



Training for Early-Onset Pre-eclampsia Risk Factor Screening to Improve Midwives' Knowledge in Primary Care

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Abstract

Background: Screening for maternal risk factors by primary health providers is essential for managing early-onset pre-eclampsia (EOPE) and reducing maternal and fetal morbidity and mortality. Effective prevention requires well-trained healthcare professionals, particularly midwives, but knowledge gaps remain key barriers to optimal management.

Objectives: The present study aimed to assess the level of improvement in midwives' knowledge after training in EOPE risk factor screening.

Methods: This quasi-experimental study employed a pretest-posttest design and prospectively enrolled a convenience sample of 85 midwives from Banyumas city, Central Java, Indonesia. A non-probability consecutive sampling technique was used. The study was conducted in October 2021. Training was delivered over 2 days using case-based learning, consisting of four sections: Material presentation, material discussion, scenario presentation, and scenario discussion. Two scenarios were included. Knowledge was assessed using a validated and reliable researcher-developed questionnaire. McNemar and Wilcoxon tests were used for statistical analysis.

Results: Training in EOPE risk factor screening significantly improved midwives' knowledge, with a 57.6% increase in overall scores ($P < 0.001$). Almost all participants (98.8%) demonstrated marked improvement in recognizing EOPE risk identification criteria ($P < 0.05$).

Conclusion: Early-onset pre-eclampsia risk factor screening training is essential for enhancing midwives' knowledge and supporting timely preventive care in primary settings.

Keywords: Pre-eclampsia, Midwifery, Risk Factors, Screening, Teaching

1. Background

Pre-eclampsia (PE) is a leading cause of maternal and neonatal mortality, with a prevalence of 2% - 7% across high- and low-to-middle-income countries (1-4). It is categorized into early-onset pre-eclampsia (EOPE) and late-onset pre-eclampsia (LOPE), occurring in a 1: 6 ratio. This condition is characterized by the onset of clinical signs and symptoms and delivery before (EOPE) or after (LOPE) 34 weeks of gestation. Early-onset pre-eclampsia is associated with higher maternal and neonatal morbidity and mortality rates compared with LOPE (1-3).

Neonates born to mothers with EOPE are at greater risk of respiratory distress, asphyxia, and prolonged hospital stays compared with those born to mothers with LOPE (1, 5-7). Additionally, women with EOPE are more likely to experience severe complications, such as hemolysis, elevated liver enzymes, low platelet count (HELLP syndrome), antepartum hemorrhage, cardiovascular disease, and organ dysfunction. By contrast, LOPE is typically associated with prolonged maternal care due to various complications (8).

The risk factors for PE include personal behaviors, lifestyle, environmental exposure, and hereditary traits

(9). Three systematic reviews have identified 17 risk factors for PE (9, 10). Prevention of PE, particularly among high-risk individuals, can significantly reduce maternal and fetal morbidity and mortality during pregnancy or outside of pregnancy (11). Midwives play a crucial role in preventing PE by identifying these risk factors in primary healthcare settings. However, insufficient knowledge and skills among midwives remain a major barrier to effective PE management (12-14). Midwives worldwide often lack sufficient knowledge regarding various aspects of PE diagnosis and management (15). To address this gap, training policies should incorporate non-traditional approaches that enhance midwives' knowledge. Continuous and impactful training in power-implemented health is essential to improve knowledge and skills in the management of PE (16-20). In Indonesia, existing policies promote the screening of PE risk factors among primary care physicians (20, 21).

2. Objectives

The present study aimed to evaluate the improvement in knowledge among midwives after receiving training in EOPE risk factor screening within primary healthcare settings as part of broader preventive efforts.

3. Methods

3.1. Research Design

This quantitative study used a quasi-experimental, one-group pretest-posttest design to examine the differences in midwives' knowledge of EOPE risk factor screening before and after training.

