



## FACTORS AFFECTING PREGNANT WOMEN'S KNOWLEDGE LEVEL OF PREECLAMPSIA SCREENING

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### ABSTRACT

**Background:** Preeclampsia is a hypertensive syndrome affecting 3–8% of pregnancies worldwide, involving multiple organ systems, and typically occurring after 20 weeks of gestation. In Surabaya, 1,265 cases were reported in 2023. Optimal prevention of preeclampsia is achieved through early screening at 11–13 weeks of gestation during antenatal care. Maternal knowledge and awareness are essential determinants of timely screening, as non-adherence to antenatal care has been associated with insufficient understanding of pregnancy management, delayed recognition of complications including preeclampsia and chronic conditions, and has ultimately contributed to the persistently high rates of preeclampsia and maternal and neonatal mortality in Indonesia. The aim was to analyze factors influencing pregnant women's knowledge regarding preeclampsia screening. **Method:** This research employed a quantitative design with a cross-sectional approach, using a purposive sampling method. This study involved 91 pregnant women who met the inclusion criteria: women in the first to third trimester of pregnancy who had attended at least two antenatal care visits. A structured questionnaire was used as the research instrument. Data were analyzed using the Spearman rank correlation test to examine the relationship between educational level and parity experience and the pregnant women's level of knowledge regarding preeclampsia screening. **Results:** The study included 91 pregnant women as respondents. 56 % respondent had secondary level of education, 52% respondents were moderate parity and 52 % respondents demonstrated good knowledge, Showed significant associations between education level ( $p < 0.001$ ) and parity ( $p = 0.031$ ) with knowledge of preeclampsia screening. **Conclusions:** That demographic factors and reproductive experiences influence maternal knowledge. Therefore, education on preeclampsia screening should be tailored to maternal characteristics, and the active involvement of healthcare providers is essential to support comprehensive, holistic, and sustainable midwifery care.

**Keywords:** pregnant women, knowledge, preeclampsia screening, parity, education





## INTRODUCTION

Preeclampsia is one of the leading causes of maternal and perinatal morbidity and mortality, with a global prevalence of 3–8% of pregnancies and an incidence rate seven times higher in developing countries (Osungbade, 2011). Preeclampsia increases the risk of hypertension, stroke, and cardiovascular disease in mothers, as well as intrauterine growth restriction (IUGR), preterm delivery, and low birth weight in infants. Hypertensive disorders in pregnancy are the second leading cause of maternal mortality in Indonesia, accounting for 412 of 4,482 maternal deaths (Indonesian Ministry of Health, 2023).

The East Java Health Profile (2023) reported a decline in both first (K1) and fourth (K4) antenatal care (ANC) visits, partly due to pregnant women failing to attend ANC appointments on time, which in turn reduces the coverage of screening and early detection during pregnancy. Non-adherence to ANC is also linked to low maternal knowledge regarding pregnancy care and delayed detection of complications, including preeclampsia. The American College of Obstetricians and Gynecologists (ACOG) emphasizes that preeclampsia can be secondarily prevented through early pregnancy screening, ideally conducted between 11 and 13 weeks of gestation. In Indonesia, preeclampsia screening is typically performed by physicians and midwives through biophysical examinations. When pregnant women understand the risks of preeclampsia, they are more likely to seek timely examinations and adopt preventive measures (Wulandari & Zulissetiana, 2020). However, limited knowledge and poor adherence to ANC continue to hinder optimal screening and early detection of at-risk cases (Yasinta & Aprilia, 2023).

Education plays a vital role in shaping maternal attitudes and behaviors toward ANC compliance. Ernias (2020) found that low educational attainment was associated with limited understanding of the importance of ANC, while Mustafa and Nur (2022) reported that mothers with higher education demonstrated better knowledge and greater adherence to scheduled visits. Such compliance supports effective preeclampsia screening and the integrated implementation of ANC. Parity also contributes to maternal knowledge, as previous pregnancies provide valuable learning experiences that foster more rational decision-making (Astuti, 2017). Therefore, education and parity are key determinants of ANC adherence and the

effectiveness of preeclampsia screening. Adequate knowledge motivates mothers to seek care earlier and more consistently, enabling the prompt management of complications and ultimately reducing maternal and neonatal mortality.

