**Original Research Article**

**The Correlation Between Antenatal Education History And Maternal Knowledge Level About Preeclampsia Danger Signs: Cross-Sectional Study**

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| **ABSTRACT**  **Introduction :** Preeclampsia is a leading cause of maternal and infant morbidity and mortality in Indonesia, including Buleleng Regency, and highlights the need for improved maternal knowledge of its warning signs. Antenatal education, through classes and ANC visits, can enhance awareness and help prevent pregnancy complications.  **Aims:** This study aimed to determine the relationship between antenatal education history (participation in antenatal classes and education during ANC visits) and the level of knowledge about preeclampsia warning signs among pregnant women at Buleleng District Hospital.  **Study design:**  This was an observational analytic study with a cross-sectional design.  **Place and Duration of Study:** This study was conducted at the Obstetric Outpatient Clinic of Buleleng District Hospital from March 6 to April 25, 2025.  **Methodology:** The study population included all pregnant women with preeclampsia attending Buleleng District Hospital. A total of 38 pregnant women were selected using a total sampling technique. Data were collected using a validated questionnaire. The inclusion criteria were women in the second and third trimester with preeclampsia, and exclusion criteria included women with verbal or mental impairments. Univariate and bivariate analyses were performed using Fisher’s Exact test in SPSS version 26.  **Results:** Univariate analysis showed that most respondents were aged 20–35 years (86.8%), had higher education levels (78.9%), were multiparous (84.2%), and had a moderate level of knowledge (60.5%). Fisher Exact test showed a significant corrrelation between participation in antenatal classes (p = 0.000) and education during ANC visits (p = 0.001) with maternal knowledge of preeclampsia danger signs.  **Conclusion:** The history of antenatal education is significantly associated with the level of maternal knowledge about preeclampsia warning signs at Buleleng District Hospital. Healthcare workers, especially midwives, are expected to improve interactive educational methods to enhance the effectiveness of antenatal education and contribute to reducing maternal and neonatal complications due to preeclampsia. |

*Keywords:* [*antenatal education, maternal knowledge, preeclampsia warning signs*]

1. INTRODUCTION

Preeclampsia is one of the uttermost cause maternal death globally, with an incidence seven times higher in developing countries than advanced countries. As stated by WHO (2023), preeclampsia accounts for 12% maternal deaths in the world. In Indonesia, the number of incidences of preeclampsia reached 9,4%, while in Bali in 2023 there were 718 cases, with 116 cases in Buleleng regency (Bali Provincial Health Office, 2023). Preeclampsia also has a serious impact on the fetus, increasing the risk of prematurity, IUGR, dan BBLR (Sugiantari, dkk., 2019).

Efforts to prevent preeclampsia in Indonesia is a priority, one of which is through the role of midwives as the front-line health workers. Based on the Midwife Professional (Kemenkes RI, 2020), midwives have an important role in providing promotional, preventive, curative, and collaborative services. One of the preventive and promotive efforts carried out by the midwives is antenatal education, which includes the participation of pregnant women in prenatal class and education antenatal care (ANC) visits. This antenatal education aims to increase the maternal knowledge of danger signs of pregnancy, including preeclampsia (Andira & Sri Rahayu, 2023; Erawati, dkk., 2019).

Good knowledge is expected to help mothers to recognize the initial symptoms of preeclampsia, prevent complications, and enrich compliance towards antenatal visits. However, facts on the ground show that even though the mother attended antenatal class and regular ANC examinations, many mothers still lack understanding of the signs and symptoms of preeclampsia (Tamma, dkk., 2023). This gap indicates the needs of evaluation of effectiveness antenatal education, both from the participation of mothers in antenatal classes and the education provided during ANC visits.

Therefore, this study aims to analyze the correlation between antenatal education history (participation in antenatal class and education during ANC) with the level of knowledge of expectant mother about the danger signs of preeclampsia in Buleleng regency. The results of the study are expected to be the basis of the improvement antenatal education program to be more effective in reducing the risk of complications and maternal mortality due to preeclampsia.

