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Determinants of Preeclampsia and Its Maternal and Perinatal Outcomes Among Women in Narok County, Kenya

Rotich Kibet Aron[1], Mark Kilongosi Webale[2], Stanley Kiarie Njau[3]

[1]School of Health Sciences, Kirinyaga University, P.O. Box 143-10300, Kerugoya, Kenya
[2]School of Health Sciences, Kirinyaga University, P.O.Box, 143-10300, Kerugoya, Kenya
[3]School of Nursing, University of Embu, P.O. Box 6–60100, Embu, Kenya
[*]Email: kibetaron3@gmail.com

ABSTRACT

Preeclampsia is a critical hypertensive disorder in pregnancy that significantly impacts maternal and neonatal health outcomes. The World Health Organization (WHO) recognizes it as a key direct factor in global maternal mortality, especially in low- and middle-income countries. The disease is prevalent in Sub-Saharan Africa, posing a considerable threat to women and their infants. In resource-limited settings like Narok County, Kenya, delays in accessing healthcare and gaps in screening and treatment have worsened the impact of preeclampsia. This study aimed to identify the key factors associated with preeclampsia and to evaluate its impact on mothers and their newborns in Narok County. Using a hospital-based cross-sectional design, medical records of mothers who delivered between January and December 2023 at Narok County Referral Hospital were systematically reviewed with a standardized data extraction tool. Binary logistic regression was utilized to identify factors associated with preeclampsia, while univariate analysis characterized maternal and perinatal outcomes. Key findings indicated that rural residence (OR = 4.50, p = 0.054) and multiple gestation (OR = 3.46, p = 0.043) were significantly associated with preeclampsia. The majority of cases (88.2%) were classified as severe and commonly presented with symptoms such as severe headache and epigastric pain. Cesarean section was performed in 17.6% of cases, maternal complications occurred in 58.8%, and maternal mortality was reported at 5.9%. Common maternal complications included HELLP syndrome and eclampsia. Neonatal outcomes revealed 27.8% stillbirths, 50% low birth weight, and 44.4% low Apgar scores, with neonatal complications and deaths reported in 7.7% and 5.6% of cases, respectively. In conclusion, preeclampsia significantly compromised maternal and neonatal health in Narok County, with rural residence and multiple gestations emerging as key risk factors. These findings underscore the imperative to enhance antenatal care by early screening, risk-based monitoring, and timely intervention to mitigate the impact of preeclampsia and improve pregnancy outcomes

Keywords: Adverse Maternal outcome, Adverse perinatal outcome, Determinants, Global burden, Preeclampsia.

INTRODUCTION

Hypertensive diseases during pregnancy, which affect approximately 10% of pregnant women, constitute a primary factor in morbidity and mortality for both mothers and their infants (Cífková, 2023). These disorders can be categorized into several types: Gestational hypertension, chronic hypertension, preeclampsia/eclampsia, and chronic hypertension with superimposed preeclampsia. Chronic hypertension accounts for the majority, ranging from about 90-95%, of hypertensive conditions during pregnancy, and around 25% of these cases progress to preeclampsia later in the pregnancy. Preeclampsia is estimated to result in around 76,000 maternal deaths and 500,000 neonatal deaths globally each year (Poon *et al*., 2021). In addition to its high mortality toll, preeclampsia is a major contributor to severe maternal and perinatal complications, including babies born too early, babies with low birth weight, babies that are small for their age, and long-term maternal conditions such as chronic kidney disease (Ishaku *et al*., 2021; Khan *et al*., 2022). These devastating outcomes underscore the urgency of addressing preeclampsia as a critical global public health crisis that demands immediate and sustained action.

In cases of preeclampsia, the only option for therapy is to give birth, which can lead to a premature delivery and increases the likelihood of problems for the newborn. The prophylactic administration of low-dose aspirin is advised for women at high risk (Ives *et al*., 2020). Still, its effectiveness depends on early identification, which remains inadequate in many parts of Kenya, including Narok County.