3.2. Setting and Samples

This study was conducted at 40 public health centers in Banyumas city, Central Java, Indonesia, in October 2021. The target study population comprised all midwives employed at these health centers. Midwives with more than 5 years of professional experience and who were willing to participate in the study were enrolled. The minimum sample size of 85 participants was determined using the formula for categorical pair comparison (confidence interval 95% with power 80%). A non-probability consecutive sampling technique was utilized for participant recruitment (21).

$$n = \frac{(Z_\alpha + Z_\beta)\pi^2}{(P_1 - P_2)^2} \quad (1)$$

$$\pi = (P_1 Q_2) + (P_2 Q_1) \quad (2)$$

Where:

n: Minimal sample

Z_α : Confidence interval 5% = 1.96

Z_β : Beta standard values 20% = 0.84

P_1 : The proportion of knowledge on measurement of knowledge before training = $(P_2 - 0.20) = 0.657$

Q_1 : $1 - P_1 = 1 - 0.657 = 0.343$

P_2 : Proportions on measurement knowledge after training, based on a previous study (22) = 0.857

Q_2 : $1 - P_2 = 1 - 0.857 = 0.143$

$P_1 - P_2$: The minimum difference in knowledge considered meaningful between before and after the training was set by = 0.20

3.3. Intervention

The intervention administered to the participants consisted of training on EOPE risk factor screening. A paper and case-based learning approach was used as the instructional method. The training covered several key topics, including definition, pathophysiology, signs and symptoms, maternal and infant complications, risk factor screening, and EOPE preventive management. The training was delivered in two sessions: The provision of instructional material (first day) and case-based learning (second day). Each session began with a lecture by the instructor, followed by a discussion of the corresponding material or case. For the case-based learning component, cases were drawn from the Maternal and Child Health Handbook (23).

3.4. Measurement and Data Collection

After the participants agreed to enroll in the study, an interview was conducted to gather demographic data, including age, education, work experience, and workplace. After filling out the demographic questionnaire, the EOPE questionnaire was administered. This questionnaire comprised 34 items: Definition (3 questions), pathophysiology (1 question), complications (4 questions), risk factors (16 questions), decision making (2 questions), and preventive management (9 questions). The questions were structured in a closed format with two response options: Yes or no. Each correct answer was assigned a score of 1. The assessment score was calculated by dividing the number of correct answers by 34 and multiplying the result by 100. The resulting scores were classified as good (if the correct answers exceeded 80

points) and poor (if the correct answers fell below 80 points).

3.5. Data Analysis

Categorical descriptive analyses were conducted using numbers and percentages to characterize the population. Changes in midwives' knowledge before and after training were assessed using the McNemar test, with the significance level set at a P-value of < 0.05 . The Wilcoxon test was used to evaluate improvements across specific criteria in the questionnaire, with the significance level set at a P-value of < 0.05 . Data analysis was performed using SPSS version 29.

3.6. Ethical Considerations

The study was reviewed and approved by the Research Ethics Committee of the Faculty of Medicine, Padjadjaran University, Bandung (847/UN6.KEP/EC/2021). This study was conducted in accordance with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. All participants provided written informed consent.

4. Results

Eighty-five midwives participated in the training intervention. [Table 1](#) outlines the demographic and professional characteristics of the participants. As indicated in [Table 2](#), there was a significant increase in the number of midwives who demonstrated good knowledge after the training ($P < 0.001$). [Table 3](#) presents detailed improvements across specific knowledge criteria. Midwives showed significant improvement in knowledge regarding EOPE pathophysiology ($P \leq 0.05$) and in recognizing critical risk factors such as diabetes mellitus, multiparity with a new partner, maternal age ≥ 35 years, obesity, and elevated mean arterial pressure (MAP). Additionally, knowledge of preventive management also improved significantly, particularly regarding early screening for risk factors before 20 weeks of gestation and primary prevention experience ($P \leq 0.05$). However, no significant improvement was observed in knowledge related to twin pregnancies or preventive therapy ($P > 0.05$).

Before training, knowledge of autoimmune conditions (systemic lupus erythematosus) and antiphospholipid syndrome, assisted reproductive pregnancies, and nulliparity was relatively low ($< 60\%$) compared with other areas. Post-training results also indicated a notable increase in knowledge in these areas ($P < 0.05$).

