

CRITERIA BASED AUDIT OF THE MANAGEMENT OF SEVERE PRE-ECLAMPSIA/ECLAMPSIA IN A NIGERIAN TEACHING HOSPITAL.

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ABSTRACT

Background: This study discusses the usage of criteria –based audit in a Nigerian teaching hospital to evaluate the quality of care among patients with severe pre-eclampsia/eclampsia (**SPE-E**) against set standards and proffers possible interventions in order to improve the quality of care.

Methods: The study was a prospective, descriptive hospital based study carried out from 1st of March to 31st of December, 2012. We conducted an 18 criterion-based audit on 52 consecutive cases of severe pre-eclampsia/eclampsia during the study period at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Nigeria.

Results: There were 34 cases of severe pre-eclampsia and 18 eclamptic patients. The case fatality rate for SPE-E was 5.8 % and 13.5 % perinatal deaths among 59 infants delivered (multiple pregnancies inclusive). From the pre-determined standard of care based on 18 criteria, the performance score ranged from 17.3 to 100% (average 69.1%). Standard of care was optimal (100%) in taking detailed history and documentation, administering magnesium sulfate, initiating drug treatment for severe hypertension, respiratory rate monitoring and steroid treatment for fetal lung maturity and very sub-optimal for various laboratory investigations and initial consultant obstetrician input in the management of patients.

Conclusion: For improvements in maternal and perinatal outcomes for patients with SPE-E, there should be strengthening of hospital facilities and avoidance of Phase 3 treatment delays in carrying out the comprehensive emergency obstetric and neonatal care needed. Hospital leaders should also be trained in hospital management for qualitative care.

Keywords: Severe pre-eclampsia, eclampsia, criteria-based audit.

INTRODUCTION

The continuum preeclampsia/eclampsia is a hypertensive disorder of pregnancy, and it is associated with substantial maternal and perinatal complications. Preeclampsia is still a

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leading direct cause of maternal and fetal mortality globally with a reported incidence of 2-8% among pregnancies [1]. Earlier studies from the study centre, revealed a case fatality rate of 100% among unbooked eclamptics with HELLP syndrome and a perinatal mortality rate of 5.84 per 1000 births among patients with severe pre-eclampsia/eclampsia (SPE-E) [2,3]. From a single disease entity, the toll exacted by SPE-E on patients in our environment is intolerably high.

The high maternal and perinatal mortality rates in our environ are indices of the limited quality of care and coverage of maternal and neonatal health services [4, 5]. An earlier survey of risk factors for maternal mortality at the study centre implicated the quality of care in about 40% of maternal deaths [6]. Obstetric care of high quality is a prerequisite for low maternal and perinatal mortality and morbidity [7,8].

WHO defined quality of health care as consisting of proper performance (according to standards) of interventions that are known to be safe, affordable to the society in question, and that have the ability to produce an impact on mortality, morbidity and disability [9].

In order to improve the quality of obstetric care, it is imperative to have periodic clinical (medical) audit of maternity services. There are three types of medical audits namely case reviews/case note presentations, national level confidential inquiries and criteria-based audit (CBA) [10].

At OAUTHC, Ile-Ife, Nigeria, the maternal and perinatal mortalities attributable to SPE-E are still intolerably high, consequently, a criteria based audit was carried out during the study period to assess the quality of care among patients with SPE-E and also to discuss possible interventions to improve the quality of care.

PATIENTS AND METHODS

Setting: We carried out a criteria-based clinical audit of all patients diagnosed and admitted with severe pre-eclampsia and eclampsia between 1st of March to 31st of December, 2012 at the Obstetric unit of OAUTHC, located in Ile-Ife, Nigeria. This a teaching hospital based in a semi-urban part of the southwestern geo-political zone of Nigeria. The hospital serves as a referral centre with a catchment area > 100 km radius. Annual number of deliveries ranged from 1400 to 2100. There was only one functional operating theatre for obstetric cases during the study period. There was also incessant electrical power outages from the national grid and closure of the hospital due to frequent industrial actions by various cadres of hospital staff.

