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Comparative Analysis of Antihypertensive and Anticonvulsant Regimens in Managing Pre-eclampsia and Eclampsia: Insights from a Sudanese Retrospective Study

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Background: Preeclampsia presents with gestational proteinuria, usually after 20 weeks of gestation, and can be complicated by generalized tonic-clonic seizures of eclampsia. Particularly in countries with limited healthcare resources, preeclampsia and eclampsia are major causes of maternal morbidity and mortality. This retrospective study aimed to evaluate the presentation, management, and outcomes of 185 women with preeclampsia and eclampsia in 2 maternity hospitals in Omdurman, Sudan, between January and December 2020.

Material/Methods: An analytical retrospective study was conducted in 2 main maternity hospitals in Omdurman, Sudan, between January and December 2020. The study included 185 pregnant women with preeclampsia or eclampsia. Data on clinical and obstetric characteristics (history of the illness, comorbid diseases, parity, gravida, multifetal pregnancy, and laboratory investigations), medications used, and maternal and neonatal outcomes were obtained for the diagnosis. The data were analyzed using the SPSS version 27.

Results: Results: The mean age was 27.2±6.3 years, with 42.7% primigravida, 30% had a triple-drug regimen, nifedipine was the most common antihypertensive (60.5%), and 17.3% of patients underwent observation only. The seizure rate was 20%, with 92.73% controlled with magnesium sulfate. The antihypertensive regimen before delivery was significantly associated with the mode of delivery (P=0.001) and maternal outcomes (P=0.047); the regimen used after delivery significantly achieved blood pressure control (P=0.043) and improved maternal outcomes (P=0.007), but not fetal outcomes.

Conclusions: Maternal outcomes were markedly affected by the antihypertensive drug regimens used and the patient's seizure control status, and use of anti-convulsants successfully controlled all seizures.

Keywords: Antihypertensive Agents • Eclampsia • Fatal Outcome • Hospitals, Maternity • Pre-Eclampsia

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Introduction

Preeclampsia is a pregnancy-associated disorder characterized by developing hypertension greater than 140/90 mmHg after the 20th week of gestation, often accompanied by proteinuria or multi-organ failure [1,2]. Eclampsia is the convulsive manifestation of preeclampsia, characterized by tonic-colonic, focal seizures in the absence of other causative conditions [1]. The pathogenesis of the disease is not fully understood, but coagulation and fibrinolysis changes were suggested to have a role [3]. A variety of risk factors have been identified [1,2]. Preeclampsia and eclampsia are important causes of mortality and morbidity for mothers and babies in Sudan, as is the situation in all other low-income countries [4,5]. Worldwide, around 8.5 million cases of preeclampsia are reported annually [6], and preeclampsia is responsible for 14% of all maternal deaths [7] and responsible for approximately 10% of all maternal deaths in the United States. In the United States, African American women have a higher incidence of preeclampsia, with a 3-fold higher rate of maternal mortality compared to their White counterparts [8]

Preeclampsia is related to new-onset hypertension, usually accompanied by proteinuria, and occurs after 20 weeks of gestation and in near-term pregnancies [9]. If left untreated, preeclampsia can cause fetal growth restriction, preterm birth, edema, proteinuria transitioning to hypertension, and organ dysfunction [9]. The most frequently described risk factors for preeclampsia are older mothers (above 40 years of age), multifetal gestation, obesity, chronic hypertension, pre-gestational diabetes, renal disease, antiphospholipid syndrome, thrombophilia, lupus, and in vitro fertilization [8].