Kenya, despite its endeavors, has not succeeded in lowering the maternal death rate to below 70 per 100,000 live births, a target established by the Sustainable Development Goals (SDGs). A considerable percentage of these fatalities is linked to direct obstetric causes, with hypertensive diseases of pregnancy, particularly preeclampsia, identified as the second most common contributor to maternal mortality (Mulongo *et al*., 2022). This disturbing trend underscores the need for context-specific data and targeted interventions to address the underlying causes in counties like Narok, where localized research is lacking.

There is limited data available on preeclampsia in Narok, despite its significant impact on the health of both mothers and babies. The lack of local evidence makes it difficult to design targeted interventions and delays effective policy action. It is against this backdrop that the study seeks to investigate the prevalence, outcomes, and risk factors of preeclampsia in Narok County, generating critical, context-specific evidence to strengthen clinical care, shape responsive health policies, and ultimately reduce preventable maternal and neonatal harm.

METHODS

Study site, design, and population

This study adopted a retrospective cross-sectional design and employed a quantitative approach to assess the determinants and outcomes of preeclampsia. It was conducted at Narok County Referral Hospital (NCRH), the main referral facility in Narok County, Kenya, known for managing a high volume of obstetric cases, including complications such as preeclampsia. The hospital was purposively selected due to its central role in maternal healthcare delivery in the region. The target population consisted of all pregnant women residing in Narok County, while the accessible population comprised those who were admitted and delivered at NCRH between January 1 and December 31, 2023. Out of 5,801 recorded deliveries, 217 medical records were systematically selected for review. The study included women of all ages with complete delivery records. Records were excluded if they were incomplete, involved deliveries outside the study period, or cases where delivery occurred before arrival at the facility.

Data collection

Data were collected from patient records at Narok County Referral Hospital between January and December 2023 using a structured extraction form. Information gathered included maternal age, education, marital status, and place of residence. Obstetric history, blood pressure readings, symptoms, lab results, and antenatal care details were also recorded. Maternal outcomes like delivery method, complications (e.g., eclampsia), and hospital stay were noted, along with baby outcomes such as birth weight, Apgar scores, stillbirths, and neonatal admissions. All data were anonymized to protect patient privacy.

Preeclampsia diagnosis

Preeclampsia was diagnosed using the 2021 guidelines from the International Society for the Study of Hypertension in Pregnancy (Magee *et al*., 2021). It is defined as high blood pressure (140/90 mmHg or more) that starts after 20 weeks of pregnancy, along with signs of organ problems or poor placental function. These signs could include kidney or liver issues, low platelets, severe headaches, vision problems, and seizures. Protein in the urine was considered but not required for diagnosis. We confirmed each diagnosis by reviewing the participants' clinical records, lab results, and maternity register.

Data Analysis

Data were coded, cleaned, and analyzed using IBM SPSS Statistics version 29. Since all study variables were categorical, data were summarized using the mode. The Chi-square (χ^2) test or Fisher's exact test was applied to compare frequencies between women with and without preeclampsia, as appropriate. Binary logistic regression was used to identify risk factors associated with preeclampsia. Univariate analysis examined maternal, fetal, and neonatal outcomes. A *p*-value of less than 0.05 was considered statistically significant.

Ethical consideration

Ethical approval was obtained from the Institutional Research Ethics Committee (IREC) of Baraton University (ERC number UEAB/ISERC/02/12/2024). A research license was issued by the National Commission for Science, Technology and Innovation (NACOSTI) (License No NACOSTI/P/25/415532), and further authorization was granted by the Narok County Government and Narok County Referral Hospital (NCRH) to access medical records. Data were retrieved retrospectively from hospital records without direct contact with patients. Access to files was done on-site under supervision, and no records were removed, copied, or altered. A structured data extraction tool was used to collect only relevant variables needed for the study. All data were anonymized at the point of collection using unique study codes, and no personally identifiable information was recorded. The anonymized data were stored in a secure, password-protected database accessible only to the lead investigator. Confidentiality, privacy, and data protection were strictly maintained throughout in line with ethical research standards.

