

Pre-referral management of preeclampsia with severity features in a low-income country—characteristics and challenges in a Sub-Saharan setting: a mixed method study



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BACKGROUND: Preeclampsia continues to be a major cause of maternal and perinatal mortality and morbidity globally. Although pre-referral treatment constitutes a bigger part of the management package for preeclampsia with severity features in low-income settings, little is known regarding the characteristics and challenges of preeclampsia pre-referral and referral management in the Sub-Saharan setting.

OBJECTIVE: To determine the characteristics and challenges of pre-referral and referral management of preeclampsia with severity features.

STUDY DESIGN: We conducted a mixed method study on the pre-referral management of pregnant women complicated by preeclampsia with severity features in Ethiopia. We prospectively collected data on clinical characteristics, management outcomes, and pre-referral characteristics of pregnant women who are complicated by preeclampsia with severity features. Data were collected using a structured questionnaire. For the qualitative part of our study, we conducted 20–30 minutes of semistructured, qualitative, face-to-face, in-depth interviews with 14 health professionals. Quantitative data were analyzed using SPSS (version 23), and simple descriptive statistics were employed. We used thematic analysis on Open Code 4.03 software to analyze the qualitative data.

RESULTS: A total of 261 pregnant women who had preeclampsia with severity features were included in the study, and 14 care providers were interviewed about existing challenges with pre-referral management for patients with preeclampsia with severity features. The mean systolic and diastolic blood pressures were 154.3 mm Hg and 100.3 mm Hg, respectively. The total perinatal mortality was 6.5% (17/261). Three of 261 mothers (1.1%) were complicated by intracranial hemorrhage, and other 1.1% (3/261) of other women developed pulmonary edema. Out of 261 patients, only 41 patients (15.7%) received magnesium sulfate before referral. Similarly, antihypertensive medication was given only to 35 of 261 patients (13.4%) pre-referral. Eight of 261 mothers convulsed (3.1%) during referral. Two of 261 mothers (0.8%) developed pulmonary edema when they arrived at recipient health institutions after referral. Similarly, another 2 of 261 (0.8%) women developed disseminated intravascular coagulation by the time of arrival from the referring health institution. On the basis of qualitative data analysis, 3 overarching themes were recognized: (1) challenges related to patient and family resistance, (2) Challenges related to healthcare providers' knowledge, skill, and confidence, and (3) health system-related challenges. Low use of magnesium sulfate and antihypertensive drugs, patient misperceptions regarding reasons for referral, providers' lack of knowledge on the pre-referral management, inadequate communication between referring and recipient health institutions, and nonexistence of uniform preeclampsia pre-referral and referral management protocols among the referring institutions were the identified gaps.

CONCLUSION: We found a significant gap in pre-referral management for patients with preeclampsia with severity features. Preeclampsia management policy reforms should include the introduction of adequate patient counseling platforms, increasing community awareness creation, providing in-service training on pre-referral management of preeclampsia for health personnel, ensuring constant availability of anticonvulsant and antihypertensive drugs and uniform implementation of preeclampsia pre-referral management protocols across health institutions.

Key words: health policy, preeclampsia, pre-referral, referral system, severe preeclampsia

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Why was this study conducted?

Available literature shows that preeclampsia is a leading cause of maternal and perinatal mortality, especially in low-income settings such as Sub-Saharan Africa. In those settings, pre-referral management is key in achieving the safe transfer of patients with preeclampsia with severity features. Despite this, little is known regarding the characteristics and challenges of pre-referral management for preeclampsia with severity features in this region of Africa. Our study sought to determine the characteristics and challenges of pre-referral management for preeclampsia with severity features in a Sub-Saharan setting.

Key findings

Among 261 patients with preeclampsia with severity features, only 1 in 6 patients were managed with magnesium sulfate, and only 1 in 7 were managed with antihypertensives before arrival from a referral at our center as part of the pre-referral management for preeclampsia. Eight mothers convulsed (developed eclampsia) during referral (while being transferred). On qualitative data analysis, underuse of magnesium sulfate and antihypertensive drugs, patient misperceptions regarding reasons for referral, providers lack of knowledge on the pre-referral management, insufficient communication between referring and recipient health institutions, and nonexistence of uniform preeclampsia pre-referral and referral management protocols among the referring institutions were the identified challenges.

What does this add to what is known?