In a more recent study, Ndwiga et al compared the clinical presentation and outcomes of early- and late-onset preeclampsia over 2 years [10], revealing that women who developed preeclampsia earlier than those who did so later were more likely to experience adverse maternal and perinatal outcomes, such as hemolysis, elevated liver enzymes, low platelets syndrome, renal dysfunction, stillbirth, and birth deformity [10]. The early onset of preeclampsia was also associated with a higher risk of antepartum hemorrhage and a longer hospital stay for the mother. A baby born after preeclampsia started was more likely to experience asphyxia during delivery and respiratory distress. [10]. Similarly, a study of pregnant women receiving prenatal care in Ethiopia found that the prevalence of preeclampsia was 5.5%, and preeclampsia was linked to characteristics such as maternal age, history of preeclampsia, hypertension, and family history of hypertension (>35) [11].

Globally, there is disagreement about many aspects of preeclampsia prevention and treatment. Low-dose aspirin and calcium supplementation via different regimens and concentrations are recommended interventions that can reduce the risk of developing preeclampsia [2,5]. Non-pharmacological treatments and an antihypertensive drug regimen should be based on the prescribing clinician's experience with that particular regimen, its cost, and local availability, although various guidelines recommend different drug regimens [1,2,6,12]. Eclamptic convulsions are usually self-limiting, intravenous diazepam or clonazepam may be given while the magnesium sulfate is being prepared as a 4-g loading dose, followed by an infusion of 1-2 g/h. Delivery of baby and placenta is still the most effective and the only definitive treatment of preeclampsia, which is determined by disease severity and gestational age [13].

The use of antihypertensive medications compared to no medications reduces maternal and fetal preeclampsia complications, the incidence of severe maternal morbidities, renal impairment, placental abruption, neonatal hypotension, and the incidence of neonatal intensive care unit (NICU) admission. Even antihypertensive drugs have significant differences regarding their outcomes and adverse effects [14-19].

The lack of consensus among guidelines about drug options for preeclampsia and eclampsia management generates questions about the relative effectiveness of various regimens. Few studies have compared all drugs used, and most of the available studies compared just one drug to a placebo or another drug [11-13,20-22]. In Sudan, the conflicts involved in applying multiple protocols and guidelines requires several drugs to be used cautiously. We performed the present study to assess the effectiveness of all drugs used to reflect the current situation and provide primary data that can be developed into a generalized local protocol in Sudan. Therefore, this retrospective study aimed to evaluate the presentation, management, and outcomes of 185 women with preeclampsia and eclampsia in 2 maternity hospitals in Omdurman, Sudan, between January and December 2020.

Material and Methods

Study Design and Setting and Ethical Considerations

Before the study began, ethics approval (KMOH-REC-2-2021) was obtained from the Ethics Committee of the Ministry of Health, Khartoum State, and additional approval for conducting this research was also obtained from the hospitals' administration. Due to the retrospective nature of this study, informed consent was not required, and to ensure patients' privacy and confidentiality, no personal identifiers were included. This was a hospital-based, analytical, retrospective study, carried out in 2 main maternity hospitals (Al Saudi and Mohammed Ali Fadol maternity hospitals) in Omdurman, Khartoum State, Sudan. This study included data from all pregnant women with

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preeclampsia or eclampsia admitted to these hospitals from January to December 2020.

Study Population and Sampling Procedure

Pregnant women with preeclampsia or eclampsia who met the inclusion criteria admitted to hospitals during the study period. Women with lost data or unavailable files were excluded from this study. The sample size required for this study was calculated using Solvin's formula for the known population [$n=N/1+N(e^2)$] [23], where n: sample size, N: target population (353), and e: margin of error (0.05). The minimum sample size was found to be 185 patients. Simple random sampling was done to select 185 patient files from all included patients.

Data Collecting Tool

Data were retrieved from patients' medical files using a structured data collection sheet. These data included patients' demographics (age and residence), clinical and obstetric characteristics (history of the illness, comorbid diseases, parity, gravida, multifetal pregnancy, and laboratory investigations), medications used (drug regimens and their doses), and maternal and neonatal outcomes.

Data Analysis

Collected data were analyzed using the SPSS version 26 (SPSS, Inc., Chicago, IL). Descriptive statistics are presented in percentages frequencies for categorical variables, while continuous variables are expressed as mean±standard deviation. Associations between variables were assessed using the chi-square test, paired *t* test, and ANOVA. The results were considered significant at $P \leq 0.05$.

