavioral factors such as high-fat diets, smoking, and low ANC adherence have also been reported to be associated with an increased incidence of preeclampsia.

Equally important, the role of primary healthcare determinants, especially at health centers, in early screening and risk management has not been comprehensively defined in various regions. Studies show that inadequate ANC visits, delays in referrals, and limited periodic blood pressure monitoring are associated with an increased incidence of severe preeclampsia in delivery rooms (10). This condition shows that the aspect of the healthcare service system is a structural determinant that is just as important as individual clinical factors.

Previous literature reviews have identified that risk factors such as maternal age <20 or >35 years, primigravida, obesity, and a history of chronic hypertension are strong predictors of the occurrence of preeclampsia (4). However, there is still a research gap specifically analyzing the determinant patterns among housewives in health center delivery rooms compared to referral hospitals, as well as inconsistencies in results across service settings. This indicates the need for a more systematic and contextual synthesis of evidence to produce policy recommendations that are responsive to the socio-demographic characteristics of mothers in Indonesia.

Thus, a comprehensive and critical literature review becomes extremely important to integrate the latest empirical findings related to biomedical and social determinants, identify gaps in evidence across healthcare service levels, and formulate evidence-based promotive and preventive intervention recommendations in efforts to reduce maternal morbidity and mortality in Indonesia. Without such a multidimensional review, maternal health strategies risk remaining partial and insufficiently adaptive to the complex determinants of preeclampsia in the field.

2. Methods

This study uses a literature review design with a systematic review approach aimed at identifying, analyzing, and synthesizing scientific evidence regarding the determinants of preeclampsia occurrence in housewives in maternity wards of hospitals and community health centers. The literature search was conducted systematically through electronic databases, namely PubMed, Scopus, ScienceDirect, Google Scholar, and Garuda. The articles searched were limited to publications from the last five years (2020–2025) to obtain the most current evidence relevant to the development of maternal healthcare practices.

3. Results and discussion

Based on the synthesis of the table above, being a housewife does not always serve as a direct independent determinant, but acts as a social determinant that amplifies the effects of biomedical risk factors and health services. The highest risks were found in the combination of housewives with chronic hypertension (OR 4.2) and obesity (OR 3.4), indicating an interaction between social determinants and metabolic factors. In addition, low adherence to ANC visits consistently increased the risk of preeclampsia in the housewife group, suggesting that access to and utilization of health services are important mediators.

Overall, these findings indicate that the variable of being a housewife is better understood within the framework of social determinants of health, which influence service-seeking behavior, control of metabolic risk factors, and psychosocial support during pregnancy. This underscores that preeclampsia prevention interventions should not focus solely on clinical aspects, but also consider social and promotive approaches at the primary care level.

Table 1 Extraction of Determinants of Preeclampsia Incidence in Housewives (2020–2025)

No	Author and Year	Research Location	Study Design	Analyzed Determinants	Result
1	Sari and Putri, 2023	Semarang City Health Center, Indonesia	Cross-sectional	Occupation (housewife), ANC, parity, age	Housewives with fewer than 4 ANC visits showed a 3.1 times higher risk of preeclampsia ($p<0.05$), after controlling for age and parity variables.
2	Nugroho et al., 2024	Dr. Soetomo Hospital Surabaya and Community Health Center Surabaya, Indonesia	Case-control	Job, chronic hypertension, BMI	The status of being a housewife accompanied by chronic hypertension increases the risk of preeclampsia by 4.2 times; the relationship remains significant after multivariate analysis.
3	Ahmed et al., 2022	Addis Ababa, Ethiopia	Case-control	Employment status, education, pregnancy spacing	Mothers who do not work have a 2.0 times higher risk of developing preeclampsia compared to working mothers; the effect is stronger in the low-education group.
4	Hassan et al., 2021	Kairo, Mesir	Cross-sectional	Housewives, psychosocial stress, family support	Housewives with high levels of psychosocial stress have a 2.3 times higher risk of developing preeclampsia ($p<0.05$), indicating the contribution of psychosocial factors to increased blood pressure during pregnancy.
5	Rahmawati et al., 2024	Dr. Kariadi General Hospital, Semarang, Indonesia	Case-control	Work, obesity, history of preeclampsia	Housewives with obesity (BMI ≥30 kg/m^2) have a 3.4 times higher risk of developing preeclampsia; a history of previous preeclampsia is the most dominant predictor.
6	Silva et al., 2023	São Paulo, Brasil	Cross-sectional	Job, education, economic status	Housewives with low education levels show a 2.1 times higher risk, which is mediated by limited access to information and antenatal services.
7	Oliveira et al., 2022	Porto, Portugal	Case-control	Occupation, age >35 years, parity	Mothers who do not work and are over 35 years old have a 1.8 times higher risk compared to the optimal reproductive age group.
8	Kim et al., 2020	Seoul, South Korea	Cohort	Work, gestational diabetes	Housewives with gestational diabetes have a 2.7 times higher risk of experiencing preeclampsia; the interaction between metabolic factors and social status is statistically significant.
9	Martínez et al., 2023	Madrid, Spanyol	Systematic Review	Socioeconomic factors (including occupation), BMI	Low socioeconomic status which is mostly found among housewives is consistently associated with an increased risk of preeclampsia through the pathways of obesity and limited access to healthcare services.

10	Pratiwi et al., 2024	Sleman Regency Health Center, Indonesia	Cross-sectional	Housewife (HW), ANC compliance	Housewives with low ANC compliance have a 2.9 times higher risk of experiencing preeclampsia, indicating the importance of health service factors in the non-working population.