The department of obstetrics and gynecology had 7 consultant members of staff one of whom must be available for consultations at the maternity unit on 24- hour basis. There were also 7 senior registrars and 6 registrars (1 senior registrar and 2 registrars were available to cover the maternity unit on a 24 hour basis). The maternity unit also had 17 nurse-midwives (3-4 were available for each 8 hour duty) and 3 peri-operative nurses at the labor ward theatre. The 20-bedded ante-natal ward was manned by at least 2 -3 nurse-midwives at each 8-hour shift. A 3-bedded 'semi-intensive' eclamptic room is in-built to the labor ward. In addition, for cases that would need ventilatory support after delivery, an 8-bedded intensive care unit situated outside the maternity unit is available and is manned by one consultant anaesthesiologist, 2 resident anaesthesiologists and 3-6 nurses during each 8-hour shift duty.

Guidelines for the management of severe pre-eclampsia/eclampsia at OAUTHC.

The departmental protocol for the management of SPE-E had been arrived at during departmental clinical meetings and daily morning reviews during which all cases managed in the preceding 24 hours are presented and audited.

On admission, convulsions are controlled or prevented by giving 4grams of magnesium sulfate (20%) slowly intravenously followed by 10 grams(50%) intramuscularly(5grams into each buttock). Airways are maintained and intravenous lines are secured and a urinary Foley's catheter is inserted to monitor urinary output. Further convulsions are controlled with magnesium sulfate for 24 hours after the last seizure or delivery during which there would be close monitoring of the respiratory rate, urinary output on hourly basis and assessment of deep tendon reflexes. Hypertension would be controlled with intermittent intravenous injections of hydralazine.

Baseline investigations such as complete blood count including platelet, serum urea, uric acid and creatinine, liver function tests are carried out. Fetal assessment is carried out and delivery modality is determined. Maternal complications such as pulmonary edema and renal failure are further managed by sending consultations to the appropriate department.

As soon as the patient is stable, delivery is effected by the more appropriate route, vaginal or abdominal delivery under general or spinal anesthesia . After delivery, patients would be kept under close monitoring and a fully recovered and ambulant patient is transferred to the post-natal ward where care continues until discharge.

Working Definitions

Severe Pre-Eclampsia: occurrence of hypertension after the 20th week of pregnancy, the blood pressure > 160/110 mmHg on admission, significant proteinuria > 30 mg/dl in random urine specimen or > 300 mg in a 24 hour urine specimen.

Eclampsia: existence of parameters above and occurrence of seizures.

Perinatal death: fetal death > 28 weeks and infantile death within one week of life.

Performance score for the quality of care: (i) optimal score : 100%, (ii) suboptimal score : 75 - 99.9%, (iii) very suboptimal score : 0 -74.9%.

Audit procedure: Clinical audit is the systematic and critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources and the resulting outcome and quality of life for the patient [11].

Before the commencement of the study in March, 2012, the standard of care was determined based on 18 criteria which evolved from decisions agreed upon during departmental clinical meetings and morning reviews. These criteria were based on clinical best practices adapted to prevailing local conditions.

Data were collected by a senior registrar and 2 registrars trained for the purpose and were all supervised by the principal investigator. Socio-demographic data were obtained by interviewing the relative/s accompanying the patient using a structured questionnaire. Case files were also reviewed to gather salient data such as booking status, gestational age at delivery, number of eclamptic seizures, blood pressure on admission, proteinuria check, administration of anti-hypertensives and magnesium sulfate, maternal and perinatal outcomes. Actual type of care given was

compared with the pre-determined standard of care highlighted in Figure 1. Mothers were followed up till discharge and all infants referred to the neonatal ward were followed up for seven days to get data on early neonatal deaths. The admission register was used to check if all admitted cases were included.