Results

Sociodemographic and Clinical Characteristics and Blood Pressure Measurements

The mean age was 27.2 years, with a standard deviation of ±6.3 years. The most predominant age category was 20-29 years, which represented 54% of cases. A family history of hypertension was found in 19.5% of patients, and 6.5% had a history of preeclampsia. Diabetes mellitus and chronic hypertension were the most common comorbid diseases in 8.6% and 6.5% of patients, respectively. Moreover, 42.7% of them were primigravida, and 87% had single pregnancy. The average duration of hospitalization was 6.19±6.019 mean days and 3-5 days was the highest category among duration of hospitalization categories, accounting for 49.7% of patients. The characteristics of patients are shown in **Table 1**.

Blood pressure was assessed at 3 points – before, during, and after delivery – as shown in **Table 2**. At admission, the mean systolic blood pressure was 161.3±30.6, and 103.3±21.9 for diastolic blood pressure, which was higher than other blood pressure readings at different times (**Table 2**).

Drug Regimen Data

The largest percentage of pregnant women (30.3%) were treated with the 3-drug regimen, followed by 17.3% treated with no drugs with observation and monitoring of blood pressure, and 15.7%, 13.5%, 14.1%, 6.5%, 2.2%, and 0.5% received 1, 2, 4, 5, 6, and 8 drugs, respectively.

Furthermore, nifedipine was the most commonly used drug, with 112 patients (60.5%) using it as monotherapy or in combination, followed by hydralazine and magnesium sulfate in 110 patients (59.4%) each. Magnesium sulfate was given as 4 g over 20 min intravenous loading dose followed by 1 g/h for 24 h till stabilization, while hydralazine was given as a 5 mg loading dose followed by 5 mg every 20 min until reaching an acceptable blood pressure. **Table 3** describes the frequencies of drugs used in the treatment of preeclampsia and eclampsia.

Anti-Hypertension Treatment Regimens Used Before Delivery and Their Impact on Blood Pressure

The largest drug regimen category was no drug and only observation and monitoring of blood pressure, used in 43.2% of patients, followed by 15.7% for combined hydralazine and nifedipine, then 14.1% for hydralazine alone. Moreover, antihypertensive regimens, their magnitude of blood pressure reduction, and their significance from admission to the time of delivery are demonstrated in **Table 4**.

Treatment Regimens Used After Delivery and Their Impact on Blood Pressure

No drug with observation was used for 30.3% of patients, representing the largest regimen category, followed by 21.1% for nifedipine, then 10.3% for amlodipine. Antihypertensive regimens, their magnitude of blood pressure reduction, and the significance of change from delivery to day 2 postpartum are demonstrated in **Table 5**.

Seizure Control

Out of the 185 patients, 37 developed seizures. A total of 110 patients received magnesium sulfate as treatment (33.6%) and 66.3% as prophylactic, while 8 patients received diazepam, 2 patients received phenytoin, and only 1 patient received carbamazepine. Seizure control regimens with magnesium sulfate alone achieved seizure control in 92.73% of patients, 5.45%

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Table 1. Sociodemographic and clinical data of the women studied (n=185).

