Original Article

Management of Severe Pre-eclampsia within 24hours Postpartum at a Tertiary Hospital in Lusaka, Zambia: A clinical Audit

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ABSTRACT

The worldwide incidence of pre-eclampsia ranges between 2% and 5%. Due to its complications, pre-eclampsia remains a significant public health threat, especially in developing countries. The quality of care given to postpartum women with severe pre-eclampsia has implications on disease progression.

We audited the immediate postpartum care given to women with severe pre-eclampsia at the Women and Newborn Hospital-University Teaching Hospitals, a tertiary level hospital in Lusaka, Zambia. We retrospectively reviewed 170 patient's medical records for the period of January 2020 to July 2020 and audited their management based on the local standard guidelines for the management of severe pre-eclampsia.

The total number of patients seen during the study period was 1,317. Of these, the total number with SPE was 170, giving a period prevalence of 12%. All patients were admitted to the Special observation unit, now Obstetrics intensive care unit (OICU). 12 SPE patient files had incomplete data; hence their information was not included in the analysis to maintain data quality. All 158 patients received antihypertensive drugs, $MgSO_4$, with only 35% having laboratory results available.

We found that more than 85% of women received adequate care according to standard guidelines on most parameters, including magnesium sulphate administration; however, the laboratory tests were below standard as only 36% of these women had adequate investigations. These findings are promising, indicating that high quality care is achievable in a low resource setting through clinical audits and completing the audit cycles with a focus on correcting identified gaps.

INTRODUCTION

Globally hypertensive disorders are among the top causes of maternal morbidity and mortality, affecting approximately 5% of all pregnancies.[1] In 2017, the World Health Organisation (WHO) reported that 810 women died each day from preventable pregnancy and childbirth-related causes, with about 99% of these deaths occurring in low resource settings.[2] Hypertensive disorders are the second commonest direct cause of maternal mortality at 14% after haemorrhage.[2] There has been a general reduction in maternal deaths globally in the last decade; however, the progress has been slow

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Keywords: *Audit cycle, Severe pre-eclampsia, Eclampsia, Pregnancy, Maternal mortality, Sub-Sahara Africa, Magnesium sulphate*

in low and middle-income countries. At the current rate, sub-Saharan Africa (SSA) may not achieve the sustainable development goal number 3.1 to reduce the global maternal mortality ratio (MMR) to less than 70 per 100000 live births.[3]

The Zambia Maternal and Perinatal Death Surveillance Review reported 674 maternal in 2018, translating toMMR of 183/100000 live births, with 13.1% of these deaths attributed to hypertensive disorders.[4] At the Women and Newborn Hospital of the University Teaching Hospitals (WNH-UTH), severe pre-eclampsia (SPE) is one of the leading causes of emergency obstetric admissions, as not fewer than two patients are admitted each day.[5]

Pre-eclampsia is characterised by multiple processes such as defective placentation, placental ischaemia, abnormal spiral artery remodelling, oxidative stress at the maternal-foetal interface and angiogenic imbalance in the maternal circulation leading to endothelial and multiple-organ damage.[6]In 2014, the International Society for the Study of Hypertension in Pregnancy (ISSHP)revised the definition of pre-eclampsia as "hypertension developing after 20 weeks gestation and the co-existence of one or more of the following new-onset conditions: proteinuria, maternal organ dysfunction and uteroplacental dysfunction".[7] Severe pre-eclampsia is defined as "hypertension of above 160 systolic and 110 diastolic at >20 weeks gestation on two occasions at least 6 hours apart and with proteinuria of 5g/l or 3 to 4 dipsticks with or without the following symptoms/signs: Severe headache; visual disturbance; papilledema; epigastric pain; vomiting, liver tenderness, abnormal liver enzymes; and platelets less than 100 $\times 10^9$ /l".[8]

Delivery of the foetus is thought to be the definitive management of pre-eclampsia in the antenatal period; however, this does not always halt the progression of the disease, SPE can worsen or present for the 1st time following delivery.[9]Although more common in the ante- and intrapartum period, 44% developed eclampsia postpartum in one study[10], and in another study, nearly one-third of patients developed eclampsia 48 hours after delivery.[11]SPE can complicate into an intracranial haemorrhage, reversible cerebral vasoconstriction syndrome, and other cardiovascular morbidities.[12] The postnatal period is considered a critical phase in mothers and new-born babies' lives, as it presents an opportunity to prevent complications that may arise.

