ORIGINAL RESEARCH ARTICLE

Evaluation of Criteria-Based Clinical Audit in Improving Quality of Obstetric Care in a Developing Country Hospital

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ABSTRACT

Study evaluated criteria–based clinical audit in measuring and improving quality of obstetric care for five life-threatening obstetric complications: obstetric haemorrhage, eclampsia, genital tract infections, obstructed labor and uterine rupture. Clinical management of 65 patients was audited using a 'before (Phase I) and after (Phase II)' audit cycle design using standard criteria. Following Phase I, areas in need of improvement were identified; mechanisms for improving quality of care were identified and implemented. Overall care of the complications improved significantly in obstetric haemorrhage (61 to 81%, p = 0.000), eclampsia (54.3 to 90%, p=0.00), obstructed labour (81.7 to 93.5%, p<0.001) and genital tract sepsis (66 to 85.2%, p < 0.01). Clinical monitoring, drug use, and urgent attention by senior medial staff also improved significantly after intervention. Criteria-based clinical audit is feasible and acceptable for improving management of life-threatening obstetric complications. Its application is recommended in health institutions in developing countries *(Afr J Reprod Health 2008; 12[3]:59-70).*

RÉSUMÉ

Evaluation à base de critères d'audit clinique dans la qualité d'améliorer le soin obstétrique dans un hôpital du pays en voie de développement L'étude a évalué l'audit clinique basé sur des critères dans les mesures et l'amélioration de la qualité de soin obstétrique pour cinq des complications obstétriques extrêmement graves : hémorragie obstétrique, éclampsie, infections des passages génitaux, accouchement entravé et la rupture utérine. La direction clinique de 65 patients a été vérifiée en se servant du modèle du cycle audit 'avant (Phase 1) et après (Phase II)' avec des critères courants. Suivant Phase I, des régions qui ont besoin d'amélioration ont été identifiées ; les mécanismes pour améliorer la qualité de soin ont été identifiées et appliquées. Le soin complet des complications s'est amélioré d'une manière significative dans l'hémorragie obstétrique (61 a 81%, p = 0.000), éclampsie (54,3 a 90%, p = 0.00), accouchement entravé (81,7 a 93,5%, p <0.001) et la septicité du passage génital (66 à 85,2%, p < 0.01). La surveillance clinique, l'usage de drogue et l'attention urgente du personnel médical supérieur ont aussi amélioré significativement après l'intervention. L'audit clinique basé sur des critères est possible et acceptable pour améliorer la direction des complications obstétriques extrêmement graves. Son application est recommandée dans des établissements sanitaires des pays en voie de développement *(Afr J Reprod Health 2008; 12[3]:59-70).*

KEY WORDS: Quality of Care, Criteria-based Audit, Obstetric Care, Obstetric Complications

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Introduction

Worldwide, over 500,000 women die every year as a result of complications arising from pregnancy and childbirth.[1] Most of these deaths could be avoided if preventive measures were taken and adequate care was available.[1] It is indeed alarming and a national tragedy that maternal mortality in Nigeria is amongst the highest in the world.[2] Indeed, recent WHO/UNICEF/UNFPA estimates put the figure for Nigeria as 1,100 per 100,000 births.[3] It has been estimated that for every woman who dies, 20-30 others suffer from serious adverse conditions that can affect them for the rest of their lives. The high maternal mortality rate in developing countries is an index of the limited quality of care and coverage of maternal health services.[4] A survey of risk factors for maternal mortality in a Nigerian Teaching Hospital implicated the quality of care in about 40% of maternal deaths.[5] In view of the above, improving the quality of obstetric care is imperative in developing countries if the high maternal mortality rates in these regions are to decline. Obstetric care of high quality continues to be a key requirement for reducing maternal mortality.