Variable	Category	Frequency (%)
Age (years)	15-19	18 (9.7)
	20-29	100 (54)
	30-39	58 (31.5)
	40 and more	9 (4.8)
Mean of age (years)	27.2±6.3	
History	Family history of hypertension (HT)	36 (19.5)
	History of preeclampsia	8 (4.3)
	Family history of HT+history of preeclampsia	4 (2.2)
	Patients with no history	137 (74)
Comorbid diseases	Diabetes mellitus (DM)	16 (8.6)
	Chronic HT	12 (6.5)
	Renal failure	1 (0.5)
	DM+chronic HT	3 (1.6)
	Gestational HT	2 (1.1)
	DM+gestational HT	1 (0.5)
	Patients with no comorbid disease	150 (81.1)
Blood group	O+	57 (30.8)
	O-	2 (1.1)
	A+	42 (22.7)
	A-	3 (1.6)
	B+	17 (9.2)
	B-	1 (0.5)
	AB+	12 (6.5)
	Not-documented	51 (27.6)
Gravida	Prima-gravida	79 (42.7)
	Multi-gravida	106 (57.3)
Multi-fetal pregnancy	Single	161 (87)
	Twins	24 (13)
Duration of hospitalization (days)	0-2	18 (9.7)
	3-5	92 (49.7)
	6-9	59 (31.9)
	10-20	9 (4.9)
	More than 20	7 (3.8)
Mean of duration of hospitalization (days)	6.2±6	

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Table 2. Blood pressure (mean±standard deviation) in preeclampsia and eclampsia patients.

Blood pressure	Systolic	Diastolic
On admission	161.3±30.6	103.3±21.9
At delivery	148.9±24.8	94.1±19.1
After delivery	141.3±19.5	89.1±14.7
Day 2 postpartum	136.3±22.9	86.5±14.8

required the addition of diazepam to magnesium sulfate to achieve control, and 1.82% required the addition of phenytoin, carbamazepine, and diazepam to magnesium sulfate to control their seizures.

Outcomes

Cesarean section was performed in 59.5% of patients, and there was a significant association between the mode of delivery and the antihypertensive regimen used before delivery (*P*=001). A total of 55.1% of patients were discharged with uncontrolled blood pressure. Regarding maternal outcomes, 43.7% of patients delivered at term, 32.4% delivered preterm without complications of eclampsia seizures, and 2.7% were treated and maintained their pregnancies. Seizures occurred in 19.9% of patients – 16.2% as eclampsia and 3.2% as postpartum eclampsia (**Table 6**).

Concerning fetal outcomes, intrauterine fetal death (IUFD) and intrauterine growth retardation were found in 7% and 1.1% of cases, respectively, and 17.7% of babies were referred to a special care baby unit (SCBU) while (35.9%) were not. Fetal outcomes were not associated with treatment regimens used for BP control before delivery and seizure control condition (**Table 6**).

Discussion

The largest age group was 20-29 years; this may be reasonable, as this age category is supposed to include most primigravida (40%) patients, and being primigravida is a strong risk factor for preeclampsia and eclampsia [21]; 6.5% had a history of preeclampsia, which is a risk factor for severe preeclampsia [24]; and 19.5% had a family history of hypertension, which also increased the risk of severe preeclampsia [25]. Moreover, having multiple fetuses, which was observed in 13% of patients, is considered to be a risk factor for preeclampsia [26]; this is a high percentage compared to the probability of

Table 3. Drugs used in the management of preeclampsia and eclampsia.

Drug	Number of patients who use it (frequency %)	Dose	Number of patients use it
Nifedipine	112 (60.5)	10 mg BID	10
		20 mg BID	102
Magnesium sulfate	110 (59.4)		
Hydralazine	110 (59.4)		
Atenolol	42 (22.7)	50 mg OD	30
		100 mg OD	12
Amlodipine	56 (30.2)	5 mg OD	16
		10 mg OD	40
Aspirin	4 (2.1)	100-75 mg OD	
Methyldopa	25 (13.5)	250 mg TID	22
		500 mg TID	3
Labetalol	7 (3.8)		
Losartan	1 (.5)	50 mg OD	
Diazepam	8 (4.3)		
Phenytoin	2 (1.1)	250 mg	1
		500 mg	1
Carbamazepine	1 (.5)	200 mg OD	1

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Table 4. Antihypertensive regimens used before delivery and their effect on blood pressure.