Uniform implementation of appropriate preeclampsia pre-referral and referral management protocols across health institutions in the Sub-Saharan setting is vital to curb the current high maternal mortality and severe morbidity because of preeclampsia in the region.

referral management of pregnant women complicated by PE with severity features in Ethiopia over 6 months (from October 1, 2020 to March 31, 2021). It was conducted at St. Paul's Hospital Millennium Medical (SPHMMC), one of the leading maternity hospitals in Ethiopia. We prospectively collected data on pregnant women who had PE with severity features and managed at St. Paul's Hospital Millennium Medical College (SPHMMC) after they were referred from catchment health institutions. For the qualitative component of this study, we enrolled health professionals who were involved in the management of such PE patients either pre-referral (at referring institutions) or after referral (at recipient institution).

Participants

For the quantitative part of our study, women with PE with severity features (all preterm and term PE cases) referred from the catchment health institution of our hospital (SPHMMC) and who were managed at our hospital over the study period were included. Exclusion criteria were PE without severity features, not volunteering to participate in the study and those with incomplete data. The criteria used to diagnose PE with severity features were as follows: systolic blood pressure of ≥ 160 mm Hg or diastolic blood pressure of ≥ 110 mm Hg on 2 occasions at least 4 hours apart (unless antihypertensive therapy was initiated before this time); new-onset headache unresponsive to medication and not accounted for by alternative diagnoses; visual disturbances; severe persistent right upper quadrant or epigastric pain unresponsive to medications; thrombocytopenia (platelet count $< 100 \times 10^9/L$); an impaired liver function that is not accounted for by alternative diagnoses and as indicated by abnormally elevated blood concentrations of liver enzymes (to more than twice the upper limit normal concentrations); renal insufficiency (serum creatinine concentration > 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal diseases); pulmonary edema; and/or

Introduction

Preeclampsia (PE) continues to be a major cause of maternal and perinatal morbidity and mortality.^{1–3} In low-income and middle-income countries, health system-related delays in diagnosis and management of PE are among the major contributors to PE-related maternal and perinatal complications.^{4,5}

In Ethiopia, PE accounted for 11% of all maternal deaths and 16% of direct maternal deaths in 2011.⁶ A 2-year (2016–2017) maternal death review conducted at a national referral hospital in the country found that PE was the most frequent cause of maternal mortality.⁷ The practice of PE prevention using aspirin prophylaxis is also reported to be low in Ethiopia according to a recent studies, with low scores of prenatal providers' knowledge and practice of PE prevention.^{8,9} Currently, strong evidence recommends the use of aspirin (ASA) prophylaxis for the prevention of PE

in women who are at risk of developing PE.^{10,11}

Despite significant progress in reducing maternal mortality in Ethiopia, which is 267 per 100,000 live births. As it currently stands in the most recent reports,¹² PE continues to be a major public health problem and among the leading causes of maternal death. A recent study that explored the barriers and opportunities for PE and PE prevention and management in Ethiopia recommended formalizing a national policy on PE and eclampsia diagnosis, referral, and management to clarify persistent policy gaps.¹³ In this study, we aimed to determine the characteristics of pre-referral and referral management of PE with severity features at a leading maternity hospital in Ethiopia.

Materials and methods
Study design

This was a mixed method study (qualitative and quantitative study) on pre-

eclampsia. In the qualitative part of the study, interviews were conducted with 14 participants. Representatives of 6 sampled health institutions (we considered 15 catchment health institutions, including one private center using a lottery method, whereas St. Paul's hospital, being the 16th institution, was included automatically) were included. We enrolled 2 health professionals from each referring institution selected (a total of 5 health institutions were selected), making a total of 10 participants. We included 4 participants from St. Paul's Hospital (considering an extra 2 participants who were Ob-Gyn resident physicians while the initial consideration of 2 participants per institution was maintained). In this way, we recruited 5 maternal health coordinators (who are also midwives), 2 junior obstetrics/gynecology residents, 5 senior midwives, 1 integrated emergency surgical officer (IESO), and 1 liaison officer at our center (St. Paul's Hospital).

Data collection

Quantitative data were collected using a structured questionnaire prepared in English, which had 5 sections: sociodemographic characteristics, clinical characteristics, management, outcomes, and pre-referral characteristics of pregnant women with PE with severity features. Qualitative data was collected by an experienced qualitative data collector with the title of medical doctor (MD). We conducted a 20–30 minute, semi-structured, qualitative, face-to-face, in-depth interview with the participants. The interviews aimed to explore the characteristics and challenges in pre-referral and referral management of patients with PE with severity features. Ethical clearance was obtained from St. Paul's Hospital Millennium Medical College Institutional Review Board. Written informed consent was obtained from study participants.