In 2023, the prevalence of severe preeclampsia in Indonesia reached 63.7% (Daniel et al., 2024). In East Java, 499 maternal deaths were reported, 20 of which occurred in Surabaya. The city also recorded 1,265 preeclampsia cases out of 7,997 obstetric complications. Maternal knowledge of preeclampsia screening plays a crucial role in preventing pregnancy-related complications. The Simomulyo Public Health Center in Surabaya (Puskesmas Simomulyo) was selected as the study site due to its high ANC coverage and a notable number of preeclampsia cases, including maternal deaths associated with hypertension in 2023. Therefore, this study aims to analyze the influence of education and parity on maternal knowledge of preeclampsia screening.

## **METHODS**

This study employed a quantitative approach with a cross-sectional design and was conducted at the Simomulyo Public Health Center, Surabaya, from April to June 2025. The study population consisted of pregnant women in their first, second, or third trimester who attended ANC visits at the health center. The sample size was determined using the formula for two proportions adapted from Kusumastuti (2018) which examined the relationship between maternal characteristics, parity, and sources of information and maternal knowledge of warning signs during pregnancy. A 95% confidence level and 90% statistical power were applied to ensure validity and reliability.

A total of 91 respondents were recruited using purposive sampling based on inclusion criteria of having attended at least two ANC visits at a healthcare facility and providing informed consent to participate. Data were collected using a structured questionnaire that had been previously tested for validity and reliability. Education and parity served as the independent variables, analyzed in relation to maternal knowledge of preeclampsia screening. Data analysis was performed using Spearman's rank correlation test to determine the associations between variables.

## RESULT AND DISCUSSION

The study included 91 pregnant women as respondents. The majority had a secondary level of education (56%), nearly one-third had higher education (30%), and a minority had a low level of education (14%). Regarding parity, more than half were women of moderate parity (52%), followed by primiparous mothers (45%), with only a small proportion being women of high parity (3%). In terms of knowledge of preeclampsia screening, just over half of the respondents demonstrated good knowledge (52%), nearly half had fair knowledge (46%), and only a few showed poor knowledge (2%).

**Table 1. Frequency distribution of respondent characteristics**

Category	Characteristics	n	%
<b>Education level</b>	Low (Elementary/Junior High School)	13	14
	Secondary (Senior High School/Vocational School)	51	56
	Higher (Diploma/Bachelor's degree)	27	30
<b>Parity</b>	Primiparous (1)	41	45
	Moderate parity (2-4)	47	52
	High parity ( $\geq 5$ )	3	3
<b>Level of knowledge of preeclampsia screening</b>	Poor (< 60%)	2	2
	Fair (60 – 79%)	42	46
	Good (80 – 100%)	47	52
<b>Total</b>		91	100

Data source: primary data, 2025.

Table 1 presents the frequency distribution of respondent characteristics. These findings suggest that maternal education and parity may play an important role in shaping knowledge levels about preeclampsia screening, which could contribute to the early detection and prevention of pregnancy complications. Statistical analysis using Spearman's rank correlation revealed a positive relationship between maternal education level and knowledge of preeclampsia

screening ( $p < 0.001$ ). The frequency distribution is shown in Table 2. Furthermore, the correlation coefficient ( $r$ ) indicated a moderate positive association, suggesting that higher maternal education is linked to better knowledge of preeclampsia screening.

**Table 2. Relationship between education level and knowledge of preeclampsia screening**

Education level	Poor		Fair		Good		Total	p-value	$r_s$
	n	%	n	%	n	%			
<b>Low</b>	2	15	8	62	3	23	13 (100%)	< 0.001	0.429
<b>Secondary</b>	0	0	29	57	22	43	51 (100%)		
<b>Higher</b>	0	0	5	18	22	82	27 (100%)		
<b>Total</b>	2	2	42	46	47	52	91 (100%)		

The findings in Table 2 reveal a significant positive correlation between maternal education level and knowledge of preeclampsia screening ( $p < 0.001$ ,  $r_s = 0.429$ ). Women with higher education demonstrated better understanding than those with lower or secondary education, who generally showed only fair knowledge. This indicates that education plays a pivotal role in enhancing maternal awareness and comprehension of preeclampsia screening, as it increases access to health information and the ability to interpret and apply it effectively.

Higher educational attainment strengthens an individual's capacity to seek, comprehend, and utilize health information. Pregnant women with higher education levels often have broader access to credible information sources, greater health literacy, and a more receptive attitude toward preventive health measures, including early detection of preeclampsia. Similar findings were reported by Lestari et al. (2023) and Harahap (2020), who noted that education improves maternal understanding of early preeclampsia detection, thereby supporting informed decision-making in pregnancy care.