The World Health Organization (WHO) defines quality of health care as consisting of proper performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question, and that have the ability to produce an impact on mortality, morbidity and disability.[6] In order to improve the quality of obstetric care, there is a need for periodic clinical audit of maternity services. Clinical audit acts as mechanism for change.[7] It ensures that patients being treated are receiving optimum obstetric care with the least possible complications. It also involves measurement of comparison of the care given against pre-determined standards.[8]

The aim of this study was to evaluate criteria-based audits in improving the quality of hospital-based obstetric care services at the Federal Medical Centre, Abeokuta, Nigeria focusing on the management of five life-threatening obstetric complications namely obstetric haemorrhage, eclampsia, genital tract sepsis, obstructed labour and uterine rupture, and to compare changes in the level of care of these specific obstetric complications pre and post intervention.

METHODS

This study was conducted in the department of Obstetrics and Gynaecology of the Federal Medical Centre, Abeokuta in south-western Nigeria. It is a young tertiary health care institution with annual deliveries of about 600. The study was a prospective, descriptive hospital-based study carried out among obstetric patients. The study spanned a period of 13 months (January 1, 2002 – January 31, 2003); it was conducted in two phases of 6 months each. All patients with specific obstetric complications within the periods, who satisfied the working definition of life threatening obstetric complications as shown in Table 1, were included. These obstetric complications were obstetric haemorrhage, eclampsia, obstructed

Table 1: **Working definitions of life-threatening obstetric complications**

Complication	Essential features	Additional features
Obstetric haemorrhage		
Abortion-related haemorrhage	Gestation of less than 28 weeks	At lease one of the following: Blood loss of more than 500ml Clinical signs of shock (pulse >100/min, and systolic blood pressure <100mmHg)
Ruptured ectopic pregnancy	Pregnancy outside the uterine cavity with haemoperitoneum, diagnosed by laparoscopy, or laparotomy	
Primary postpartum haemorrhage	Genital tract bleeding within 24 hours of delivery Gestation of fetus $\geq$ 28 weeks	At least one of the following: Perceived blood loss of more than 1000ml Clinical signs of shock pulse >100/min; systolic blood pressure <100mmHg)
Secondary postpartum haemorrhage	Genital tract bleeding after 24 hours of delivery but within 42 days Gestation of the fetus should be $\geq$ 28 weeks	At least one of the following: Blood loss should be more than 500ml Clinical signs of shock pulse >100/min; systolic blood pressure <100mmHg)
Antepartum haemorrhage	Gestation $\geq$ 28 weeks Clinically observed vaginal bleeding	May or may not have abdominal pain Amount of bleeding immaterial Confirmation: Placenta praevia – with scan or at operation, Abruption – presence of retroplacental clot
Eclampsia	Generalised fits in a patient without previous history of epilepsy	
Obstructed labour	Clinical signs of shock (systolic blood pressure <100mmHg, pulse >100/min)	At least one of the following: Labour > 12 hours, Uterine tetany, Abnormal pelvis, Bandi's ring, Uterine rupture, Haematuria, Caput or moulding
Uterine rupture	Rupture of uterus during labour with confirmation at laparotomy	
Genital tract sepsis associated with pregnancy		
Chorioamnionitis	Evidence of ruptured membranes	At least one of the following: Temperature $\geq$ 37.5^{0}C Odorous vaginal discharge
Septic abortion	Gestation less than 28 weeks Temperature $\geq$ 37.5^{0}C	At least one of the following: Abdominal pain/tenderness Injury to genital tract Odorous vaginal discharge Tender fornices Open cervix with products of conception
Puerperal sepsis	Temperature $\geq$37.5^{0}C within 42 days of delivery	At least one of the following: Odorous vaginal discharge Tender subinvoluted uterus

Adapted from Graham et al[9].

labour, uterine rupture and genital tract sepsis. The first phase involved the assessment of the current level of obstetric care in the unit. The level of obstetric care was compared with a set of criteria suggested by Graham et al[9] with some modifications. The criteria for each of these obstetric complications as described by these authors with few modifications were used in this study (Table 2).

Being an audit process, the base line data collection was conducted discreetly. The nursing and medical staff was unaware of the nature of the study during the first phase of the trial. The investigators retrieved information from patients' medical records for entry into a data sheet immediately after patients' discharge from the ward (alive or dead) during the two phases of the study. The patients were identified from admission and discharge registers on the wards, the operating theatre register and the labour ward register. To ensure complete and correct retrieval of information, each patient's medical record was scrutinized twice. An initial pilot study used two cases from each group of complications; information on the data sheet was found to be adequate.