5. Discussion

This study demonstrated the effectiveness of training midwives on understanding EOPE risk factors. These results extend previous findings that midwives need health promotion training for PE ([24](#)). It is consistent with studies in several countries showing that midwives' knowledge about PE management can be improved ([25, 26](#)). Case-based learning was employed to bridge theory and practice, focusing on two core topics: The pathophysiology of risk factors and preventive management. Case-based learning is an inquiry-based pedagogical approach that prepares students for clinical practice through the use of authentic cases. The implementation of this method can enhance student learning by promoting the acquisition and application of knowledge in patient assessment and problem-solving ([27, 28](#)). This study demonstrated that this method enhanced the midwives' knowledge and assessment of risk factors and supported problem-solving efforts in the prevention of EOPE.

The effectiveness of case-based learning varies depending on the modality used – paper-based and video-based. Video case studies provide a more holistic perspective on labor and delivery care, incorporating psychosocial factors and centering on the experiences of women and their families. By contrast, paper-based case studies tend to emphasize biomedical assessments, offering a more clinically focused learning experience for healthcare providers ([29](#)). The paper-based case technique used in this study effectively strengthened participants' understanding of the pathophysiology associated with several key risk factors. However, certain areas such as the pathophysiology of twin pregnancy, renal disease, and proteinuria were poorly understood. Similarly, knowledge related to preventive therapy did not show significant improvement. This may be attributed to less innovative instructional methods or insufficiently intensive mentorship relationships. Research suggests that incorporating video content can provide additional psychomotor benefits for learners ([30](#)).

This study has some limitations. The sample size of 85 participants in this one-group pretest-posttest design was relatively large for the minimal requirement, but there is no comparison with a control group. Additionally, the study focused on participants from a single district encompassing 40 community health centers, which restricts the generalizability of the findings. Additional limitations included the absence of a random sampling method and the lack of long-term follow-up. Future studies should involve larger, more

Table 1. Demographic and Occupational Characteristics of Participants (n = 85)

Characteristics	No. (%)
Age (y)	
< 35	30 (35.3)
> 35	55 (64.7)
Education	
Midwifery associate degree	79 (92.9)
Midwifery applied bachelor's degree	12 (14.1)
Work experience (y)	
< 10	19 (22.4)
≥ 10	66 (77.6)
Workplace	
Public health	40 (47.1)
Community	45 (52.9)

Table 2. Comparison of Midwives' Knowledge Level Regarding to Early Onset Preeclampsia Risk Factors Before and After Training (n = 85)

Knowledge	Before	After	P-Value
Good	35 (41.2)	84 (98.8)	
Deficient	50 (58.8)	1 (1.2)	< 0.001 ^a

^a Significance value of the McNemar test.

diverse samples across multiple regions to enhance the applicability of the results.

5.1. Conclusions

This study assessed the changes in midwives' knowledge before and after training on EOPE risk factor screening. The results indicated a significant improvement in midwives' knowledge, particularly in understanding the pathophysiology of EOPE and preventive management strategies, early screening, and primary prevention. These results suggest that targeted case-based learning training in EOPE risk factor screening can improve the accuracy of EOPE screening in primary care settings. Prompt recognition and intensive interventions may reduce the risk of complications.

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Footnotes

Authors' Contribution: All authors contributed to the study conceptualization, methodology, and manuscript preparation. W. D. P. and E. P. S. drafted the original manuscript, while D. H. and A. P. were responsible for formal analysis, resources provision, and manuscript review and editing. All authors have reviewed and approved the final version of the manuscript.

Conflict of Interests Statement: The authors declare no conflict of interests.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication.

Ethical Approval: Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine, Padjadjaran University, Bandung (Approval No: 847/UN6.KEP/EC/2021).

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Informed Consent: Written informed consent was obtained from all participants.