Outcomes

The primary outcome of this study was pre-referral and referral characteristics of pregnant women complicated by PE with severity features. Secondary outcomes were adverse maternal and

perinatal outcomes of women with PE with severity features referred from our catchment health institutions.

Statistical analysis

The sample size for the quantitative data was determined using a single population proportion estimation formula by taking a *P* value of 78% (the proportion of patients who received magnesium sulfate as a main pre-referral intervention) found in a previous similar study.¹⁴ Quantitative data were analyzed using SPSS (version 23; IBM, Armonk, NY). Simple descriptive statistics were used to analyze the pre-referral, referral, and after-referral management characteristics of women with PE with severity features.

For the qualitative part of the study, thematic saturation of data was used to determine sample size. Interviews were audio recorded, transcribed, coded using an iteratively developed codebook and thematically analyzed on Open Code 4.03 software. An experienced qualitative research consultant handled qualitative data analysis. We carried out a triangulation of qualitative and quantitative data.

Results

In this study, a total of 261 pregnant women with a diagnosis of PE with severity features were included after 2 such women were excluded because of incomplete data.

Sociodemographic and clinical characteristics

The mean age of the patients was 26.4 ± 5.2 years (Table 1). Most of them had low to medium socioeconomic status. Most (148/261, 56.7%) patients were nulliparous women. The mean gestational age was 35.8 ± 4.3 weeks (Table 2). Cerebral symptoms (global headache and blurry vision) were the most frequent presenting symptom, representing 66.3% (173/261), whereas close to 2% (5/261) presented with abnormal body movement (convulsion). Three of 261 patients (1.1%) presented with loss of consciousness. Most of the women had singleton pregnancies (248/261, 95%). Almost all of them had antenatal care follow-up, with a median number of 4 contacts. The mean systolic and diastolic blood pressures were

154.3 ± 14.8 mm Hg and 100.3 ± 10.8 mm Hg, respectively.

Maternal and perinatal outcomes

Most of the women had a spontaneous vaginal delivery, 163/261 (62.5%), followed by another 83 of 261 women (31.8%) who delivered via cesarean delivery (Table 3). The total perinatal mortality was 17 of 261 (6.5%; 14 stillbirths and 3 early neonatal deaths). Moreover, 11 of 261 women (4.2%) ended up having second-trimester induced abortions. The mean birth-weight of the neonates was 2443.1 ± 739.4 g. Three of 261 mothers (1.1%) were complicated by intracranial hemorrhage, and 3 of 261 (1.1%) other women developed pulmonary edema.

Pre-referral management characteristics

We found that most of the patients were not managed with magnesium sulfate (MgSO₄). Out of 261 patients, only 41 patients (15.7%) received MgSO₄ (Table 4). Similarly, antihypertensive medication was given only to 35 of 261 patients (13.4%). The median time spent at the referring health facility was 2 hours, and ambulances were the most common mode of transportation used to transfer the patients (213/261, 81.6%). Forty-nine of 261 patients (18.8%) were referred without being accompanied by a health professional. Eight of 261 mothers (3.1%) convulsed (developed eclampsia) during referral (while being transferred). Two of 261 mothers (0.8%, 2/261) developed pulmonary edema. Another 2 of 261 patients (0.8%) women developed disseminated intravascular coagulation (DIC).

On the basis of qualitative data analysis, we identified 3 overarching themes related to pre-referral management: (1) challenges related to patient and family resistance, (2) challenges related to healthcare providers' knowledge and skills, and (3) health system-related challenges.

Theme 1: patient-related challenges

Participants mentioned that patients had a wrong perception that they could be managed at the health centers, which led to unnecessary delays and late arrivals from referrals at a tertiary hospital. An

TABLE 1
Sociodemographic characteristics of patients with severe PE in Ethiopia, 2020–2021

Category	Mean±SD and n (%)
Age (y)	26.4±5.2
Marital status	
Single	19 (7.3)
Married	241 (92.3)
Divorced	1 (0.4)
Educational status	
Illiterate	76 (29.1)
Primary School	68 (26.1)
Secondary School	90 (34.5)
≥12th grade	27 (10.3)
Occupation	
Housewife	209 (80.1)
Government employee	22 (8.4)
Private employee	17 (6.5)
Farmer	2 (0.8)
Daily laborer	3 (1.1)
Unknown	8 (3.1)
Socioeconomic status (income)	
Low	118 (45.2)
Medium	142 (54.4)
High	1 (0.4)
Address	
Addis Ababa	115 (44.1)
Out of Addis Ababa	146 (55.9)
Parity	
Nulliparous	148 (56.7)
Parous	113 (43.3)

PE, preeclampsia; SD, standard deviation.