Feedback

At the end of the first phase of this study, the preliminary findings (current practice) were presented at a meeting of Nursing and Medical personnel in the institution. Also in attendance were representatives from other units of the hospital including Administration, Pharmacy and Laboratory. The staffs were encouraged to identify poor quality management issues in the five life-threatening complications and to identify ways to change these for the ultimate benefit of the patients. The integration of the criteria into clinical practice was also discussed. Consensus was reached on the areas of good practice.

The feedback meeting held during the intervening month between the two phases of the study, served as the basis for the second phase of the study. Mechanisms agreed for achieving improvement at this feedback meeting included developing, displaying and using clinical protocols for the five obstetric complications selected and regular reappraisal of the criteria implementation at various clinical for a. During this feedback interval, advocacy and consultation with all stakeholders in obstetric care delivery in the hospital, including the hospital management, were carried out. The most remarkable achievement of the feedback interval was the recognition of the need to procure magnesium sulphate. Shortly after integration of the care criteria into clinical practice, the second phase of the study commenced and lasted six months. The data variables included patient's biodata and specific management elements offered, which were based on specific pre-determined criteria for the optimal management of each condition.

The scoring system was as follows: for any variable that was fully met, one unit was awarded, if partially met, half of a unit was awarded, while if absent, zero was awarded. If a patient was managed for more than one of the

Table 2: **Criteria for optimal management of life threatening obstetric complications (Source: Graham et al[9])**

Complica-tions	Criteria
Any complication (2 criteria)	• Patients history should be documented in case note on admission, age, parity and complications in current and or previous pregnancies. • General clinical state on admission should be recorded - pulse, blood pressure, temperature.
Obstetric haemorrhage (12 criteria)	• Experienced Medical Staff should be involved in the management of life-threatening obstetric haemorrhage within 10 minutes of diagnosis • Intravenous access should be achieved • Patients haematocrit or haemoglobin level should be established • Typing and cross matching of blood should be performed. • Coagulation tests should be performed if indicated – clotting time, platelet count • Crystalloid and/or colloids should be infused until cross matched blood is available. • Clinical monitoring to detect early deterioration should be done at least every quarter of an hour for 2 hours: pulse, blood pressure. • Urinary output should be measured hourly • Oxytocics should be used in the treatment of postpartum haemorrhage • Genital tract exploration should be performed in cases of continuing postpartum haemorrhage. • Women with antepartum haemorrhage should not have vaginal examination unless placenta praevia has been excluded by ultrasonography or unless emergency operative delivery is possible. • In ectopic pregnancy emergency surgery should be performed.
Eclampsia (8 criteria)	• Senior Medical Staff should take responsibility of formulating a management plan for patient. • Antihypertensive treatment should be given to patients with severe hypertension. • The treatment and prophylaxis of seizures should be with magnesium sulphate • Respiratory rate and tendon reflexes is monitored when magnesium sulphate is used. • Antepartum/intrapartum fluid balance chart should be maintained. • Haematological and renal investigations should be done at least once: clotting time, platelet count, and urine albumin test. • Delivery should be achieved within 12 hours of the first convulsion. • Monitoring of blood pressure and urine output should continue for at least 48 hours after delivery.
Uterine rupture (3 criteria)	• In suspected or diagnosed uterine rupture, emergency surgery should be performed. • Urinary bladder should be drained. • An observation chart is maintained showing urine output, pulse and blood pressure.
Obstructed labour (6 criteria)	• Prompt delivery of the fetus should occur within 2 hours of diagnosis. • Urinary bladder should be drained. • An observation chart should be maintained – urine output, pulse, blood pressure, and temperature. • Intravenous access and hydration should be achieved • Broad – spectrum antibiotics should be given • Typing and cross matching of blood should be carried out.
Genital tract sepsis (6 criteria)	• Delivery should be expedited in chorioamnionitis irrespective of the gestation. • Blood should be taken for culture • Treatment of genital tract sepsis should be with broad spectrum antibiotics • Metronidazole should be included in the antibiotic regimen • An observation chart should be maintained: urine output, pulse, blood pressure and temperature. • Exploration and evacuation of the uterus should be performed if retained products of conception are suspected.