RESULTS

Baseline Characteristics of Study Participants

Baseline Characteristics of Study Participants are shown in Table 1. The study involved 217 pregnant women admitted and delivered at Narok County Referral Hospital. Age distribution indicated that 6.5% were under 17 years, 54.8% were between 18–25 years, 31.8% were between 26–35 years, and 6.9% were 36 years or older. A majority (60.8%) resided in rural areas, whereas 39.2% lived in urban settings. Most participants (78.8%) were married, while 21.2% were single. Gravidity varied: 39.6% were primigravida, 46.5% had 2–4 pregnancies, and 13.8% had five or more. For parity, 41.5% had no previous deliveries beyond 24 weeks (nulliparous), 45.2% had one to three prior viable deliveries, and 13.3% had four or more. Antenatal care attendance also varied, with 4.1% having no visits, 52.5% attending one to three visits, and 43.3% attending 4 or more, meeting the WHO recommendation. Furthermore, 87.6% of the women had singleton pregnancies, whereas 12.4% reported multiple gestations. Preexisting medical conditions were uncommon: 6% of the women had chronic hypertension, 0.9% had diabetes, and 0.5% had both conditions. A family history of

preeclampsia was reported by 2.3% of participants, and 1.8% had experienced preeclampsia in a previous pregnancy. Preeclampsia was diagnosed in 7.8% of the women, of which 17.6% were early-onset and 82.4% late-onset. Blood pressure assessments showed that 85.7% had normal readings (≤140/90 mmHg), 7.8% had moderate hypertension (140–160/90–110 mmHg), and 6.5% had severe hypertension (>160/110 mmHg). Most women (75.6%) delivered at term (≥37 weeks), 19.8% between 34–36 weeks (late preterm), and 4.6% before 34 weeks (early preterm). Vaginal delivery occurred in 86.2% of cases, while 13.8% delivered via cesarean section. A total of 98.6% of mothers survived, with three maternal deaths (1.4%) recorded. Among the newborns, 93.7% were born alive, while 6.3% were either stillbirths or intrauterine deaths. Birth weight analysis indicated that 80.3% of the newborns had a normal weight, whereas 19.7% were of low birth weight. Admission to the newborn unit was required for 8.1% of infants, while 91.9% did not require special care. Overall, 90.1% of the newborns survived beyond the neonatal period, and 9.9% did not survive, including stillbirths and postnatal deaths.

Table 1 Demographic and clinical characteristics of study participants

Characteristics	**N (%)**
Preeclampsia	
Positive	17 (7.8)
Negative	200 (92.2)
Onset of Preeclampsia	
Early	3 (17.6)
Late	14 (82.4)
Highest Blood pressure reading	
Normal (≤140/90 mmHg)	186 (85.7)
Mild (>140≤159 />90≤109 mmHg)	17 (7.8)
Severe (≥160/110 mmHg)	14 (6.5)
Age in years	
<18	14 (6.5)
18≤25	119 (54.8)
26≤35	69 (31.8)
≥36	15 (6.9)
Residence	
Rural	132 (60.8)
Urban	85 (39.2)
Marital status	
Married	171 (78.8)
Single	46 (21.2)
Gestational age in weeks at delivery	
<34	10 (4.6)
34≤36	43 (19.8)
≥37	164 (75.6)
Gravidity	
1	86 (39.6)
2≤4	101 (46.5)
≥5	30 (13.8)

Characteristics	**N (%)**
Parity	
0	90 (41.5)
1≤3	98 (45.2)
≥4	29 (13.4)
Number of antenatal (ANC) visits	
0	9 (4.1)
1≤3	114 (52.5)
≥4	94 (43.3)
Preexisting medical conditions	
Non	201 (92.6)
Diabetes	2 (0.9)
Chronic hypertension	13 (6)
Diabetes and chronic hypertension	1 (0.5)
Family history of preeclampsia	
Yes	5 (2.3)
No	212 (97.7)
Previous history of preeclampsia	
Yes	4 (1.8)
No	213 (98.2)
Multiple gestations (current pregnancy or previous)	
Yes	27 (12.4)
No	190 (87.6)
Mode of delivery	
Caesarean section	30 (13.8)
Vaginal delivery	187 (86.2)
Maternal outcome	
Survived	214 (98.6)
Died	3 (1.4)
Fetal outcome	
Live birth	209 (93.7)
Stillbirth/intra-uterine fetal death	14 (6.3)
Birth weight	
Normal	179 (80.3)
Low birth weight	44 (19.7)
Admission to the Newborn unit (NBU)	
Yes	18 (8.1)
No	205 (91.9)

Characteristics	N (%)
Neonatal survival status	
Survived	201 (90.1)
Dead	22 (9.9)

Data are presented as numbers and proportions (%) of study participants. ≤, less than or equal to. <, less than. ≥, greater than or equal to. >, greater than.