Regiment of treatment used before delivery		Blood pressure on admission		Blood pressure before delivery		*P* value	
		Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic
No drug (n=80)		147±27.9	93.7±21.2	141±25.8	87.9±18	.017	.008
One drug	Nifedipine (n=15)	162.6±23.3	102.7±14.6	146.7±14.9	94.2±11.3	.003	.062
	Hydralazine (n=26)	176.6±28.5	109.3±17.9	152.9±24.3	97.6±15.9	.002	.016
	Labetalol (n=3)	176.3±35.5	108.6±28.7	163±35.3	98.7±28	.423	.423
	Methyldopa (n=4)	142.5±5	102.2±4.5	146±4.7	96.00±9.6	.155	.161
Two drugs	Hydralazine+ Nifedipine (n=29)	171.9±24.8	116.2±23.3	156.1±21.1	102.8±23	.014	.016
	Nifedipine+ Methyldopa (n=8)	159.8±21.3	98.4±8.3	149±27.01	90±15.8	.203	.300
	Hydralazine+ Methyldopa (n=4)	167.5±22.2	113.2±20.5	152±17.8	103.5±21.8	.361	.657
Three drugs	Hydralazine+Nifedipine+ Methyldopa (n=2)	166.3±20.9	122.2±10.5	155.7±25.9	102.2±22.1	.719	.070
Significant among treatment regimens		.001	.001	.008	.052		

Table 5. Postpartum antihypertensive regimens used and their effect on blood pressure.

Regiment of treatment after delivery		Blood pressure after delivery		Blood pressure 2 days postpartum		P-value	
		Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic
No drug (n=56)		129±15	80.7±13.4	123.9±14.9	78.1±13.1	.078	.262
One drug	Nifedipine (n=39)	141.3±18.1	87.8±13.5	136.3±19.3	85.8±13	.117	.370
	Hydralazine (n=3)	151.5±16.2	96±12.7	126.5±9.1	88±11.3	.397	.079
	Atenolol (n=6)	147.4±8	94.8±17.7	145.6±14	93.6±9.8	.717	.807
	Amlodipine (n=19)	141.4±13.3	88.3±9.2	133.7±10.7	83.7±9.9	.077	.237
Two drugs	Amlodipine+ Atenolol (n=10)	144.1±23.2	93.4±20	142.7±21.2	91.1±16.3	.843	.747
	Nifedipine+ Amlodipine (n=10)	143.5±12.6	90±9	132.5±52.9	80.8±15.4	.495	.187
	Nifedipine+ Atenolol (n=9)	157.3±18.1	104.1±12	140.6±14.5	89.1±12.6	.012	.001
Three drugs	Hydralazine+Nifedipine+ Atenolol (n=4)	167.2±10.9	109±8.6	164.2±21.9	112.7±22.6	.698	.690
	Nifedipine+Amlodipine+ Atenolol (n=9)	159.1±11.7	99.4±16.8	143.1±19.9	97±13.7	.082	.466
	Hydralazine+Nifedipine+ Amlodipine (n=4)	165.±21.2	104.6±11	138.5±2.1	95.6±7.5	.355	.501
Significant among treatment regimens		.001	.001	.055	.001		

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Table 6. Maternal and fetal outcomes associations with antihypertensive regimens and seizure control status in preeclampsia and eclampsia patients.

Variable	Category	Frequency (percent)	Association with antihypertensive treatment before delivery	Association with antihypertensive treatment after delivery	Association with seizers control status
Maternal outcomes associations					
Blood pressure control on discharge	Not controlled	102 (55.1)		.043	.178
	Controlled	83 (44.9)			
Mode of delivery	Normal vaginal delivery	75 (40.5)	.001		.098
	Cesarean section	110 (59.5)			
Maternal complication outcome	Delivered on term	81 (43.7)	.047	.007	.001
	Early birth	60 (32.4)			
	Termination of pregnancy	2 (1.1)			
	Resolve & maintain pregnancy	5 (2.7)			
	Develop eclampsia	15 (8.1)			
	Develop eclampsia+rarly birth	14 (7.6)			
	Develop eclampsia+resolve and maintain pregnancy	1 (0.5)			
	Post-partum eclampsia	5 (2.7)			
	Develop eclampsia+post-partum eclampsia	1 (0.5)			
	Early birth+post-partum eclampsia	1 (0.5)			
Fetal outcome associations					
Fetal complication outcome	Ultrasound intrauterine growth retardation	2 (1.1)	.996		.085
	Intrauterine fetal death IUFD	13 (7)			
Need for special care	Referred to special care baby unit (SCBU)	34 (17.7)	.987		.730
	Not referred to special care baby unit (SCBU)	69 (35.9)			
	Missing	89 (48.1)			