Statistical methods: Pearson's Chi-squared and Fishers' exact probability were used to compare categorical variables. 95% confidence intervals for proportion estimates were obtained and Clopper-Pearson method was used where percentages were close to 0 or 100% in determining adherence to audit standards on the management of women diagnosed with SPE-E.

RESULTS

There were a total of 52 patients who presented with SPE-E during the study period and the categorization is shown in Table 1. 67.3% of the patients presented after the age of 25 years and most (73%) were parous. About 60% of the patients were unbooked. Furthermore, the proportion of the unbooked who had eclampsia was greater compared with booked patients ($\chi^2 = 6.43, p = 0.01$). Late onset SPE-E at > 34 weeks of gestation was preponderant over early onset type and many more (67.3%) of the patients were delivered by Caesarean section. There were 3 (5.8%) maternal deaths and 8/59* (13.5%) perinatal deaths (*5 sets of twins and a set of triplets were inclusive).

The performance score for the quality of care ranged from 17.3 – 100% and the average performance was 69.1%. The score was optimal (100%) for 5 parameters; suboptimal (75-98.1%) for other 6 parameters; and very suboptimal (17.3 - 74%) in the remaining 8 parameters as shown in Table 2b. The performance scores of 13/18 (72.2%) of the

indicators were found to be statistically significant.

DISCUSSION

Clinical audit has also been defined as the systematic and critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources and the resulting outcome and quality of life for the patient [11]. Clinical audits use explicit criteria for measurement rather than implicit judgements and also allow numerical comparison of current practice patterns against these criteria [12].

The study evaluated the care of patients with SPE-E in a tertiary hospital located in a semi-urban area of a low income country by comparing current practice against pre-set standard. Suboptimal care had been identified as one of the risk factors for maternal mortality [6]. In the pre-set standard of care based on 18 criteria, it was only in 5 (27.8%) that care was optimal as in figure 2b. Adherence to pre-set standard was suboptimal for 6 (33.3%) criteria and very suboptimal in 7 (38.9%). The average performance score was 69.1% which is very suboptimal.

Patients with SPE-E are high risk obstetric cases usually presenting with life threatening complications both for mothers and babies. In order to have good outcome in such cases, the quality of care cannot but be optimal. Some of the reasons for the suboptimal standard of care were: inadequacy of basic infrastructure such as incessant electrical power outages from the national grid; incessant closure and partial closure of the hospital due to industrial actions by various cadres of hospital staff; out-of stock (stock-out) of various consumables such as drugs in the essential medicine list necessary in the care of these very ill obstetric patients. These

aforementioned reasons impacted negatively on various laboratory investigations needed to arrive at accurate diagnoses and monitoring of patients and were responsible for various Phase 3 treatment delays during the study period such as prolonged decision-delivery interval for cases that needed Caesarean section. Phase 3 treatment delay is delay that occurs in receiving adequate care after arriving at a health facility [13].

In monitoring patients with SPE-E after the administration of magnesium sulfate, determining serum levels of the drug may not be readily attainable in a low income country like Nigeria. Clinical parameters such as respiratory rate, urinary output and assessment of deep tendon reflexes are more feasible. However, during the study period, health-care givers relied more on the first two than the last probably because patellar hammers were not readily available in the obstetric unit.

Lastly, as regards adherence to standard of care during the study period, input by consultant obstetricians within 2 hours of admission of patients had a performance score of 21.2% which is very suboptimal. The reasons responsible for this were: consultant staff are not resident within the hospital even during call periods but accessible by phone; regular network problem experienced while using mobile phones within the locality and safety issues in contacting and transporting consultant staff during the night by ambulances.

With a case fatality rate of 5.8% for SPE-E, perinatal death rate of 13.5% and an average performance score of 69.1% for the quality of care in this study, it is glaring that the level of care needs to be greatly improved upon to bring down the intolerably high maternal and perinatal mortality. This study has been able to identify

some problems associated with the sub-optimal standard of care for SPE-E and the need for resource mobilization.