Predictors of Preeclampsia

Determinants of preeclampsia are presented in Table 2. Age was not associated with preeclampsia (p > 0.005). However, the rate of preeclampsia cases was significantly higher among study participants living in rural areas compared to those residing in urban areas (88.6% vs. 11.2%; p = 0.016), and living in rural areas was associated with preeclampsia (OR = 4.501, 95% CI: 0.973–20.822, p = 0.054). Similarly, multiple gestation showed a significant association with preeclampsia (OR = 3.457, 95% CI: 1.040–11.495, p = 0.043). A substantial proportion of women with preeclampsia were primigravida, with 10 (58.8%) compared to only 3 (17.6%) having a gravidity of 2–4 and 4 (23.5%) having a gravidity of ≥5. This difference was statistically significant (Fisher's exact test, p = 0.026). Similarly, nulliparous women made up 10 (58.8%) of the cases, while only 3 (17.6%) had 1–3 previous births and 4 (23.5%) had ≥4 previous births, with the difference also reaching statistical significance (p = 0.036*)*.

Table 2 Predictors of Preeclampsia Among Study Participants

Variable	Positive Preeclampsia (n=17)	Negative preeclampsia (n=200)	*p*-value (χ^2)	OR [95 % CI]	*p*-value (Wald)
Age					
< 18 years	2 (11.8)	12 (6)			
18≤25	9 (52.9)	110 (55)	0.376*		
26≤35	4 (23.5)	65 (32.5)			
>35 years	2 (11.8)	13 (6.5)			
Residence					
Rural	15 (88.2)	117(58.5)		4.501 [0.973-20.822]	0.054
Urban	2(11.8)	83(41.5)	0.016	Ref	
Gravidity					
0	10 (58.8)	76 (38)			
2-4	3 (17.6)	98 (49)	0.026*		
≥5	4 (23.5)	26 (13)			
Parity					
0	10 (58.8)	80 (40)			
1≤3	3 (17.6)	95(47.5)	0.036*		
≥4	4 (23.5)	25(12.5)			
Multiple gestation (current and past)					
Yes	5(29.4)	22(11)		3.457 [1.040-11.495]	0.043
No	12(70.6)	178(89)	0.027	Ref.	
Antenatal care visits (ANC)					
<4	7 (41.2)	116 (58)			
≥4	10 (58.8)	84 (42)	0.179		

Variable	Positive Preeclampsia (n=17)	Negative preeclampsia (n=200)	*p*-value (χ^2)	OR [95 % CI]	*p*-value (Wald)
Preexisting medical condition					
Yes	1 (5.9)	15(7.5)	0.806		
No	16(94.1)	185(92.5)			
Past history of preeclampsia					
Yes	1(5.9)	3(1.5)			
No	16(94.1)	197(98.5)	0.197		
Marital status					
Single	7(41.2)	39(19.5)	0.036	2.647 [0.892-7.86]	0.080
Married	10(58.2)	161(80.5)		Ref.	

Data are presented as numbers and proportions (%) of study participants. ≤, less than or equal to. <, less than. ≥, greater than or equal to. >, greater than. OR, Odds Ratio. %, percentage. CI, 95 percent confidence intervals. *, Fisher-Freeman-Halton Exact Test. (χ^2), Pearson Chi-square *P*-value. Ref., reference category.