multiple fetuses in a study conducted at Omdurman Maternal Hospital, which revealed only 3.34% of normal pregnant women have twins [27]. Diabetes mellitus (DM) and chronic hypertension (HT) are common comorbid diseases, and DM and HT increase the risk of preeclampsia by 2- to 4-fold [28]. In this study, 30.3% of patients were treated with a drug regimen, while 17.3% did not receive drug medication and underwent observation and monitoring of blood pressure and preeclampsia signs and symptoms, as evidence indicates that the only effective and definitive treatment of preeclampsia is delivery of the baby and placenta, which is decided according to the severity of the disease and gestational age [9]. In middle-income countries like Sudan, preeclampsia and eclampsia are still important causes of mortality and morbidity for mothers and babies [29]. There are many risk factors for development of these diseases [4,5]. Therefore, to lower the risk of unfavorable neonatal and maternal outcomes during pregnancy, pregnant women with preeclampsia must be identified and

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referred to hospitals for proper treatment and management, and close monitoring is recommended throughout pregnancy.

There are several antihypertensive medications used to manage preeclampsia and reduce maternal and fetal complications [15-17]. In this study, 30.3% of patients were treated with a drug regimen, while 17.3% did not receive drug medication and underwent observation and monitoring of blood pressure and preeclampsia signs and symptoms, as evidence indicates that the only effective and definitive treatment of preeclampsia is delivery of the baby and placenta, which is decided according to the severity of the disease and gestational age [9]. Nifedipine was the most commonly used antihypertensive drug to reduce blood pressure, followed by hydralazine and amlodipine. These results align with the World Health Organization (WHO), American College of Obstetricians and Gynecologists (ACOG) recommendation, and National Institute for Health and Care Excellence (NICE) guidelines for severe preeclampsia management, which regard nifedipine and hydralazine as the first-line treatments, while amlodipine is not recommended by any reliable guidelines [1,5,12].

Among drugs used before delivery as antihypertensive monotherapy, hydralazine was the only drug that significantly decreased systolic and diastolic blood pressure (*P*=.002 systolic, *P*=.016 diastolic), and nifedipine significantly decreased systolic blood pressure (*P*=.003). In contrast, other drugs did not significantly decrease blood pressure, perhaps because patients who need monotherapy had slightly high blood pressure on admission relative to other patients who require combined antihypertensive treatment, and lowering their blood pressure to an acceptable level may not significantly affect outcomes, but this slight decrease had clinical value.

Nifedipine is the most commonly used drug in the regimens among all antihypertensives used before delivery. Use of the combination of hydralazine and nifedipine significantly decreased systolic blood pressure (*P*=.014). The other 2-drug regimens did not significantly decrease blood pressure, in agreement with meta-analysis findings comparing antihypertensive efficacy and concluding that nifedipine significantly decreases hypertension [30,31]. The combination of hydralazine, nifedipine, and methyldopa is the most commonly used triple antihypertensive drug regimen, but none of these combinations significantly reduced blood pressure because patients who need 3 antihypertensive drugs tend to have very high blood pressure that cannot be managed within the short period between admission and delivery [30,31].