References

Table 3. Comparison of Midwives' Knowledge About Early Onset Preeclampsia Criteria Before and After Training (n = 85)

Criteria	Correct Answers		
	Before Training; No. (%)	After Training; No. (%)	P-Value
Pathophysiology	42 (49.4)	80 (94.1)	< 0.001 ^a
Risk factors			
Pregnant with twins	77 (90.6)	80 (94.1)	0.405
Diabetes mellitus	65 (76.5)	82 (96.5)	< 0.001 ^a
Renal disease	71 (83.5)	79 (92.9)	0.059
Autoimmune conditions, SLE	48 (56.5)	79 (92.9)	< 0.001 ^a
APS	50 (58.8)	83 (97.6)	< 0.001 ^a
Multiparity with a new partner	73 (85.9)	85 (100)	0.001 ^a
Pregnancy with assisted reproduction	46 (54.1)	84 (98.8)	0.008 ^a
Age ≥ 35 years	69 (81.2)	80 (94.1)	< 0.001 ^a
Nulliparity	41 (48.2)	84 (98.8)	0.005 ^a
Pregnancy interval > 10 years	68 (80.0)	81 (95.3)	< 0.001 ^a
Pre-pregnancy obesity/Body Mass Index > 30	72 (84.7)	81 (95.3)	< 0.001 ^a
MAP ≥ 90	67 (78.8)	85 (100)	0.003 ^a
Proteinuria	68 (80.0)	81 (95.3)	0.132
Preventive management			
Risk factor screening before 20 weeks of gestation	76 (89.4)	81 (95.3)	0.013 ^a
Preventive therapy	74 (87.1)	83 (97.6)	0.655
Primary prevention of PE	82 (96.5)	83 (97.6)	< 0.001 ^a

Abbreviations: MAP, mean arterial pressure; PE, pre-eclampsia.

^a Significance value of the Wilcoxon's test.

- Bernardes TP, Mol BW, Ravelli ACJ, van den Berg P, Boezen HM, Groen H. Early and late onset pre-eclampsia and small for gestational age risk in subsequent pregnancies. *PLoS One*. 2020;15(3). e0230483. [PubMed ID: 32218582]. [PubMed Central ID: PMC7100959]. <https://doi.org/10.1371/journal.pone.0230483>.
- Lourenco I, Gomes H, Ribeiro J, Caeiro F, Rocha P, Francisco C. Screening for Preeclampsia in the First Trimester and Aspirin Prophylaxis: Our First Year. *Rev Bras Ginecol Obstet*. 2020;42(7):390-6. [PubMed ID: 32559792]. [PubMed Central ID: PMC10309226]. <https://doi.org/10.1055/s-0040-1712124>.
- Shen M, Smith GN, Rodger M, White RR, Walker MC, Wen SW. Comparison of risk factors and outcomes of gestational hypertension and pre-eclampsia. *PLoS One*. 2017;12(4). e0175914. [PubMed ID: 28437461]. [PubMed Central ID: PMC5402970]. <https://doi.org/10.1371/journal.pone.0175914>.
- Tang Z, Ji Y, Zhou S, Su T, Yuan Z, Han N, et al. Development and Validation of Multi-Stage Prediction Models for Pre-eclampsia: A Retrospective Cohort Study on Chinese Women. *Front Public Health*. 2022;10:911975. [PubMed ID: 35712289]. [PubMed Central ID: PMC9195617]. <https://doi.org/10.3389/fpubh.2022.911975>.
- Ndwiga C, Odwe G, Pooja S, Ogutu O, Osoti A, E. Warren C. Clinical presentation and outcomes of pre-eclampsia and eclampsia at a national hospital, Kenya: A retrospective cohort study. *PLoS One*. 2020;15(6). e0233323. [PubMed ID: 32502144]. [PubMed Central ID: PMC7274433]. <https://doi.org/10.1371/journal.pone.0233323>.
- Thangaratinam S, Allotey J, Marlin N, Dodds J, Cheong-See F, von Dadelszen P, et al. Prediction of complications in early-onset pre-eclampsia (PREP): development and external multinational validation of prognostic models. *BMC Med*. 2017;15(1):68. [PubMed ID: 28356148]. [PubMed Central ID: PMC5372261]. <https://doi.org/10.1186/s12916-017-0827-3>.
- Weitzner O, Yagur Y, Weissbach T, Man El G, Biron-Shental T. Preeclampsia: risk factors and neonatal outcomes associated with early- versus late-onset diseases. *J Matern Fetal Neonatal Med*. 2020;33(5):780-4. [PubMed ID: 30001660]. <https://doi.org/10.1080/14767058.2018.1500551>.
- Dall'Asta A, D'Antonio F, Saccone G, Buca D, Mastantuoni E, Liberati M, et al. Cardiovascular events following pregnancy complicated by pre-eclampsia with emphasis on comparison between early- and late-onset forms: systematic review and meta-analysis. *Ultrasound Obstet Gynecol*. 2021;57(5):698-709. [PubMed ID: 32484256]. <https://doi.org/10.1002/uog.22107>.
- Kirch W. *Risk factor in Encyclopedia of Public Health*. 20230227 ed. Dordrecht, Netherlands: Springer; 2008. [PubMed ID: 37363382]. [PubMed Central ID: PMC9970133]. <https://doi.org/10.1007/s11947-023-03038-9>.
- Burton GJ, Redman CW, Roberts JM, Moffett A. Pre-eclampsia: pathophysiology and clinical implications. *BMJ*. 2019;366:l2381. [PubMed ID: 31307997]. <https://doi.org/10.1136/bmj.l2381>.
- Staff AC. The two-stage placental model of preeclampsia: An update. *J Reprod Immunol*. 2019;134-135:1-10. [PubMed ID: 31301487]. <https://doi.org/10.1016/j.jri.2019.07.004>.
- Indarti J, Prasetyo S. Knowledge of Midwives as a Healthcare Provider About Hypertensive Disorders During Pregnancy. *Indo J Obstet*