Maternal Outcomes among Women Diagnosed with Preeclampsia

Maternal outcomes among study participants with preeclampsia are presented in Table 3. Late-onset preeclampsia accounted for 14 (82.4%) of cases, whereas early-onset preeclampsia comprised 3 (17.6%). Additionally, most cases presented with severe disease, with 15 (88.2%) classified as severe preeclampsia and only 2 (11.8%) as mild. Among the reported symptoms, severe headache was the most common, occurring alone in 6 cases (35.3%), while severe headache combined with visual disturbances was reported in 2 cases (11.2%). Other symptoms, including epigastric pain, occurred in 1 (5.9%) case and a combination of severe headache and epigastric pain in another 1 (5.9%); however, 7 (41.2%) presented with no symptoms. Blood pressure measurements revealed that 13 (76.5%) participants had severely elevated readings (≥160/110 mmHg), whereas 4 (23.5%) exhibited mildly elevated levels (140–159/90–109 mmHg). In preeclamptic cases, vaginal delivery was the predominant mode of delivery, occurring in 14 (82.4%) participants, while 3 (17.6%) underwent cesarean section. There was 1 (5.9%) maternal death, and 16 (94.1%) mothers survived. Maternal complications were reported in 10 (58.8%) cases, while 7 (41.2%) experienced no complications. The most frequent antenatal complications included HELLP syndrome (23.5%), followed by acute kidney injury (11.8%), eclampsia (5.9%), eclampsia with HELLP syndrome (5.9%), anemia (5.9%), and complex cases involving a combination of eclampsia, HELLP syndrome, cellulitis, and hyperglycemia (5.9%). The most commonly reported postpartum complication was puerperal sepsis, affecting 4 (23.5%) participants, either alone or in combination with comorbidities such as diabetic foot and anemia. However, the majority, 13 (76.5%), did not experience any postpartum complications. Prolonged hospital stays were reported in 10 (58.8%) cases (defined as 5 or more days for cesarean deliveries and 3 or more days for vaginal deliveries), while the remaining 7 (41.2%) cases were discharged within the expected timeframe.

Table 3 Maternal Outcome Among Women Diagnosed with Preeclampsia

Maternal Outcome Characteristics	n (%)
Severity of preeclampsia	
Mild	2 (11.8)
Severe	15 (88.2)
Cases with symptoms	
Epigastric pain	1 (5.9)
Severe headache	6 (35.3)
Severe headache and epigastric pain	1(5.9)
Severe headache and visual disturbances	2 (11.2)
No symptoms	7 (41.2)
Systolic and diastolic blood pressure readings	

Maternal Outcome Characteristics	**n (%)**
Mild (140≤159/90≤109 mmHg)	4 (23.5)
Severe (≥160/110 mmHg)	13 (76.5)
Mode of Delivery	
Caesarean section	3 (17.6)
Vaginal delivery	14 (82.4)
Maternal mortality	
Survived	16 (94.1)
Died	1 (5.9)
Maternal Complication	
No complications reported	7 (41.2)
Yes	10 (58.8)
Type of antenatal complications	
AKI	2 (11.8)
Eclampsia alone	1 (5.9)
Eclampsia + HELLP syndrome	1 (5.9)
Eclampsia + HELLP syndrome + cellulitis + hyperglycemia	1 (5.9)
HELLP syndrome	4 (23.5)
Anemia	1 (5.9)
None	7 (41.2)
Type of postpartum complications	
Puerperal sepsis	1 (5.9)
Anemia + puerperal sepsis	1 (5.9)
Puerperal sepsis + Prolonged hospital stays	1 (5.9)
Sepsis + Prolonged hospital stays, Diabetic foot + cervical tear grade 4	1(5.9%)
None	13 (76.5)
Prolonged hospital stays (CS≥5, SVD ≥3)	
Yes	10 (58.8)
No	7 (41.2)

Data are presented as numbers and proportions (%) of study participants with preeclampsia. ≤, less than or equal to. <, less than. ≥, greater than or equal to. >, greater than. +, and. CS, Caesarean section. SVD, Spontaneous vertex delivery. AKI, Acute Kidney Injury. HELLP, Hemolysis Elevated Liver Enzymes and Low Platelets.