Problems need to be solved by prioritizing such as ensuring constant supply of electrical power on a 24-hour basis. If this is achieved, there would be positive impact on laboratory investigations and a shorter decision - delivery intervals for Caesarean sections and it would also help the nurses and doctors on duty to monitor their patients better. Furthermore, to give comprehensive emergency obstetric care that SPE-E deserves, it is imperative to ensure continuous stocking of essential drugs and consumables and never allow the stock-out syndrome to be pervasive. For optimal care for cases of SPE-E, the following groups of drugs categorized as essential medicine list must be available and properly stored on a 24-hour basis: antihypertensives, magnesium sulfate, drugs for end-organ complications such as aminophilline and frusemide (diuretic); antenatal corticosteroids for iatrogenic pre-term delivery; drugs for induction of labor where indicated; and medicine for the prevention of primary post-partum hemorrhage such as oxytocin and rectal misoprostol.

It is also recommended that at the study centre, an ICU with standard facilities and optimal staffing strength should be established within the maternity unit and not outside it. An earlier study at the centre revealed that eclampsia was the primary obstetric diagnosis for admission into the ICU [14].

In order to have improved quality of care, leaders in the health sector ought to be educated in health management. It has been discovered that the vast majority of health system capacity-building efforts have focused on enhancing medical and public health skills with less

attention being directed at developing hospital managers despite their central role in improving the functioning and quality of health-care systems [15].

The hospital management board and the obstetric departmental staff have roles to play to ensure that the standard of care improves urgently. The former should ensure that basic infrastructural facilities such as power supply and effective communication are provided on a 24- hour basis. The hospital management should also ensure that there is industrial harmony within the hospital. For the latter, there ought to be a re-orientation of all stake holders such as physicians, nurse-midwives, pharmacists and laboratory staff. At the obstetric departmental level there should be display of treatment protocols and all staff should be reminded at all clinical fora about the need to attain optimal standard of care. After some period, when the identified challenges would have been solved, the second round of clinical auditing could then be implemented to see if the standard of care would have improved since such an audit acts as a mechanism for change. Ultimately, it will ensure that patients being treated are receiving optimum obstetric care with the least possible complications.

CONCLUSION

Criteria based audit can help to identify challenges associated with quality of care in obstetrics including management of SPE-E. Reorganization of resources and priorities in problem solving is the key to standardized quality of care.

Figure 1: 18-criterion based pre-determined standard of care for SPE-E patients:

1. Detailed history and documentation.
2. Management plan by senior staff (at least a senior registrar within one hour of admission).
3. Specialist (Consultant obstetrician) input/review within 2 hours of admission.
4. Administration of magnesium sulfate within half hour after diagnosis.
5. Initiation of anti-hypertensive drug treatment in severe hypertension.
6. Adequate monitoring of blood pressure.
7. Proteinuria check by dipstick and documentation on admission.
8. Adequate respiratory rate monitoring.
9. Treatment with steroids for fetal lung maturity when necessary.
10. Adequate input/output monitoring for at least 48 hours post delivery.
11. Delivery per vaginam when appropriate within 12 hours of admission or last seizure.
12. Proper use of partogram when applicable.
13. Caesarean section within 2 hours of decision.
14. Full blood count monitoring (platelet inclusive)- at least one report within 24 hours of admission.
15. Serum urea, uric acid and creatinine monitoring (at least one report within 24 hours of admission).
16. Liver function tests (at least one within 24 hours of admission).
17. Deep tendon reflex assessment on admission and while on magnesium sulfate administration.
18. Prompt response to inter-departmental consultations when complications ensued (within 1 hour).

Table 1: Categorization Of Cases Studied.