specific complications, each entity was assessed separately. The criteria score for each patient was individualized. The level of care for each complication was then assessed as:

$$\frac{Care \cdot score}{Criteriascore} \times 100$$

Data entry and analysis were performed with EPI-INFO 6.04 software.[10] The pre – and post – intervention results were compared using chi squared (γ^2) and student's t-tests as appropriate. The level of statistical significance was set at $p < 0.05$. Ethical approval for this study was obtained from the institution's ethical committee.

Results

Characteristics of the Study Population

The total number of women who presented with the five life-threatening conditions during the two phases of the study and the number who met the criteria for inclusion are shown in Table 3. Equal number (65) of cases were selected and managed in each phase. In phase 1, the mean age, parity and duration of hospitalization were 29.1 years $\pm$ 6.1(SD), 1.8 $\pm$ 1.8(SD) and 9.2 days $\pm$ 5.2(SD) respectively, while for phase II these were 27.8 years $\pm$ 5.4(SD), 1.5 $\pm$ 1.5(SD) and 8.2 $\pm$ 3.0(SD) respectively. The differences between these phases were not of statistical significance. The percentages of total cases of the obstetric complications were invariably similar during the two phases as shown in Table 4 and Figure 1. Table 4 also shows that there were statistically significant differences in the care given for each obstetric complication between the first and second phases of the study. There were two maternal deaths in each phase of the study.

Specifically, significant changes were noted in mean care scores for obstetric haemorrhage (from 61% at baseline to 81% p=0.000), eclampsia (from 54.3% to 90% p=0000), obstructed labour (from 81.7% to 93.5% p = 0. 002) and genital tract sepsis (from 66 to 85.2% p=0.006). It was only in uterine rupture that a minimal reduction was noted. The overall mean care score for phase I was 65.65% while for phase II was 85.7%. The difference between the two phases was statistically significant (p=0.000).

Details of Baseline Assessment (First phase)

Table 5 shows the details of the baseline assessment of the management of the five life threatening obstetric complications. In all, except in uterine rupture, there were areas of deficiencies of quality of care in the management of these life threatening obstetric complications. Specifically, there was sub-optimal management in clinical monitoring, nursing care (measuring the urine output) and in drug use. In obstetric haemorrhage, clinical monitoring and hourly urine output were sub-optimal (45% and 16% respectively) while in eclampsia, sub-optimal management was seen in the use of magnesium sulphate (0%) and its monitoring in seizure treatment and prophylaxis (0%). This was primarily because magnesium sulphate was not then available in the hospital. In obstructed labour, sub-

Table 3. **Number of women admitted and number selected for audit exercise**

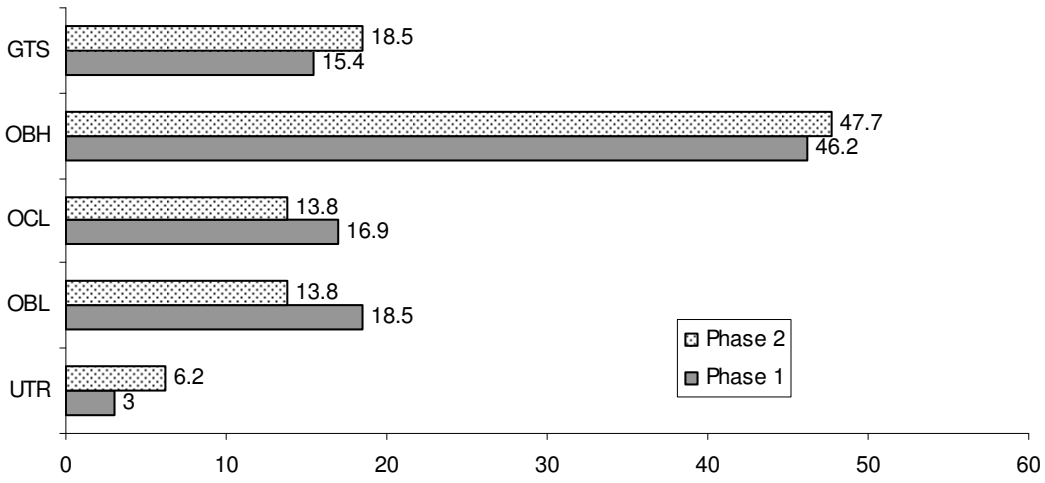
Condition	Phase 1		Phase 2	
	Number of women admitted	Number selected	Total of women admitted	Number selected
Obstetric haemorrhage	35	30	38	31
Eclampsia	15	11	12	9
Obstructed labour	15	12	12	9
Uterine rupture	4	2	5	4
Genital tract sepsis	12	10	15	12
Total	81	65	82	65