Fetal and Neonatal Outcomes

The fetal and neonatal outcome of infants delivered by the study participants with preeclampsia is presented in Table 4. Among the 18 neonates delivered by 17 study participants with preeclampsia, including one set of twins, 13 (72.2%) were live births while 5 (27.8%) were stillbirths. The gestational age at delivery showed that 11 (61.1%) neonates were born at term, 4 (22.2%) were late preterm, and 3 (16.7%) were early preterm. Birth weight was evenly

divided, with 9 (50%) neonates classified as normal weight (≥2500 grams) and 9 (50%) as low birth weight (<2500 grams). Apgar score assessments indicated that 10 (55.6%) neonates had normal scores of 7 or higher at both 1 and 5 minutes, while 8 (44.4%) had low scores below 7. Of those with low scores, only 1 (7.7%) required admission to the newborn unit, while 12 (92.3%) were not admitted. The five stillbirths were excluded from this admission assessment. Neonatal complications were assessed only among the live births and were reported in 1 (7.7%) neonate, while the remaining 12 (92.3%) experienced no adverse events. At the time of hospital discharge, 12 (66.7%) neonates had survived, 5 (27.8%) were stillbirths, and 1 (5.6%) neonate had died.

Table 4 Fetal and Neonatal Outcomes of Infants Delivered by Women with Preeclampsia

Fetal / Neonatal characteristics	**n (%)**
Fetal status at delivery	
Live birth	13 (72.2)
Stillbirth	5 (27.8)
Fetal age at delivery	
Early preterm	3 (16.7)
Late preterm	4 (22.2)
Term	11 (61.1)
Birth weight	
Normal (≥2500 grams)	9 (50.0)
Low birth weight (<2500 grams)	9 (50.0)
Apgar score at 1 and 5 minutes	
≥7 (normal)	10 (55.6)
<7 (low)	8 (44.4)
Neonatal admission to NBU	
No	12 (92.3)
Yes	1 (7.7)
Congenital abnormality recorded	
Yes	0 (0.0)
No	18 (100.0)
Neonatal complications	
No	12 (92.3)
Yes	1 (7.7)
Neonatal survival status	
Survived	12 (66.7)
Not applicable (were stillbirths)	5 (27.8)
Death	1 (5.6)

Data are presented as numbers and proportions (%) of fetal outcomes. ≤, less than or equal to. <, less than. ≥, greater than or equal to. >, greater than. NBU, Newborn Unit.

DISCUSSION

This study aimed to identify the key determinants of preeclampsia in Narok County, Kenya, and found that rural residence and multiple gestation were independently and significantly associated with its development. Women living in rural areas were more likely to develop preeclampsia, a trend that echoes findings from similar studies in Ethiopia and Zambia (Eticha *et al., 2024; Katore et al., 2021; Sinkala, 2021)*. These findings may indicate reduced access to quality antenatal care in rural areas. This hypothesis is reinforced by a previous study reporting that pregnant women living in rural areas have

limited access to antenatal care due to some factors like low socioeconomic status, low education level and a very low number of health facilities, and the problem is further compounded by poor road networks (Wairoto *et al.*, 2020). In contrast, a previous study in Ghana showed that urban residency is associated with preeclampsia (Van Middendorp *et al*., 2013). This variation may be explained by the sedentary lifestyle, which is common in urban areas. This hypothesis is reinforced by a systematic review study in Ghana, which revealed a higher prevalence of overweight and obesity, related to lifestyle, among women in urban than rural areas (Ofori-Asenso *et al.*, 2016). Furthermore, a study conducted in India reported contrasting findings by showing no association between rural or urban residency and pregnancy-induced hypertension (preeclampsia) *(Lakhute et al.*, 2021). This disparity may be ascribed to India's extensive access to healthcare, facilitated by the early establishment of universal health coverage (UHC) and the wider acceptance of health insurance programs (Marazi & Pandit, 2024). This study's findings that multiple gestations are associated with an increased risk of preeclampsia are in line with those of an earlier study conducted in Ethiopia (Kassa, Asnkew, *et al*., 2023). One possible explanation for this observation is that many pregnancies lead to a larger placenta, which can cause aberrant placentation and endothelial dysfunction (Maynard *et al*. 2008). This dysfunction causes the placenta to make too much of antiangiogenic factors like soluble fms-like tyrosine kinase-1 (sFlt-1) and soluble endoglin (sEng), which fight against placental growth factor (PlGF) and vascular endothelial growth factor (VEGF). This makes angiogenesis worse and leads to high blood pressure, proteinuria, and other problems for the mother that are linked to preeclampsia (Bdolah *et al*., 2009). Therefore, targeted interventions that address the unique needs of both rural and urban pregnant women are essential for reducing disparities in preeclampsia outcomes.