Auditing maternal care is vital towards the reduction of SPE associated morbidity and mortality. A clinical audit based on a set local standard is a valuable method to define and improve the quality of care regarding the complete spectrum management of severe pre-eclampsia. An audit is a process of defining standard criteria of care, collect data of adherence to standard criteria, identify areas for improvement and implement necessary changes and then back to defining new contextual standards.[13] The department of Obstetrics and Gynaecology, now WNH-UTH, developed clinical management protocols and guidelines in 2014.[8]Therefore, this clinical audit was aimed at assessing the compliance to these guidelines in the management of SPE within 24hours postpartum and identify areas of improvement.

The goal in managing severe pre-eclampsia is to optimise pregnancy outcomes and prevent eclampsia and end-organ damage. Therefore, blood pressure control, prevention of fits and monitoring of biochemistry and haematology parameters are essential in quality management.The WNH-UTH standard guidelines recommend initiating antihypertensive at blood pressures above 140/90mmHg; drugs such as Hydralazine, Nifedipine, Methyldopa and Labetalol for use during the antenatal period, whileNifedipine andAtenolol in the postpartum period. The use of Methyldopa in the postnatal period is associated with maternal depression hence should be avoided.[14]

When SPE is diagnosed antenatally, Magnesium Sulphate ($MgSO_4$) is administered before delivery and continued for at least 24hours postpartum or last seizure, whichever one is last, to reduce the risk of

eclampsia. However, care should be taken to prevent toxicity because$MgSO_4$ toxicity may present as respiratory paralysis, altered cardiac conduction and cardiac arrest. Therefore, deep tendon reflexes, respiratory rate, urine output and serum concentrations are routinely assessed while a patient is receivingMgSO. Ongoing monitoring of biochemical and haematology parameters is vital as some of the complications of pre-eclampsia are HELLP syndrome (Hemolysis,ElevatedLiver enzymes, and a Low Platelet count), renal and liver failure.

METHODS

Data was collected retrospectively, from patients' records, for the period 1st January to 31st July, 2020. Data included; Antihypertensive medications and anticonvulsants and NSAIDS being administered,fluid input and urine output, biochemistry and hematology results, blood Pressure (BP), temperature (T), respiratory rate (RR) and pulse rate (PR).

Only patients who were managed at WNH-UTH for SPE were included, patients with either mild pre-eclampsia, eclampsia or were not managed at UTH at the time of delivery were excluded.

We suggested and used the following indicators based on the local protocols and guidelines in the 24hour postnatal period[8];

- The proportion of women with SPE being treated in the special observation unit.
- The proportion of women with SPE with biochemistry and hematology investigations.
- The proportion of women with SPE administered the appropriate analgesia, fluids, antihypertensive drugs and Magnesium Sulphate ($MgSO_4$).
- The proportion of women with SPE having their BP, RR, PR and deep tendon reflexes checked.

Data was analysed using excel software and has been presented using percentages.

RESULTS

The total number of patients seen during the study period was 1,317. Of these, the total number with SPE was 170, giving a period prevalence of 12%. All patients were admitted to the Special observation unit, now Obstetrics intensive care unit (OICU). 12 SPE patient files had incomplete data; hence their information was not included in the analysis, to maintain data quality. All 158 patients received antihypertensive drugs, $MgSO_4$ with only 35% having laboratory results available. The rest of the results are summarised in Table 1.