Table 4: **Comparison of the characteristics of patients, distribution and mean care score of complications during the two phases**

Variable	Phase 1	Phase 2	p-value
Total number of cases	65	65	
Mean Age (Years)	29.1 ± 6.1	27.8 ± 5.4	0.2 (NS)
Mean Parity	1.8 ± 1.8	1.5 ± 1.5	0.4 (NS)
Mean Duration of Hospitalization (days)	9.2 ± 5.2	8.2 ± 3.0	0.2 (NS)
Number of maternal deaths	2	2	
Distribution of complications			
Obstetric haemorrhage (% of total)	30 (46.2%)	31 (47.7%)	
Eclampsia (% of total)	11 (16.9%)	9(13.8%)	
Obstructed labour (% of total)	12 (18.5%)	9 (13.8%)	
Uterine rupture (% of total)	2 (3.0%)	4 (6.2%)	
Genital tract sepsis (% of total)	10 (15.4%)	12 (18.5%)	
Mean Care Score			
Obstetric haemorrhage	61.0%	81.0%	P=0.000(S)
Eclampsia	54.3%	90.0%	P=0.000(S)
Uterine rupture	100.0%	98.0%	NS
Obstructed labour	81.7%	93.5%	P=0.002(S)
Genital tract sepsis	66.0%	85.2%	P=0.006 (S)
Overall mean care score	65.65 ± 16.8	85.7 ± 13.1	P = 0.00(S)

Table 5: **Details of pre- an post-intervention assessment of Quality of Care and comparison of the care score of each criterion for the two phases**