3.1. Determinants of Employment Status: Housewife

Based on ten studies in the table, employment status as a housewife (HW) consistently emerges as a determinant associated with an increased risk of preeclampsia. Studies by Ahmed et al. (2022), Silva et al. (2023), Oliveira et al. (2022), and Nugroho et al. (2024) indicate that non-working mothers have a 1.8–2.1 times higher risk compared to working mothers. Although in some studies the significance decreases after multivariate analysis, the pattern suggests that HW status remains relevant as a contextual risk factor (12)(13)(14)(15).

However, the status of being a housewife does not always act as a direct biological determinant, but rather as a representation of the social determinants of health. Housewives tend to have economic dependence, limited access to health information, and low health literacy. This condition affects their health service-seeking behavior as well as their ability to recognize early signs of pregnancy danger.

Thus, based on the synthesis of the table, the IRT variable is more appropriately positioned as a structural determinant that strengthens the effects of other clinical factors. This status becomes the social context that allows the accumulation of metabolic risk, low ANC compliance, and increased psychosocial stress, which ultimately contribute to the occurrence of preeclampsia.

3.2. Biomedical Determinants (Chronic Hypertension, Obesity, Gestational Diabetes)

Biomedical determinants show the highest association strength across all the studies analyzed. Nugroho et al. (2024) reported that CKD with chronic hypertension has a 4.2 times higher risk of developing preeclampsia (15). Rahmawati et al. (2024) found that CKD with obesity (BMI ≥30 kg/m^2) has a 3.4 times higher risk (16). Kim et al. (2020) also indicated that the combination of CKD and gestational diabetes increases the risk up to 2.7 times (17). Pathophysiologically, chronic hypertension and obesity cause endothelial dysfunction, systemic inflammation, and impaired uteroplacental perfusion. Gestational diabetes worsens this condition through insulin resistance and increased oxidative stress. These mechanisms are the main pathways in the development of preeclampsia.

The table synthesis shows that although biomedical factors are the dominant determinants, the risk becomes higher when it occurs in the housewife group. This indicates an interaction between metabolic factors and social context, particularly related to the management of chronic diseases and lifestyle during pregnancy.

3.3. Determinants of Health Services (Antenatal Care/ANC Compliance)

Health service variables, particularly ANC compliance, show a significant contribution in two studies in Indonesia (Sari and Putri, 2023; Pratiwi et al., 2024). Pregnant women with fewer than four ANC visits have a 2.9–3.1 times higher risk of experiencing preeclampsia compared to those who attend visits according to the standard. These findings emphasize the importance of early detection through blood pressure and proteinuria screening during pregnancy. When ANC visits are inadequate, blood pressure increases often go undetected until they reach a more severe clinical stage. This contributes to the discovery of preeclampsia cases during delivery in the birthing room (18)(19).

Among housewives, low ANC compliance can be influenced by the perception that pregnancy is a natural process, limited family support, as well as transportation barriers or indirect costs. Therefore, health service variables become an important mediator between social determinants and the occurrence of clinical preeclampsia.

3.4. Socioeconomic and Educational Determinants

Several studies in the table (Ahmed et al., 2022; Silva et al., 2023; Martínez et al., 2023) indicate that low education and low socioeconomic status are significantly associated with an increased risk of preeclampsia. Women of reproductive age with low education have approximately 2.0–2.1 times higher risk compared to those with higher education. Low education affects health literacy, so mothers have less understanding of the warning signs of preeclampsia and the importance of regular blood pressure monitoring. In addition, economic limitations affect the quality of nutrition during pregnancy and access to adequate healthcare facilities (12)(13)(20).

Martínez et al. (2023) in a systematic review emphasized that low socioeconomic status contributes to the risk of preeclampsia through pathways of obesity and limited access to healthcare services. Thus, socioeconomic determinants reinforce the effects of biomedical determinants and healthcare services in the context of housewives (20).

3.5. Psychosocial and Demographic Determinants (Stress, Age, and Parity)

Hassan et al. (2021) showed that women with high psychosocial stress had a 2.3 times higher risk of developing preeclampsia. Activation of the sympathetic nervous system due to chronic stress can lead to systemic vasoconstriction and increased blood pressure during pregnancy (21). Additionally, Oliveira et al. (2022) found that non-working mothers over the age of 35 have a 1.8 times higher risk compared to those in optimal reproductive age (14). The age factor is associated with decreased vascular elasticity as well as increased prevalence of metabolic comorbidities. Sari and Putri (2023) also indicated that parity serves as a control variable that influences the risk (18).

Overall, psychosocial and demographic variables serve as predisposing factors that worsen blood pressure regulation and vascular conditions. When combined with other biomedical and social determinants, these factors increase the likelihood of preeclampsia in housewives.

4. Conclusion

Based on the results of research in the literature review, it can be concluded that the occurrence of preeclampsia in housewives is a multifactorial condition influenced by the interaction of social, biomedical, healthcare, psychosocial, and demographic determinants. Being a housewife is not always an independent clinical determinant, but it acts as a social determinant that increases vulnerability to other risk factors such as chronic hypertension, obesity, and gestational diabetes, which have been shown to have the strongest association with the occurrence of preeclampsia. The risk increases further in housewives with low antenatal care (ANC) adherence, limited education and socioeconomic status, as well as the presence of psychosocial stress and age over 35 years, which worsen vascular regulation during pregnancy. Thus, preeclampsia in housewives cannot be explained by a single factor, but rather is the result of an accumulation and interaction of various determinants, so prevention efforts must be carried out comprehensively through strengthening early detection in primary care, improving ANC compliance, family-based health education, and controlling metabolic risk factors from the beginning of pregnancy.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest in this research

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