Gynecol or Inajog. 2019;7(1):9-14. <https://doi.org/10.32771/inajog.v7i1.638>.

13. Nkamba DM, Vangu R, Elongi M, Magee LA, Wembodinga G, Bernard P, et al. Health facility readiness and provider knowledge as correlates of adequate diagnosis and management of pre-eclampsia in Kinshasa, Democratic Republic of Congo. *BMC Health Serv Res*. 2020;20(1):926. [PubMed ID: 33028310]. [PubMed Central ID: PMC7542875]. <https://doi.org/10.1186/s12913-020-05795-1>.
14. Raney JH, Morgan MC, Christmas A, Sterling M, Spindler H, Ghosh R, et al. Simulation-enhanced nurse mentoring to improve preeclampsia and eclampsia care: an education intervention study in Bihar, India. *BMC Pregnancy Childbirth*. 2019;19(1):41. [PubMed ID: 30674286]. [PubMed Central ID: PMC6344989]. <https://doi.org/10.1186/s12884-019-2186-x>.
15. Garti I, Gray M, Tan JY, Bromley A. Midwives' knowledge of pre-eclampsia management: A scoping review. *Women Birth*. 2021;34(1):87-104. [PubMed ID: 32928690]. <https://doi.org/10.1016/j.wombi.2020.08.010>.
16. Angelina JA, Kibusi SM, Mwampagatwa I, Ernest A. Knowledge on Prevention and Management of Preeclampsia and Eclampsia among Nurses in Primary Health Settings: Baseline Findings from an Interventional Study in Dodoma Region, Tanzania. *East Afr Health Res J*. 2020;4(1):33-40. [PubMed ID: 34308218]. [PubMed Central ID: PMC8279161]. <https://doi.org/10.24248/eahrj.v4i1.619>.
17. Fritz J, Montoya A, Lamadrid-Figueroa H, Flores-Pimentel D, Walker D, Trevino-Siller S, et al. Training in obstetric and neonatal emergencies in Mexico: effect on knowledge and self-efficacy by gender, age, shift, and profession. *BMC Med Educ*. 2020;20(1):97. [PubMed ID: 32234024]. [PubMed Central ID: PMC710675]. <https://doi.org/10.1186/s12909-020-02005-8>.
18. Urbute A, Paulionyte M, Jonauskaitė D, Machejeviene E, Nadišauskienė RJ, Dambrauskas Z, et al. Perceived changes in knowledge and confidence of doctors and midwives after the completion of the Standardized Trainings in Obstetrical Emergencies. *Medicina*. 2017;53(6):403-9. [PubMed ID: 29482880]. <https://doi.org/10.1016/j.medici.2018.01.006>.
19. Soggiu-Duta CL, Suciu N. Resident physicians' and Midwives' Knowledge of Preeclampsia and Eclampsia Reflected in Their Practice at a Clinical Hospital in Southern Romania. *J Med Life*. 2019;12(4):435-41. [PubMed ID: 32025263]. [PubMed Central ID: PMC6993296]. <https://doi.org/10.25122/jml.2019-0130>.
20. Kemenkes RI. *Maternal and Child Health (MCH) Books*. Jakarta, Indonesia: Ministry of Health of the Republic of Indonesia; 2021. Available from: https://kesga.kemkes.go.id/assets/file/pedoman/BUKU_KIA_REVISI