The present study identified several maternal complications in pregnant women with preeclampsia, including HELLP syndrome, eclampsia, acute kidney injury, anemia, sepsis, and maternal deaths, which often resulted in prolonged hospital stays. These findings align with previous studies conducted in Ethiopia and Tanzania (Godana *et al*., 2021; Luyeko & Mwampagatwa, 2021; Tura *et al*., 2023; Waziri *et al.*, 2023). The occurrence of these complications can be attributed to the systemic endothelial dysfunction and multi-organ involvement that characterize preeclampsia, leading to widespread tissue ischemia, organ damage, and heightened risk of adverse maternal outcomes (Maynard *et al*. 2008). Severe headache was the most commonly reported symptom, followed by visual disturbances, while epigastric pain was less frequent. These neurological symptoms are likely due to endothelial damage in the brain, causing inflammation and vascular changes (E. C. Miller & Vollbracht, 2021). The predominance of severe symptoms and complications underscores delayed detection and advanced disease, particularly among rural populations with limited access to timely and quality care (Kassa, Tiruneh, *et al.*, 2023). Taken together, pregnant women with pre-eclampsia experience suffering that is more prevalent, complex, and severe, justifying the need for urgent, well-coordinated care, including early screening and aggressive management protocols, to increase the chances of successful treatment.

Fetal and neonatal outcomes in this study highlighted the devastating impact of preeclampsia, with multiple serious complications observed. The stillbirth rate was notably high, aligning with findings from a Kenyan study (Ndwiga *et al*., 2020). This high rate of stillbirths could be attributed to chronic hypoxia resulting from abnormal placental development and decreased blood flow (Zamir *et al*., 2021). Moreover, the documented rates of preterm delivery and low birth weight substantially resemble those recorded at Moi Teaching and Referral Hospital, where infants born to preeclamptic mothers were frequently underweight (Sigei *et al*., 2023). LBW and preterm birth could stem from uteroplacental insufficiency, which leads to poor blood supply and chronic hypoxia (Burton & Jauniaux, 2018). It is also important to highlight that the majority of participants in the current study had severe preeclampsia, a condition known to be associated with low Apgar scores (Godana *et al*., 2021). This finding is consistent with a study in Indonesia, which observed a higher incidence of low Apgar scores in babies from preeclamptic mothers (Susilo *et al*., 2015). The low Apgar scores observed suggest perinatal distress, which may result from impaired placental function and subsequent fetal hypoxia (Zamir *et al*., 2021). However, the findings of the current study revealed a lower proportion of reported neonatal complications compared to a recent Ethiopian study, which documented that more than 50% of neonates born to mothers with preeclampsia or eclampsia developed complications (Godana *et al*., 2021). The differences in overall neonatal complications may be explained by variations in the timing of preeclampsia onset, with the majority of cases in this study being late-onset, which is typically associated with less severe neonatal outcomes (Teka *et al*., 2023; Thakur *et al*., 2025). Taken together, there are many adverse fetal outcomes of preeclampsia, and hence, a short-term special medical care program is required to take care of these patients.

CONCLUSION AND RECCOMENDATIONS

Preeclampsia remains a significant public health challenge in Narok County, Kenya, largely driven by modifiable risk factors such as rural residence, multiple gestation, and first-time pregnancy, with its associated maternal complications and adverse perinatal outcomes highlighting the urgent need for strategic intervention. To address this, the study recommends strengthening focused antenatal screening and early ANC attendance in rural areas, enhancing the capacity of health facilities through continuous training, clear clinical protocols, and reliable access to essential resources, and improving neonatal outcomes by equipping rural centres with functional neonatal care units, routine fetal monitoring, and timely obstetric interventions.

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