Criterion	Phase 1 (%)	Phase II (%)	P Value
Patients history (documented)			
Patients' age	100.0	100.0	-
Patients' parity	100.0	100.0	-
Complication of previous and current pregnancy	80.0	100.0	-
General clinical state on admission			
Pulse	90.8	98.5	-
BP	92.3	98.5	-
Obstetric haemorrhage			
• Experienced Medical Staff review within 10 min of diagnosis	40.0	70.0	0.01 (S)
• Intravenous access achieved	96.7	100.0	0.6 (NS)
• Patients' PCV/Hb established	96.7	100.0	0.6(NS)
• Typing/cross-matching of blood	83.3	93.5	0.4 (NS)
• Coagulation test performed	13.3	32.3	0.06 (NS)
• Crystalloid and/or colloid infused until cross matched blood is available	93.3	100.0	0.004 (S)
• Clinical monitoring ¼ hrly x 2 hrs (Pulse & BP)	45.0	87.1	<0.01(S)
• Hourly urine output	16.0	65.0	0.006 (S)
• Oxytocics in PPH	80.0	80.0	-
• Genital Exploration in continuing PPH	80.0	90.0	
• No V.E in APH (unless placental praevia excluded by USS or emergency operative delivery is possible)	100.0	100.0	-
• In ectopic gestation, emergency surgery is performed	100.0	100.0	-
Eclampsia			
• Management plan by senior medical staff	81.8	100.0	1.0 (NS)
• Antihypertensive treatment in severe hypertension	86.0	100.0	0.6 (NS)
• $MgSO_4$ for seizure treatment and prophylaxis	0	88.9	0.004 (S)
• Respiratory rate and tendon reflexes monitored while on $MgSO_4$	0	66.6	0.01(S)
• Ante/intrapartum fluid balance chart	81.8	100.0	1.00(NS)
• Haematological/Renal investigation done at least once (clotting time, platelet count, urine Albumin)	55.0	83.6	0.4 (NS)
• Delivery achieved within 12 hours of first convulsion	18.2	61.6	0.3(NS)
• BP and Urine output for at least 48 hours after delivery	90.9	100.0	0.6 (NS)
Uterine Rupture			
• Emergency surgery performed	100.0	75.0	0.3(NS)
• Urinary bladder drained	100.0	75.0	0.7(NS)
• Observation chart maintained (urine output, pulse, BP)	100.0	75.0	0.4(NS)
Obstructed Labour			
• Prompt delivery of fetus within 2 hours of diagnosis	28.0	61.1	0.7(NS)
• Urinary bladder drained	91.7	100.0	0.8 (NS)
• Observation chart maintained	71.0	100.0	0.1 (NS)
• Intravenous access established with hydration	83.3	100.0	0.6 (NS)
• Broad spectrum antibiotic given	83.3	100.0	0.6 (NS)
• Typing/Cross matching of blood carried out	83.3	100.0	0.6(NS)
Genital tract sepsis			
• Delivery expedited in chorioamnionitis	30.0	29.0	0.6 (NS)
• Blood taken for culture	10.0	50.0	0.1(NS)
• Treatment with broad spectrum antibiotic	100.0	100.0	0.6(NS)
• Metronidazole included in antibiotic regimen	90.0	100.0	0.6 (NS)
• Observation chart maintained	60.0	100.0	<0.05 (S)
• Exploration/Evacuation of the uterus performed if retained products of conception are suggested	50.0	80.0	0.4 (NS)



OBH, Obstetric haemorrhage; ECL, Eclampsia; UTR, Uterine Rupture; OBL, Obstructed labour; and GTS, Genital tract Sepsis

Figure 1: **Percentage distribution of complications in Phases I and II**

optimal management was seen in prompt delivery of the fetus (28%).

Post intervention score (Phase Two)

Table 5 also outlines the score for each criterion in the management of the five life threatening complications, after the introduction of the standard for care. There was general improvement in the care of these complications as shown with average percentage of care score for individual obstetric complications. There was improvement, particularly in those areas where sub-optimal care during the first phase was noted.

Comparison of Care Score of the Two Phases

The care scores for each criterion during the two phases are also compared in Table 5. Significant improvement was achieved in some areas in the management of three of the major complications namely obstetric haemorrhage, eclampsia and genital tract sepsis. For obstetric haemorrhage, improvements were seen in: review by experienced medical staff within 10 minutes of diagnosis (from 40 to 70%, p= 0.002) and coagulation test performed (from 13.3 to 32.3%, p=0.055) although this difference did not reach statistical significance. There were also improvements in the clinical monitoring of pulse and blood pressure for 2 hours to detect early deterioration after control of a major haemorrhage (from 45 to 87.1%, p=0.006).

There was a significant overall improvement in monitoring hourly urine output following obstetric haemorrhage

from 16% to 65% ($p < 0.001$). In cases of eclampsia, the use of magnesium sulphate for treatment and prophylaxis of seizure improved (from 0% to 88.9%, $p=0.004$); monitoring of tendon reflexes and respiratory rate, when on magnesium sulphate also improved (from 0% to 66.6%, $p=0.014$). There was also a significant increase in the proportion of patients whose observation charts were maintained, in cases of genital tract sepsis (from 60 to 100%, $p < 0.05$). There were other improvements that were not statistically significant and these included: maintenance of fluid balance chart (from 81.8 to 100%), hematological and renal investigations (from 55 to 83.6%) and achieving delivery of fetus within 12 hours of first convulsion (from 18.2 to 61.6%), while in obstructed labour, there was improvement in the quality of care, but did not reach statistical significance.