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IESO practicing at one of the referring facilities put his testimony as follows:

Mothers with a diagnosis of severe preeclampsia have been refusing to be transferred to St. Paul's hospital, partially due to fear of facing crowdedness there but largely because they believe they can be managed without being referred at our health institution” (Res2: lines 168–171).

In contrast, a care provider from the tertiary facility (St. Paul's Hospital) indicated a lack of counseling as a cause for resistance.

They (referring providers) do not give preeclampsia patients adequate information about why they are referred. It is quite important to counsel the patients appropriately including the reason why they are being referred

and advantages of being referred (Res6: lines 111–113).

Theme 2: providers challenge

Participants raised notable challenges: providers' low level of knowledge and skills, such as stabilizing patients with MgSo4 and controlling severe range blood pressure before referral as per guidelines, absence of training aiming at updating on the diagnosis and management of PE, high need for mentorship, and lack of uniformity in pre-referral preparations.

An Obstetrics and Gynecology resident from the recipient facility (St. Paul's Hospital) emphasized the point as follows:

There is a gap in having uniform working principles between referring and recipient health institutions. There are two extremes. Some health institutions unnecessarily refer patients with raised blood pressure but no diagnosis of preeclampsia with severity features, after loading them with magnesium sulphate while other institutions will transfer pregnant women who had full blown preeclampsia with severity features without stabilizing them with magnesium sulphate, controlling the severe hypertension, even without securing an IV line. (RES 13, lines 80–87).

Theme 3: system challenge

Subtheme 1: communication. Respondents to the in-depth interviews mentioned a prominent challenge related to communication before and after referrals of PE patients. The absence of regularly assigned liaison personnel at referring health institutions, issues with lack of patient accompanying providers during transfer, lack of formal periodic feedback system between referring and recipient institutions, rare incomplete referral forms, and lack of smooth communication between recipient and referring professionals were noted repeatedly.

One participant (a midwife) from a referring facility mentioned the absence of regular written feedback (the only feedback that they often receive is from the accompanying provider on whether

TABLE 2
Clinical characteristics of patients with severe PE in Ethiopia, 2020–2021

Characteristics	Mean±SD and n (%)
Gestational age	35.8±4.3
Chief complaint (presenting symptoms)	
Abnormal body movement	5 (1.9)
Loss of consciousness (coma)	3 (1.1)
Cerebral symptoms ^a	173 (66.3)
Unknown	80 (30.7)
Number of gestations	
Singleton	248 (95.0)
Twin	13 (5.0)
ANC follow-up	
Yes	259 (99.2)
No	2 (0.8)
Number of ANC contacts, median	4
Diastolic BP at time of admission	100.3±10.6
Systolic BP at time of admission	154.3±14.8

ANC, antenatal care; BP, blood pressure; PE, preeclampsia; SD, standard deviation.

^a Cerebral symptoms include global headache and blurry of vision.

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the patient was accepted or not at the destined recipient hospital). This statement was supported by the words of Ob-Gyn resident from St. Paul's Hospital.

We don't receive regular feedback (laugh) from St. Paul's hospital, apart from when there are critical patients whom we are worried about, in which case we will check their status by reaching out to them via phone-call. . . (RES 12, lines 191–195).

It may be due to the overflow of patients especially in our emergency room but we don't give feedbacks individually for every referred case (irrespective of whether the case was managed appropriately or mismanaged). We usually focus on providing feedback to striking or mismanaged cases. (RES 13, lines 195–200).

Subtheme 2: resource. The following resource-related challenges were noted

by the participants: absence of uniform protocols regarding diagnosis and management of PE inclusive of pre-referral management, patients, absence of basic life support materials in the ambulance, lack of continuous availability of medical supplies (MgSo₄, calcium gluconate, IV cannulas, etc), timely unavailability of an ambulance, expired drugs, laboratory service and inaccessibility of easy roads to the gates of the recipient facility.