Although formal education exerts a strong influence, this study also suggests that knowledge can be enhanced through alternative learning channels and media. Notably, 22 respondents with secondary education achieved good knowledge scores, indicating proactive efforts to seek health information during

pregnancy. Nevertheless, individuals with higher education (diploma, bachelor’s, or master’s degree) tend to possess better skills in evaluating and applying reliable health information. As emphasized by Nursalam (2008) and Serrano-Gil & Jacob (2010), both formal and non-formal education shape knowledge acquisition. Consequently, education remains a key determinant in improving maternal knowledge and awareness of reproductive health, particularly in the prevention and early detection of preeclampsia (Mekie et al., 2021).

**Table 3. Relationship between parity and level of knowledge of preeclampsia screening**

Parity	Poor		Fair		Good		Total	p-value	$r_s$
	n	%	n	%	n	%			
Primiparous	0	0	15	36	26	63	41 (100%)	0.031	0.226
Moderate parity	2	4	25	53	20	43	47 (100%)		
High parity	0	0	2	66	1	33	3 (100%)		
<b>Total</b>	2	2	42	46	47	52	91 (100%)		

The data in Table 3 indicate a significant relationship between parity and maternal knowledge of preeclampsia screening. Primiparous women generally demonstrated higher levels of knowledge than women of moderate or high parity, who predominantly exhibited only fair understanding. This finding suggests that first-time mothers are more receptive to health information and antenatal counseling, whereas multiparous women may rely on prior experiences and engage less actively with updated guidance. Statistical analysis using Spearman’s rank correlation confirmed a positive and significant association between parity and maternal knowledge ( $p = 0.031$ ,  $r_s = 0.226$ ), indicating that cumulative reproductive experience contributes to variations in maternal awareness.

Most primiparous respondents exhibited good knowledge, likely due to heightened motivation and anxiety associated with the first pregnancy, which encourages proactive information-seeking and consistent attendance at antenatal consultations. Shodiqoh and Fahriani (2018) reported that primigravida mothers experience greater concern and curiosity regarding pregnancy-related risks,

fostering stronger engagement with preeclampsia screening and preventive measures.

Among multiparous women, knowledge levels were generally moderate, despite their greater obstetric experience. This may be attributed to reduced vigilance and overconfidence stemming from previous uneventful pregnancies, as well as limited exposure to updated guidance during antenatal visits (Rahayu & Yunarsih, 2020).

Nevertheless, parity offers valuable opportunities for experiential learning. Dahniar et al. (2023) highlight that repeated interactions with healthcare providers across successive pregnancies enhance maternal preparedness for potential complications. Each gestational experience functions as a learning process that strengthens maternal awareness and decision-making in subsequent pregnancies. Similarly, Heryanti and Sintia (2022) emphasize that accumulated childbirth experience equips mothers to anticipate and manage complications, including preeclampsia. Thus, parity operates as both a behavioral and educational determinant, shaping maternal knowledge and engagement in preventive health practices.

## **CONCLUSION AND SUGGESTIONS**

This study indicates that most pregnant women have good knowledge of preeclampsia screening. These findings highlight the critical role of education and reproductive experience in enhancing maternal understanding of preeclampsia. Women with adequate knowledge and awareness are better prepared to make informed decisions, including timely attendance at antenatal care (ANC) services.

Innovations in health services, particularly at the primary care level, can be promoted through interactive and personalized educational strategies tailored to maternal educational backgrounds and reproductive experiences. Examples include educational videos, prenatal classes, and the involvement of community health workers within the community. Such interventions aim to facilitate early recognition of preeclampsia and other pregnancy-related danger signs, ensuring optimal management.



Ultimately, these efforts contribute to reducing the incidence of preeclampsia, as well as maternal and infant mortality in Indonesia, supporting improved maternal and neonatal health outcomes nationwide.

## DECLARATION

### **Conflict of Interest**

Authors declare no conflict of interest regarding the publication of this research.

### **Authors' Contribution**

All authors contributed significantly to the research, analysis, and writing of this article. Author designed the study and supervised data collection, performed statistical analysis, and contributed to data interpretation and manuscript preparation. All authors reviewed and approved the final version.

### **Ethical Approval**

This study obtained ethical clearance from the Health Research Ethics Committee, Faculty of Medicine, Universitas Airlangga (77/EC/KEPK/FKUA/2025), confirming that all procedures adhered to established ethical standards. Additional permission was granted by the Surabaya City Health Office (No. 000.9.2/2186/436.7.2/2025) and Simomulyo Public Health Center, Surabaya.

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### **Data Availability**

The data supporting the findings of this study are available upon reasonable request from the corresponding author, with restrictions due to participant confidentiality.

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