Discussion

This study was based on internationally developed criteria of best practice to assess quality of emergency obstetric care. We identified deficiencies in the management of obstetric haemorrhage, eclampsia, and obstructed labour and genital tract sepsis. In the clinical audit by Wagaarachchi et al[11] in Ghana and Jamaica (developing countries), similar deficiencies in care were also identified in the management of the five life-threatening obstetric complications. These deficiencies could result in high maternal mortality seen in developing countries.[12] some of the deficiencies included poor clinical monitoring of patients with obstetric haemorrhage as well as poor hourly monitoring of urinary output, while in eclampsia, lack of use of magnesium sulphate for treatment and prophylaxis of seizures was noted.

These deficiencies prompted constructive discussion among medical and nursing personnel during presentation of the baseline findings. This is important in order to enhance their motivation towards change in practice.[13, 14] Mechanisms for achieving a high standard of care were discussed including display of protocols to be followed, reminder at various clinical for a such as morbidity and mortality review meetings and incorporation of magnesium sulphate injection in the management of eclampsia. Clinical staff were encouraged to change their practice in order to meet the standard of quality obstetric care as major advances only occurred when ordinary people started taking action themselves rather than leaving problems to be solved by others.[13] In the implementation phase of the audit cycle, significant improvements were noted in the care of the obstetric complications when compared with baseline findings: obstetric haemorrhage (61-81%), eclampsia (54.3 - 90%), obstructed labour (81.7 – 93.5%) and genital sepsis (66-85%). These improvements were marked in areas of care where the baseline performance fell far below the optimal level such as clinical monitoring, nursing care, drug use and prompt attention by senior medical staff. This brings out the value of criteria based

clinical audit. This is similar to outcome of studies in other developing countries.[11]

Progress was noted in the management of eclampsia. Prior to introduction of the intervention magnesium sulphate was never in use. This prompted the incorporation of magnesium sulphate during the implementation phase of the study. Magnesium sulphate is the drug of choice for controlling or preventing convulsion.[15] Monitoring for side effects of this drug was also implemented (respiratory rate, tendon reflexes and urine output). The baseline findings and the participatory solutions served as advocacy tools that convinced the hospital management of the need to procure magnesium sulphate. The project carried along all stakeholders within the hospital. In obstructed labour, there were improvements in the various criteria although these did not reach statistical significance. This is explained by the fact that the baseline findings were of high scores.

The value of criteria based clinical audit in improving quality of obstetric care can be assessed objectively in terms of the change in the proportion of cases where management met the criteria for good quality care.[13] the number of staff and available resources were similar during the first and second phases of the study.

Conducting a clinical audit is associated with constraints. These include changes in health care system, availability of medical supplies and equipment, and providers' level of competence and motivation.[16] In this study, constraints encountered included insufficient blood in the blood bank that delayed actions in the management of patients with obstetric complications requiring blood transfusion. Others included occasional low morale of the staff probably due to delay in monthly salary or sheer lack of motivation to follow protocol. Lack of magnesium sulphate injection discovered during the baseline study was also a form of constraint as its absence affected the quality of care given to patients with eclampsia. Incessant industrial actions by the health workers may also affect the quality of care offered to patients. These constraints were discussed with hospital management and addressed where possible. Small sample size is a limitation in this study. Despite this limitation, we have reported appreciable gains in the process of clinical management of the life-threatening complications. With larger sample size, differences in mortality will probably become appreciable.

Our experience from the exercise is that clinical audit is a feasible entry point for the identification of non-clinical causes of poor performance and that when these causes are promptly and adequately addressed, the quality of care given to patients increases. It is suggested that in order to sustain the gains of clinical audit, every member of staff should be involved in clinical audit by constant training beginning from the medical staff.[14] This will make clinical audit a continuous process that will lead to improvement in quality of care due to change in practice. Promotion of audit

and feedback has been suggested as a useful strategy to improve professional practice in under-resourced settings where adherence to recommended practice is low.[17]

The results of this study have shown that criterion based clinical audit is a feasible and acceptable method for evaluating and improving the quality of care in the management of life-threatening obstetric complications. Its introduction led to measurable improvements in the quality of care provided to women experiencing life-threatening obstetric complications. We recommend its adoption in all units in order to improve the overall quality of care.

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