Discussion

Main findings

PE with severity features had increased maternal and perinatal adverse outcomes: perinatal death, maternal intracranial hemorrhage, pulmonary edema, and DIC. We found low use of magnesium sulfate (only 1 in 6 cases of PE with severity features received MgSo₄ during the pre-referral management) and antihypertensive drugs (only 1 in 7 similar cases were treated with

antihypertensive drugs). Our qualitative data analysis revealed PE patients' misperceptions of the reason for referral, providers' inadequate knowledge of pre-referral management, insufficient bilateral communication between referring and recipient health institutions, and the nonexistence of uniform PE pre-referral and referral management protocols among the referring institutions.

Results

Currently, literature shows that there is a need to improve practices for the management of women with PE with severity features.¹⁵ Existing 15 international clinical practice guidelines for the management and prevention of PE consistently recommend treatment of severe hypertension, most commonly with intravenous labetalol, oral nifedipine, or IV hydralazine, and treatment for nonsevere hypertension with oral labetalol, methyldopa, or nifedipine. These guidelines also recommend the administration of magnesium sulfate (MgSo₄) for eclampsia treatment and seizure prophylaxis in women with PE with severity features.¹⁶

In low-income countries, such as Ethiopia, most patients with PE with severity features are usually managed in referral hospitals after receiving pre-referral treatment at a referring health institution (low-level facilities such as health centers). A recent formative review of literature from Ethiopia identified several barriers to the detection, management, and prevention of PE at policy, healthcare provision, and community levels, including ensuring the availability of drugs and supplies, strengthening referral pathways and pre-referral care provision, and building capacity of low-level providers on detection and early referral of patients with PE with severity features after administration of the first dose of MgSo₄.¹³

In this study, we found a significant gap in the pre-referral and during-referral management of PE with severity features at patients', providers', and system levels. Among patients with PE with severity features analyzed in this study,

TABLE 3
Management and outcome of severe preeclampsia cases in Ethiopia, 2020-2021

Characteristics	Mean±SD and n (%)
Mode of delivery	
Spontaneous vaginal delivery	163 (62.5)
Instrumental vaginal	15 (5.7)
Cesarean delivery	83 (31.8)
Alive	233 (89.3)
Stillbirth	14 (5.4)
Neonatal outcome	
Early neonatal death	3 (1.1)
Total perinatal death	17 (6.5)
Abortion	11 (4.2)
Weight of neonate, g	2443.1±739.4
Adverse maternal outcomes	
Intracranial hemorrhage	3 (1.1)
Puerperal sepsis	1 (0.4)
Pulmonary edema	4 (1.5)
Aspiration pneumonia	3 (1.1)
Wound infection	5 (1.9)
No complication	245 (93.9)
Condition of the mother during discharge	
Improved	261 (100.0)
Total duration of hospital stay (d)	
Mean	4.6
Median	3

SD, standard deviation.

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only 1 in 6 were managed with MgSo₄ before referral. Similarly, only 1 in 7 of such patients received antihypertensive treatment before arriving at the recipient referral hospital. These findings are lower than reports of previous similar studies conducted in other low-income countries. A 2017 study from India, in which 280 patients with PE with severity features were included, found that more than half of the referred patients received some intervention (MgSo₄ was used in 151 patients, 58.53%).¹³ Similarly, another study of 420 PE/eclampsia cases found administration of antihypertensive drugs was carried out in 89%

of cases during pre-referral management while close to 100 % received MgSO₄.¹⁷

Overall, PE with severity features was found to have severe maternal complications in this study, including 6.5% (17/261) perinatal mortality and 4.2% (4/261) second-trimester induced abortion. Eight of 261 mothers (3.1%) convulsed during referral, 2 of 261 mothers (0.8%) developed pulmonary edema, 2 of 261 (0.8%) women had DIC at the time of referral to the recipient tertiary health institution, 3 of 261 mothers (1.1%) had complications related to intracranial hemorrhage, and

another 3 of 261 (1.1%) developed pulmonary edema.

Among the interesting findings of our study, most of the respondents for the in-depth interview ascertained the existence of pre-referral management challenges at patient, provider, and system levels. Notable challenges were mentioned by respondents related to challenges of providers' knowledge of PE referral management, lack of uniformity in preparations for referring patients, inappropriate diagnosis of PE, and referring patients with uncontrolled blood pressure. Participants also agreed that there was a delay in referring patients as a result of provider-patient misunderstanding. They highlighted that patients perceived that they could be managed at the referring institutions, hinting the need to educate patients and increase community awareness regarding the treatment of PE. Not having a regularly assigned liaison personnel at referring health facilities, issues with providers accompanying during transfer, lack of formal periodic feedback system, rare incomplete referral forms, lack of smooth communication between recipient and referring professionals, absence of basic life support materials in the ambulance, lack of available supplies related to medication (MgSo₄, Calcium gluconate, IV cannulas, etc), and timely unavailability of an ambulance for transferring patients were the challenges identified related to the system.