2. material and methods

2.1 Participants and Survey Procedures

This study used an analytic observational design with a cross-sectional approach, which was carried out on march 6, 2025 to april 25, 2025 at the buleleng district hospital. The sample in this study consisted of 38 pregnant women with preeclampsia who attended the obstetric outpatient clinic at buleleng district hospital and met the inclusion criteria. Participants were selected using a total sampling technique. The inclusion criteria were pregnant women in their second and third trimesters diagnosed with preeclampsia and willing to participate in the study by signing an informed consent. The exclusion criteria were pregnant women with mental or verbal impairments. After obtaining ethical clearance and research permission, data were collected using a structured questionnaire administered directly by the researcher. Research ethics were obtained from the buleleng district hospital, with ethics approval letter number: 04/EC/KEPK-RSB/III/2025.

2.2 Questionnaire

The research instrument used a questionnaire developed and modified based on previous validated instruments (restika riski, 2019) to assess maternal knowledge of preeclampsia warning signs. The questionnaire consisted of 12 true-or-false questions concerning the definition of preeclampsia, risk factors, signs and symptoms, and complications. Respondents’ knowledge level was categorized into three levels based on the total correct answers: good (76–100%), fair (56–75%), and poor (≤55%). Prior to data collection, a validity and reliability test was conducted with 40 respondents outside the study setting. The validity test showed all items were valid with r-count > r-table (0.304), with r-count ranging from 0.310 to 0.513. The reliability test yielded a cronbach's alpha value of 0.843 (>0.6), indicating the instrument was reliable.

2.3 Statistical Analysis

Data were processed and analyzed using spss version 26.0. Descriptive statistics were used to summarize maternal characteristics and level of knowledge. Bivariate analysis was conducted using fisher's exact test to examine the relationship between antenatal education history and maternal knowledge of preeclampsia warning signs.

3. results and discussion

The results of the study showed that most respondents were 20-35 years old (86,8%), had a high school education (78,9%), were employed (78,9%), and multiparous (68,4%). However, more than half of the respondents did not attend antenatal class (55,3%), and almost half received non-standard compliant ANC education (47,4%). The level of maternal knowledge about the danger signs of preeclampsia was mostly in the moderate category (60,5%). The correlation analysis showed that the participation in antenatal class and ANC education quality had a significant correlation with the level of maternal knowledge.

Table 1. Distribution of Respondent Characteristics

| **Characteristics** | **Frequency**  **(f)** | **Percentage**  **(%)** |
| --- | --- | --- |
| **Usia** |  |  |
| <20 and >35 Years | 5 | 13 |
| 20-35 Years  >35 Years | 33  2 | 86,8  5.3 |
| Total | 38 | 100,0 |
| **Education** |  |  |
| Elementary & Junior High School  Senior/Vocational High School | 8  30 | 21,1  78,9 |
| Higher Education | 0 | 0 |
| Total | 38 | 100,0 |
| **Jobs** |  |  |
| Unemployed | 8 | 21,1 |
| Employed | 30 | 78,9 |
| Total | 38 | 100,0 |
| **Parity** |  |  |
| Primiparous | 6 | 15,8 |
| Multiparous | 26 | 68,4 |
| Grande Multiparous | 6 | 15,8 |
| Total | 38 | 100,0 |
| **Antenatal Class Participation** |  |  |
| Not Joining | 21 | 55,3 |
| Join | 17 | 44,7 |
| Total | 38 | 100,0 |
| **Education during ANC Visit** |  |  |
| Non-Standard Compliant | 18 | 47,4 |
| Standard Compliant | 20 | 52,6 |
| Total | 38 | 100,0 |
| **Level of Knowledge** |  |  |
| Poor | 0 | 0,0 |
| Moderate | 23 | 60,5 |
| Good | 15 | 39,5 |
| **Total** | **38** | **100,0** |

Table 2 illustrates the bivariate correlation between antenatal education history and the level of maternal knowledge about the danger signs of preeclampsia. Fisher Exact test results showed a significant correlation between participation in antenatal classes and maternal knowledge level (p = 0.000), and between education during ANC visits and maternal knowledge (p = 0.001).

Table 2.