Among antihypertensive drugs used after delivery as monotherapy or combination, none of the regimens significantly reduced blood pressure from delivery to the fourth blood pressure checkpoint (day 2 postpartum), perhaps because blood pressure has already decreased after delivery, which markedly reduces blood pressures [13]. Also, blood pressure 2 days after delivery, which is used as an assessment for the comparison, may be too early a checkpoint, providing an insufficient period from after delivery to achieve the optimum antihypertensive effect of drugs. Only the nifedipine–atenolol combination regimen significantly decreased blood pressure (*P*=.012 systolic; *P*=.001 diastolic), which can be justified by patients who received this regimen with the highest blood pressure after delivery of the other 2 drug regimens (157.38±18.118 over 101.75±11.424), and trails show that adding another antihypertensive to nifedipine gives similar results, regardless of the antihypertensive drug used [32].

For seizure control, most cases were controlled after using magnesium sulfate alone, similar to the results of a study conducted at Omdurman Maternity Hospital in 2017 [33], while a larger multi-ethnic international study showed a much lower percentage (65%) [34], and this may suggest better effectiveness of magnesium sulfate in the Sudanese population. Although magnesium sulfate is the first choice in several guidelines, including WHO, NICE, and ACOG [5,12,15], it is not universally successful and the recurrence rate of seizures despite appropriate magnesium therapy is relatively high, at 10-15% [34]. Seizure control status is significantly associated with maternal complications and outcomes (*P*=.001), which makes magnesium sulfate an important intervention to manage preeclampsia or eclampsia for the Sudanese population.

Regarding maternal outcomes, 43.7% of patients delivered at term, and 32.4% delivered preterm without complications of eclampsia seizures. Maternal complication outcomes were found to be significantly associated with the antihypertensive regimen before delivery, the antihypertensive regimen after delivery, and the status of seizure control (*P* values 0.047, 0.007, and 0.001, respectively). Cesarean section was performed in 56.2% of pateints. There was a significant association between the mode of delivery and antihypertensive regimen used before delivery (*P*=.001), while no significant association was found with the status of seizure control (*P*=.058).

Regarding fetal outcomes, intrauterine fetal death occurred in a higher portion when compared with that reported at Omdurman Maternity Hospital in Sudan [35], but was lower than in another regional study, in which it was around 20% [35]. Fetal outcomes were not associated with either the antihypertensive drug regimens used or the mother's seizure control situation. These results agree with a study that found that antihypertensive use does not affect fetal death or preterm delivery [20]. Referral to an SCBU occurred in 17.7% of babies, while 35.9% did not need to be referred, and this fetal outcome was not associated with the antihypertensive treatment regimen used or status of seizure control. In contrast, a study showed significant differences between labetalol and methyldopa, with labetalol resulting in a higher incidence of neonatal admission to the SCBU [15].

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The present study has several limitations. Most of the patients were discharged from the hospital after delivery and no data were available for the antihypertensive drugs used in postpartum hypertensive patients, so we could not assess the effect of these drugs in the postpartum phase. Because this study was retrospective, some data on eligible patients were missed. The study only covered 2 hospitals, limiting extension of our results to patients treated in other Sudanese hospitals. Thus, we strongly recommended conducting similar studies at all maternity hospitals in Sudan to get more precise results that reflect the current situation and can be generalized to become a solid background to develop a national guideline for preventing and treating preeclampsia and eclampsia in the Sudanese population.

Conclusions

The findings revealed that 42.7% of women were primigravida. Only 17.3% of the pregnant women received monitoring and observation without medication use. The choice of drug regimen differed according to the blood pressure level at admission. Maternal outcomes were clearly affected by the antihypertensive drug regimens used and the seizure control status, and use of anti-convulsants controlled all seizure cases successfully. There were different protocols applied in these hospitals in treating preeclampsia and eclampsia patients. Furthermore, fetal outcomes were only slightly affected and were not significantly associated with the antihypertensive drug regimen used or the seizure control status.

Department and Institution Where Work Was Done

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