Clinical implications

As pre-referral management of PE/eclampsia constitutes a major component of the management of PE with severity features in low-income settings such as ours, the implications of our findings are helpful in strengthening PE referral systems in such settings. The gaps identified in our study at provider, patient, and system levels in attaining ideal pre-referral management of PE with severity features cases coupled with the degree of adverse perinatal and maternal complications encountered as a result of these gaps present a clear message that informs PE management policy. We underscore that parallel to

TABLE 4
Pre-referral characteristics of severe preeclampsia patients in Ethiopia, 2020–2021

Category	n (%)
What was done at the referring facility?	
IV line opened	
Yes	45 (17.2)
No	216 (82.8)
Antihypertensive given	
Yes	35 (13.4)
No	226 (86.6)
Anticonvulsant given	
Yes	41 (15.7)
No	220 (84.3)
Catheterized	
Yes	7 (2.7)
No	254 (97.3)
Laboratory test done	
Uric acid	117 (44.8)
Hematocrit	3 (1.1)
BG/RH	141 (54.0)
Pitocin started	
Yes	12 (4.6)
No	249 (95.4)
Antibiotic given	
Yes	22 (8.4)
No	239 (91.6)
Dexamethasone given	
Yes	8 (3.1)
No	253 (96.9)
Time spent at health facility (h)	
Mean	8.5
Median	2
Mother convulses during transportation	
Yes	8 (3.1)
No	253 (96.9)
Means of transportation	
Ambulance	213 (81.6)
Public transport	44 (16.9)
Private car	4(1.5)
Attended by a health professional during referral	
Yes	212 (81.2)

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 (continued)

amplifying the efforts on PE prevention strategy, improvements in pre-referral management of PE with severity features need to be worked on tirelessly.

Research implications

Being among the first studies from the Sub-Saharan region on pre-referral and referral management of PE with severity features, our study presents crucial information that is relevant to existing health systems in other regions of Ethiopia and other countries within the Sub-Saharan Africa region. We recommend similar pre-post intervention studies, focusing on filling the gaps identified in this study.

Strengths and limitations

The strengths of our study include the mixed method study design, which is different from that of previous studies from low-income countries. We have identified the gaps at patients, providers, and system levels, which is instrumental to map out effective pre-implementation strategies to improve the quality of pre-referral and referral management of PE (with severity features) patients. Not being a country-level study (single-center study) and lacking subgroup analysis by the nature of the referring institution, private vs government institutions, are the main limitations of our study.

Conclusions

Overall, our findings indicate the existence of a significant gap in pre-referral and referral management of preeclampsia (PE) with severity features. PE was also associated with higher maternal and perinatal adverse events. Policy reforms on PE management should introduce the following interventions: eliminating patients' misunderstanding regarding the reason for referral with appropriate counseling and increasing community awareness, providing in-service training on pre-referral management of PE for health personnel, constant availability of anticonvulsant and antihypertensive drugs at referring health facilities, ensuring regular availability of ambulance for transferring patients, uniform implementation of PE

TABLE 4
Pre-referral characteristics of severe preeclampsia patients in Ethiopia, 2020–2021 (continued)

Category	n (%)
No	49 (18.8)
Referral note was sent with the patient	
Yes	261 (100.0)
No	0 (0.0)
Content of referral note (multiple responses)	
Presenting complaints	213 (81.6)
Physical examination findings	261 (100.0)
Laboratory test done	249 (95.4)
Treatment provided	83 (31.8)
Reason for referral	252 (96.6)
Name of referring health professional	242 (92.7)
Qualification of the referring HCP	182 (69.7)
Name of referring health facility	259 (99.2)
Date	257 (98.5)
Time	146 (55.9)
Complications at the time of arrival from referring institutions	
Abrupton	3 (1.1)
Aspiration pneumonia	1 (0.4)
Pulmonary edema	2 (0.8)
DIC	2 (0.8)
Eclampsia(convulsed)	8 (3.1)
No complication	253 (96.9)

DIC, disseminated intravascular coagulation; HCP, healthcare provider; IV, intravenous.

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pre-referral and referral management protocols, and improvement of bilateral communication pathways between referring and recipient health institutions. ■

Formal analysis, Data curation, Conceptualization. ■

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