21. Ahmed SK. How to choose a sampling technique and determine sample size for research: A simplified guide for researchers. *Oral Oncol Rep*. 2024;12. <https://doi.org/10.1016/j.oor.2024.100662>.
22. Setyawati A, Harun H, Herliani YK. Improving Nurses' and Midwives' Knowledge of Evidence-based Practice through Training in the Application of Evidence-based Practice. *J Sci Technol App Soc*. 2017;6(1):53-6.
23. Ministry of Health. *Maternal and Child Health Book*. Ministry of Health; 2023. Available from: <https://ayosehat.kemkes.go.id/buku-kia-kesehatan-ibu-dan-anak>.
24. Garti I, Gray M, Bromley A, Tan JB. Pre-eclampsia training needs of midwives in a Ghanaian tertiary hospital: A cross-sectional study. *Nurse Educ Pract*. 2024;75:103872. [PubMed ID: 38244337]. <https://doi.org/10.1016/j.nepr.2024.103872>.
25. Kim YM, Ansari N, Kols A, Tappis H, Currie S, Zainullah P, et al. Prevention and management of severe pre-eclampsia/eclampsia in Afghanistan. *BMC Pregnancy Childbirth*. 2013;13(1):186. [PubMed ID: 24119329]. [PubMed Central ID: PMC3852136]. <https://doi.org/10.1186/1471-2393-13-186>.
26. Ramavhoya IT, Maputle MS, Lebese RT, Ramathuba DU, Netshikweta LM. Managing hypertensive disorders during pregnancy in low resource settings. *Hypertens Pregnancy*. 2019;38(4):230-6. [PubMed ID: 31550945]. <https://doi.org/10.1080/10641955.2019.1651333>.
27. Raurell-Torreda M, Olivet-Pujol J, Romero-Collado A, Malagon-Aguilera MC, Patino-Maso J, Baltasar-Bague A. Case-based learning and simulation: useful tools to enhance nurses' education? Nonrandomized controlled trial. *J Nurs Scholarsh*. 2015;47(1):34-42. [PubMed ID: 25346329]. <https://doi.org/10.1111/jnus.12113>.
28. Bi M, Zhao Z, Yang J, Wang Y. Comparison of case-based learning and traditional method in teaching postgraduate students of medical oncology. *Med Teach*. 2019;41(10):ii124-8. [PubMed ID: 31215320]. <https://doi.org/10.1080/0142159X.2019.1617414>.
29. Nunohara K, Imafuku R, Saiki T, Bridges SM, Kawakami C, Tsunekawa K, et al. How does video case-based learning influence clinical decision-making by midwifery students? An exploratory study. *BMC Med Educ*. 2020;20(1):67. [PubMed ID: 32143611]. [PubMed Central ID: PMC7059388]. <https://doi.org/10.1186/s12909-020-1969-0>.
30. Clerkin R, Patton D, Moore Z, Nugent L, Avsar P, O'Connor T. What is the impact of video as a teaching method on achieving psychomotor skills in nursing? A systematic review and meta-analysis. *Nurse Educ Today*. 2022;111:105280. [PubMed ID: 35139443]. <https://doi.org/10.1016/j.nedt.2022.105280>.