Correlation between Antenatal Education History and Maternal Knowledge Level about Preeclampsia Danger Signs

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Knowledge | | | | | Total | P *Value* |
| Enough | | | Good | |
| F | % | F | | % |
| **Antenatal Class Participation** | |  |  | |  |  |  |
| Did not attend | 21 | 100,0 | 0 | | 0,0 | 21 | 0,000 |
| Follow | 2 | 11,76 | 15 | | 88,24 | 17 |  |
| Total | 23 | 60,5 | 15 | | 39,5 | 38 |  |
| **Education during ANC Visit** | |  |  | |  |  |  |
| Non-Standard Compliant | 16 | 88,89 | 2 | | 11,11 | 18 | 0,001 |
| Standard Compliant | 7 | 35,00 | 13 | | 65,00 | 20 |  |
| Total | 23 | 60,50 | 15 | | 39,50 | 38 |  |

The results of this study show that most expectant mothers are in in the range of 20-35 years, which is biologically the optimal reproductive age with a relatively low risk of complications (Tinta et al., 2020). However, most respondents in this group still experienced preeclampsia, indicating that other factors such as stress, lifestyle, and work contributed to the occurrence of complications (Christine, 2018; Khadari, 2025). The majority of respondents also had secondary education and were employed. Formal education plays a role in shaping basic understanding of pregnancy, but access to and engagement in active antenatal education remains a key determinant in improving maternal knowledge (Mattsson et al., 2022; Rachmawati et al., 2021). On the other hand, working mothers may experience barriers to attending antenatal classes or receiving maximum education due to time constraints and workload (Iskandar et al., 2024)

Although most of the respondents were multiparous, this did not necessarily correlate with increased knowledge, as previous pregnancy experience did not necessarily involve a proper understanding of the danger signs of preeclampsia (Khatiwada & Nepal, 2021; ACOG, 2020). This is reinforced by the fact that most respondents in this study had a level of knowledge that was only classified as fair, while the rest were good, and none were classified as poor. This suggests that although basic information has been conveyed, in-depth understanding of preeclampsia still needs to be improved through more effective interventions.

Bivariate analysis in this study emphasized that participation in antenatal classes was significantly associated with the level of maternal knowledge about the danger signs of preeclampsia. Mothers who actively attended classes had better knowledge than those who did not participate. Maternity classes provide a structured, interactive, educational tool that allows for the exchange of experiences between participants, making them an effective medium for improving maternal understanding (Koovimon et al., 2023; Yang et al., 2022). This study also supports the opinion that maternal participation in classes is greater among mothers with higher education and productive age, while housewives tend to be more flexible in attending classes than working mothers (Aljohani & Aljohani, 2020

Furthermore, education during ANC visits also showed a significant correlation with mothers' knowledge level. Mothers who received education according to the standard had more good knowledge. This suggests that ANC visits not only serve as a physical examination, but also as an important moment to convey relevant and comprehensive information about pregnancy complications. Research by Hassen and Lelisho (2022) and Ferdian et al. (2024) confirmed that the quality of counseling during ANC greatly determines the improvement of maternal knowledge. However, the fact that almost half of the respondents did not receive standardized education suggests the need for improvement in the delivery of education in health facilities. The education provided should not be biased based on parity or educational background, because every mother has the right to obtain adequate information (Tjandraprawira & Ghozali, 2019).

The role of midwives as health workers who provide education is very important in supporting the success of antenatal education. Both in antenatal classes and in anc services, midwives need to ensure that the material is delivered communicatively and in accordance with the characteristics of the mother. In accordance with permenkes no. 21 of 2021 and law no. 4 of 2019 concerning midwifery, midwives are required to monitor and provide counseling on pregnancy complications, including preeclampsia, at every stage of service. Continuous and inclusive education can be key in improving maternal knowledge and reducing the risk of pregnancy complications (Rahyani & Suardana, 2018).

Thus, the findings of this study confirm that improving maternal knowledge about the danger signs of preeclampsia is strongly influenced by active involvement in antenatal classes and the quality of education during anc. These two approaches complement each other in shaping expectant mother awareness of the risk of complications, and are an important part of preventive efforts that should continue to be strengthened in the midwifery service system.

4. Conclusion

Participation in antenatal classes and regular education during anc visits significantly improved maternal knowledge of the danger signs of preeclampsia. Mothers who attended classes and received education are considerably more likely to understand the risks of preeclampsia than who did not. Education, age, and parity affect the level of knowledge, however structured education remains crucial for all expectant mothers. The role of midwives as education provider become the key in preventing pregnancy complications through increasing maternal awareness.

Consent (where ever applicable)

As per international standards or university standards, participants’ written consent has been collected and preserved by the author(s).

Ethical approval (where ever applicable)

This research has received ethical approval from the ethics committee of the buleleng district hospital.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that no generative ai technologies such as large language models (chatgpt, copilot, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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