Table 1: Clinical audit results versus the standard criteria for postpartum management of women with severe pre-eclampsia

Parameter	Audit result	Standard criteria thresh hold
24hour monitoring in a special observation unit	100%	100%
MgS04 Administration 24hrs post delivering/fit	100%	100%
Appropriate antihypertensives given	100%	100%
Administration of NSAIDs	**2%**	**0%**
Fluid input and urine output/urinalysis monitoring	85%	100%
Biochemistry and hematology parameters monitored	**35%**	**100%**
Vital signs measured (BP, RR, PR) and deep tendon reflexes checked	90%	100%

A sub-analysis of the finding after stratification for the pre-COVID-19 period (January 2020 to March 2020) and the COVID-19 (April 2020 to July 2020) showed no significant differences in the quality of management apart from 4% improvement in blood tests observed during the pandemic. This could be explained by the fact that this data was collected before the peak of the pandemic in Zambia.

DISCUSSION

More than 85% of the women with SPE received adequate care according to local standard guidelines on most parameters, including magnesium sulphate administration; however, the laboratory tests were below standard as only 36% of these women had adequate investigations. The WHO notes that optimal care is not given to mothers in low and middle-income countries during the postnatal period based on the continuum of care model.[15] Epidemiological studies have shown a strong association between pre-eclampsia and cardiovascular disease later in life, with offspring born from affected pregnancies more likely to develop hypertension throughout the spectrum of their lives.[12,16] Postpartum follow-ups are vital because women with a history of pre-eclampsia may still have symptoms as they may persist for several weeks.

We found a period prevalence of SPE of 12%, which is slightly higher than global estimates; however, it is well known that the burden of maternal morbidity and mortality is higher in SSA.[2] The standard criteria were adhered to for the 24 hours postpartum observation time, administration of antihypertensive medications and $MgSO_4$ at 100%. However, a study at a tertiary hospital in Accra, Ghana, found low adherence to the administration of $MgSO_4$ at 24 hours postpartum.[16] Our findings may be explained by improved drug availability and human resource at the WNH-UTH special observation unit, with a 1:2 nurse-patient ratio which is way better than most countries in the region. $MgSO_4$ is toxicity is rare if it is carefully administered and patients are monitored continuously. The records reviewed showed that attention was paid to the monitoring guidelines to prevent $MgSO_4$ toxicity.

Biochemistry and haematology testing yielded a low adherence at 35%. This could be due to low demand by health care workers or inadequate capacity of the laboratory, which has to process additional samples from other hospitals. This challenge is not unique as it extends to other services provided by the laboratory like histopathology services.[18] Overall, more attention should be paid to evaluating blood parameters as HELLP syndrome (10.3%), and deranged urea and creatinine **(5%)** are common among women with SPE at the WNH-UTH.[4]

There was a minor difference in the quality of care given to SPE mothers before and during COVID-19 as laboratory testing improved. This could be because the number of nurses and doctors remained constant in the Obstetrics intensive care unit despite the COVID-19 pandemic.

From this clinical audit, we note that the majority of the guidelines are adhered to, underscoring the importance of staff understanding the role of local standard guidelines, for example, maternal case fatality rate reduced by 80% at the Enugu State University Hospital after introducing guidelines and training providers.[19] Practising evidence-based medicine has a great potential to further alleviate maternal morbidity and mortality, mainly from preventable causes like pre-eclampsia, even amid a pandemic. Consistent and timely adoption and uptake of current evidence in clinical practice can contribute significantly to attainment of SDG number 3.[3]

CONCLUSION

According to the standard guidelines, over 85% of women with SPE received appropriate care during the postnatal women. The findings of this audit are significant as Zambia matches on to its ambitious goal to reduce the maternal mortality ratio to 100 per 100000 live births by 2021. However, attention must be paid to improve adherence to laboratory tests as these are key in disease progression monitoring, and a re-audit not more than a year after the initial audit is recommended.

Limitation

The audit was conducted at one tertiary hospital; hence the findings cannot be generalised.

Ethics

Permission to conduct this audit was sort from the Senior Medical Superintendent WNH-UTH, and a waiver of consent was obtained from The University of Zambia School of Medicine Undergraduate Research Ethics committee.

Data privacy

Will be made available on request from the corresponding author.

Conflict of interest

The authors declare no conflict of interest.

Funding statement

This was not a funded clinical audit.

Acknowledgements

We would like to thank Dr Maureen Chisembele the Senior Medical Superintendent at the WNH-UTH for granting us permission to conduct this clinical audit

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