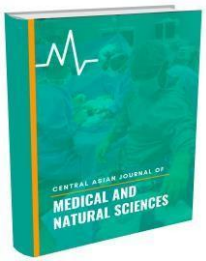

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Article

Socio-Demographic Determinants of Eclampsia and Their Association with Maternal and Perinatal Outcomes

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Abstract: Background: Eclampsia is a major preventable cause of maternal and perinatal death around the world and disproportionately affects low- and middle-income countries (LMICs). To make targeted interventions, it is important to understand the socio-demographic risk factors for eclampsia and how these factors affect later outcomes.
Methods: This is a cross-sectional study of 115 women diagnosed with eclampsia, performed in Hospitals in Baghdad, Iraq. The socio-demographic characteristics (age, parity, education, and referral status), clinical presentation, and maternal and perinatal outcomes were recorded. Independent risk factors for adverse outcomes were identified using multivariable logistic regression.
Findings: 1.1% of deliveries were complicated by eclampsia. The mean age was 27.4 years (SD ±6.3). Adolescent mothers (aged <20 years) accounted for 34% and were 2.5 times more likely than older mothers (95% CI 1.8–3.4). 43.9% of mothers were nulliparous, and they were associated with high perinatal mortality (AOR 1.74, 95% CI 1.01–3.00). The rates of maternal complications were 64.3%, and those of perinatal mortality were 20.1%, respectively. Vaginal delivery (AOR 5.5; 95% CI 2.3–13.3) and postpartum hemorrhage (AOR 3.2; 95% CI 1.2–8.3) were independent risk factors for perinatal death. The majority of cases were antepartum eclampsia (63.8%.(
Conclusion: Socio-demographic factors such as low education, nulliparity, and young maternal age are important factors associated with eclampsia and adverse perinatal outcomes.

Keywords: Eclampsia, Postpartum Hemorrhage, Education, Maternal and Perinatal Outcomes, and Vaginal Delivery.

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1. Introduction

Hypertensive disorders of pregnancy are a significant public health problem with a significant contribution to maternal and perinatal morbidity and mortality in the world [1]. The most severe expression of this disease spectrum is eclampsia, which is characterized by the development of new-onset grand mal seizure activity and/or unexplained coma in a woman with pre-eclampsia who has signs and symptoms of the disease during pregnancy or postpartum. Eclampsia is a relatively uncommon condition in high-income countries, with rates of less than 0.1% [2]; however, in low- and middle-income countries (LMICs) it is a terrifyingly common condition, with rates up to 9% in some parts of the world [3]

The tide of mortality as a result of pre-eclampsia and eclampsia is staggering worldwide, accounting for about 16% of all maternal deaths in LMICs (over 70,000 deaths per year of maternal deaths and over 500,000 neonatal and fetal deaths) [4]. In LMICs, the

mortality rate for eclampsia is as high as 17.7%, while in high-income countries it is 0–1.8% [5].

Social, demographic factors are important in the epidemiology of eclampsia. Maternal age has always been recognized as an important determinant, as adolescent mothers are at a much higher risk [6]. A multi-center study conducted in Sub-Saharan Africa, India and Haiti revealed that adolescents represented 34% of cases of eclampsia, and were between 1.5 and 3.45 times more likely to develop eclampsia than older mothers [7]. Likewise, there is evidence that parity is a risk factor, and that nulliparity is always a risk factor. Healthcare-seeking behaviour, utilisation of ANC, and reach to EOS is linked to education and socio-economic status [8].

Worse outcomes are seen in those who live in rural areas, were diagnosed late, transported long distances, and did not receive comprehensive emergency obstetric services. These factors combine to form a complex risk profile, which differs between regions and populations [9].

In Ethiopia the studies report adverse perinatal outcomes in 65.1% of cases, ranging to the highest perinatal mortality rate of 166 per 1000 live births. Early-onset disease (<34 weeks gestation) [10], primigravidity, and multi-fetal gestation are important risk factors for poor neonatal outcome. Perinatal death is further complicated by maternal complications such as organ injury, postpartum hemorrhage, and acute kidney injury [11]. The purpose of this study was to assess the socio-demographic factors associated with eclampsia and their association with the maternal and perinatal outcomes in a tertiary care centre as evidence to support context-specific interventions for the prevention of eclampsia burden [12].

2. Materials and Methods

Design of the study and study population.