Category	No of cases	%
Severe pre-eclampsia (Imminent eclampsia inclusive)	34	65.0
Eclampsia	18	35.0
Total	52	100

Table 2a: Socio-Demographic Variables Of Patients According To Category Of Disease

Variable	Severe pre-eclampsia	Eclampsia	Total (%)	χ^2 , p-value
Age (years)				1.39, 0.50
15-24	10 (58.8)	7 (41.2)	17 (100.)	
25-34	11(61.1)	7 (38.9)	18 (100.0)	
>=35	13 (76.5)	4 (23.5)	17 (100.0)	
Parity				0.73, 0.62
0	8 (57.1)	6 (42.9)	14 (100.0)	
1-2	12 (66.7)	6 (33.3)	18 (100.0)	
3-7	14 (70.0)	6 (30.0)	20 (100.0)	
Booking status				6.43, 0.01
Booked	18 (85.7)	3 (14.3)	21 (100.0)	
Unbooked	16 (51.6)	15 (48.4)	31 (100.0)	
Gestational age at presentation (weeks)				0.18*
<34	11 (84.6)	2 (15.4)	13 (100.0)	
>34	23 (59.0)	16 (41.0)	39 (100.0)	
Mode of delivery				3.21, 0.07
Vaginal	14 (82.4)	3 (17.7)	17 (100.0)	
Caesarean section	20 (57.1)	15 (42.9)	35 (100.0)	
Final disposition of patient				0.27*
Discharged	33 (67.4)	16 (32.7)	49 (100.0)	
Died	1 (33.3)	2 (66.7)	3 (100.0)	
Infant outcome (n=59)				0.70*
Perinatal death	6 (75.0)	2 (25.0)	8 (100.0)	
Alive	33 (64.7)	18 (35.3)	51(100.00)	

χ^2 = Pearson's Chi-squared. Fishers' exact probability.

Table 2b: Adherence to audit standards on the management of women diagnosed with severe preeclampsia/eclampsia

Standard	Attainment of pre-determined standard			
	Total number assessed	Number attaining pre-determined standard.	%	95% Confidence interval of %
Detailed history and documentation	52	52	100.0	93.2-100.0*
Management plan by senior staff (at least a senior registrar within one hour of admission)	52	51	98.1	89.7-100.0*
Specialist (consultant obstetrician) review/input within 2 hours of admission)	52	11	21.2	10.1-32.3
Use of magnesium sulfate	52	52	100.0	93.2-100.0*
Initiating drug treatment in severe hypertension	52	52	100.0	93.2-100.0*
Adequate monitoring of BP	52	43	83.0	72.8-93.2
Urinalysis (dipstick proteinuria check and documentation on admission	52	45	87.0	77.9-96.1
Adequate respiratory rate monitoring	52	52	100.0	93.2-100.0*
Treatment with steroids for lung maturation when necessary	11	11	100.0	0.72-100.0*

Adequate input/output monitoring for at least 48 hours post delivery	52	45	87.0	77.9-96.1
Vaginal delivery within 12 hours of admission	8	6	75.0	34.9-96.8*
Proper use of partogram for those considered for vaginal delivery	8	6	75.0	34.9-96.8*
Caesarean section within 2 hours of decision	44	28	64.0	49.8-78.2
Full blood count monitoring; at least one report within 24 hours of admission	52	13	25.0	13.2-36.8
Serum urea, uric acid and creatinine monitoring (at least one report within 24 hours of admission)	52	23	44.2	30.7-57.7
Liver function tests; at least one report within 24 hours of admission	52	9	17.3	7.0-27.6
Deep tendon reflex assessment	52	9	17.3	7.0-27.6
Prompt response to interdisciplinary consultations when complications ensued (within 1 hour)	8	4	50.0	15.7-84.3*

*Percentages adjusted using Clopper-Pearson Method where percentages are close to 0 or 100%, or sample size is too small. N.B. - Emboldened estimates are significant at P<0.000001

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