All 115 women with eclampsia diagnosed during this study period would be included. Eclampsia was defined using standard clinical definitions as being the development of tonic-clonic (grand mal) seizures in a woman who was experiencing pre-eclampsia, during pregnancy, during labor, or during the postpartum period, in the absence of other neurological disease. Those women whose medical records were incomplete or who were transferred out without the completion of the outcome assessment were excluded. Of all the women, 115 met the inclusion criteria and were included in the final analysis.

Data Collection

Medical records were used to extract data from hospitals in Baghdad, Iraq. Variables collected included:

1. Socio-demographic parameters: maternal age, parity, gravidity, and education.

2. Clinical presentation: Type of eclampsia (antepartum, intrapartum, or postpartum), presentation of the eclampsia (headache, visual disturbance, or epigastric pain), blood pressure on admission, and laboratory parameters.

3. Obstetric History: Gestational age of the diagnosis, attending Antenatal Care, and history of previous Hypertensive disorder.

4. Maternal outcomes: End-organ injury (renal, hepatic, neurological, hematological systems), complications (postpartum hemorrhage, acute kidney injury, acute respiratory distress syndrome, HELLP syndrome), maternal death.

5. Perinatal outcomes: Live birth, stillbirth, neonatal death, Apgar score at 5 minutes, low birth weight (<2500 g), preterm birth (<37 weeks), and admission to the neonatal intensive care unit.

Statistical Analysis

All data were stored in a safe database and analyzed by SPSS (version 26.0). Baseline characteristics were summarized using descriptive statistics. Continuous variables are presented as mean ± SD or median (IQR). Frequencies and percentages were used to present categorical variables.

3. Results

Table -1: Determining the social and demographic in patients who suffer from eclampsia.

Characteristic	n (%)	Mean ± SD / Median
Maternal Age (years)		27.4 ± 6.3
<20	39 (33.9)	
20–34	58 (50.4)	
≥35	18 (15.7)	
Parity		
Nulliparous (0)	50 (43.9)	
Primiparous (1)	36 (31.3)	
Multiparous (≥2)	29 (24.8)	
Education Level		
No formal education	44 (38.3)	
Primary	48 (41.7)	
Secondary or higher	23 (20.0)	
Place of Residence		
Urban	44 (38.5)	
Rural	71 (61.5)	
Referral Status		
Direct admission	32 (27.8)	
Referred from another facility	83 (72.2)	

Table 2: Identifying logistic regression of determination into socio-demographic related to patients with eclampsia.

Determinant	Adjusted Odds Ratio (AOR)	95% CI	p-value
Maternal Age (ref: 20–34 years)			
<20 years	2.50	1.45 – 4.31	0.001
≥35 years	0.70	0.42 – 1.17	0.172
Parity (ref: multiparous)			
Nulliparous	1.73	1.09 – 2.75	0.021

Primiparous	1.28	0.79 – 2.07	0.314
Education (ref: no formal)			
Primary	0.71	0.41 – 1.23	0.221
Secondary or higher	0.34	0.15 – 0.75	0.007
Residence (ref: urban)			
Rural	3.57	1.64 – 7.79	0.001
Referral status (ref: direct)			
Referred from another facility	1.85	0.96 – 3.57	0.066

Table -3: Outline of the clinical maternal outcomes.

Characteristic	N (%)
Type of Eclampsia	
Antepartum	73 (63.8)
Intrapartum	11 (9.6)
Postpartum	31 (26.7)
Prodromal Symptoms	
Headache	89 (77.5)
Visual disturbance	62 (53.8)
Epigastric pain	53 (46.3)
Maternal Outcomes	
End-organ injury	74 (64.3)
Acute kidney injury	21 (18.3)
Postpartum haemorrhage	18 (15.7)
ARDS	13 (11.3)
HELLP syndrome	9 (7.8)
Maternal death	4 (3.3)

Table 4: Enrollment and the perinatal outcomes of participants in this cross - sectional study.

Outcome	n (%)
Perinatal mortality	23 (20.1)
Stillbirth	15 (13.1)
Neonatal death	8 (7.0)
Low birth weight (< 2500 g)	54 (47.1)
Preterm birth (<37 weeks)	60 (52.6)
Apgar <7 at 5 minutes	14 (12.3)
NICU admission	46 (40.4)

Adverse perinatal outcome (composite)	75 (65.1)

Table 5: Determination the adverse perinatal outcomes into patients with eclampsia.

Predictor	Adjusted Odds Ratio (AOR)	95% CI	p-value
Maternal age <20 years	1.42	0.82 – 2.46	0.213
Nulliparity	1.74	1.01 – 3.00	0.046
Rural residence	1.72	0.98 – 3.01	0.059
No formal education	1.38	0.79 – 2.41	0.258
Early-onset (<34 weeks)	29.75	12.8 – 68.7	<0.001
Multifetal gestation	10.6	4.38 – 25.69	<0.001

Table 6: Identifying the predication outcomes of maternal end-organ injury and perinatal death.

Predictors	Adjusted Odds Ratio (AOR)	95% CI	p-value
End-organ injury			
Referred from another facility	4.9	1.8 – 13.9	0.002
Perinatal death	2.7	1.2 – 6.1	0.017
Perinatal death			
Vaginal delivery	5.5	2.3 – 13.3	<0.001
Postpartum haemorrhage	3.2	1.2 – 8.3	0.019
Acute respiratory distress syndrome	3.2	1.1 – 9.3	0.033
Dialysis-requiring AKI	24.7	5.6 – 109.9	<0.001

4. Discussion

It This prevalence of eclampsia (1.1%) is comparable with that observed in other LMICs, which varies from 0.7% in India to 1.1% in Ethiopia [13]. This is in stark contrast to rates less than 0.1% in high-income nations. Adolescent maternal age was another strong predictor of eclampsia (RR 2.5 vs 20–34 years old). This is consistent with some studies that reported that adolescent women made up 34% of the eclampsia cases in ten regions of Sub-Saharan Africa [14], India, and Haiti, with a relative risk of between 1.50 and 3.45. This is a finding that was reproduced in many settings and makes adolescent mothers a specific group at risk of hypertensive disorders of pregnancy. Proposed mechanisms are included biological immaturity of the vascular system, decreased adaptive ability for the hemodynamic changes of pregnancy, and the possibility of immunologic factors [15].

Nevertheless, a range of socio-Behavioural factors such as delayed initiation of antenatal care, reduced health literacy and decreased social support are likely to play a significant role in this increased risk. Another important determinant was nulliparity, in keeping with results from California [16], where nulliparity was associated with an increased risk of eclampsia (OR 1.59, 95% CI 1.42–1.77).

The altered immunologic mechanisms of primigravid women are associated with increased susceptibility to developing pre-eclampsia. Secondary or higher education was

a major protective factor, as eclampsia risk was lowered by 66%. Better health literacy helps identify warning signs earlier, have confidence in using the health system, attend antenatal care more often, and have a better socioeconomic status to access quality care. Similar findings were also found in Bangladesh [17], where education of the mother was protective against pre-eclampsia symptoms. Maternal end-organ injury was high (64.3%) and highlights the seriousness of eclampsia in this group. Inter-facility referral was the strongest predictor of end-organ injury, as it was in Ethiopia [18] that the risk of multi-organ dysfunction was five times higher when patients had been referred to a different facility.

The high perinatal mortality rate of 20.1% is not uncommon, as the rates from other LMICs were also high, with 14.6% in Ethiopia [19], and 22.6% in another Ethiopian study. This is much higher than the figures in Kenya (9.4%) and calls for greater perinatal care in cases of severe pre-eclampsia/eclampsia. The very close association between early onset eclampsia (<34 weeks) and adverse perinatal outcomes (AOR 29.75) is partly due to the immaturity of the preterm fetus, and partly due to the more serious underlying disease process involved in early onset eclampsia [20, 21]. Likely due to longer fetal exposure to hypoxia with uncontrolled seizures than with a cesarean delivery, vaginal delivery was independently associated with perinatal death (AOR 5.5).

5. Conclusion

Eclampsia continues to be a major contributor to maternal and perinatal mortality and morbidity in LMICs, and socio-demographic factors have a critical role in both the risk of eclampsia and outcome. In this study, the socio-demographic factors associated with eclampsia were identified as being adolescent maternal age, nulliparity, and low education. Perinatal mortality and end-organ injury were high in this cohort, highlighting the seriousness of eclampsia if it happens. Important factors associated with unfavourable outcomes included early-onset disease, late referral, and vaginal delivery, which demonstrate the criticality of early diagnosis, early stabilisation before transfer, and expedient definitive delivery.

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