

Clinical Audit in the Management of Mild Pre-eclampsia in Upper Egypt
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ABSTRACT

Background: Clinical audits based on standard criteria have been used in developed countries in order to improve the management of certain diseases, but have been nowadays introduced in assessment of diseases in developing countries as pre-eclampsia and eclampsia. **Study Design:** a retrospective study. **Objective:** to assess the clinical audit in the management of mild Pre-eclampsia in Upper Egypt. **Setting:** Obstetrics & Gynecology department, Sohag General Hospital. **Duration:** from 1st of January 2015 to the end of December 2015. **Patients and methods:** this clinical audit study was conducted on 108 pregnant women who had mild pre-eclampsia from those admitted to Obstetrics & Gynecology department of Sohag General Hospital. Patients were diagnosed as mild preeclampsia according to ACOG criteria, 2013 of mild preeclampsia. **Results:** about 33% of studied cases developed featured of severe pre-eclampsia. Vaginal delivery was only in 31.4% of cases. The clinical audit was nearly adherence to standards of mild pre-eclampsia management but was very poor in asking about symptoms of severe disease only obtained for 7.4% of cases, family history was neglected completely, lower limb examination was fairly done in 60.2% of cases, pelvic examination was done in 74.1% of cases and no case had chest or heart examination. 24 hours protein collection and protein creatinine ratio were not done. Only 9.3% of cases were assessed and managed by consultants and 90.7% of cases were assessed and managed by obstetric specialists. **Conclusions& Recommendations:** accesses to prenatal care, early detection and diagnosis of pre-eclampsia, well monitoring and suitable management are crucial elements in the pre-eclampsia prevention regarded to maternal death. Potential areas for further improvement in quality of care for management of cases with mild pre-eclampsia related to standardizing management guidelines, greater involvement of specialists in the management and continued medical education on current management of disease for junior staff.

Keyword: Clinical Audit – Mild Pre-eclampsia – Upper Egypt.

INTRODUCTION

Pre-eclampsia (PE) is a pregnancy disorder characterized by increase in blood pressure and presence of a significant amount of protein in urine^[1]. The disease usually occurs in last trimester of gestation and becomes worse over time. In severe cases there may be breakdown in the erythrocytes, thrombocytopenia, elevated liver enzymes, impaired kidney function, edema, dyspnea due to pulmonary edema, or visual defects. Pre-eclampsia has negative effects on outcomes for both the baby and the mother. In case of negligence in treatment, the disease may lead to eclampsia which is characterized by presence of convulsions^[2]. An earlier survey of risk factors for maternal mortality at the study centre implicated the quality of care in about 40% of maternal deaths^[3]. The disease is more frequent in primigravida and in cases of twins' pregnancies. The underlying mechanism of the disease involves abnormal placental blood vessels beside other factors. Antenatal diagnosis mostly occurs. But rarely, the disease begins postnatal period^[4]. Diagnosis of pre-eclampsia historically required high +blood pressure and presence of protein in

the urine, some definitions included the formal definition beside presence any organ dysfunction^[5]. Preeclampsia incidence ranges from 2 to 8% of pregnancies all over the world. Hypertensive disorders of pregnancy generally the 2nd cause of maternal death^[6]. Clinical audit is a process of quality improvement which seeks to improve care of patient and his outcomes through systematic review of care against the explicit criteria and implementation of change. The structure, processes and outcomes aspects of care are selected and systematically evaluated against explicit criteria. When indicated, changes are implemented at an individual, team, or service level then further monitoring is used for improvement confirmation in delivery healthcare^[7].

The aims of this audit were:

1. Auditing the current management of mild pre-eclampsia at Obstetrics & Gynecology department of Sohag General Hospital.
2. Identifying the gap between the current practice on management of with mild pre-eclampsia cases at obstetrics & gynecology department of Sohag General Hospital and ideal practice (according to

the guidelines of American College of Obstetricians and Gynecologists).

3. Setting recommendations for filling the gap to improve patient satisfaction and minimize complications.

PATIENTS AND METHODS

This clinical audit study was conducted on 108 pregnant women who had mild preeclampsia from those admitted to obstetrics & gynecology department of Sohag General Hospital, from 1st of January 2015 to the end of December. Patients were diagnosed as mild preeclampsia according to **ACOG criteria** [4] of mild preeclampsia:

-BP is 140 to 159 mmHg systolic and/or 90 to 109 mmHg diastolic on 2 occasions at least 6 hours apart.

-Proteinuria is 300 mg /24 hours; or ≥1+ by dipstick (on 2 random urine samples, collected at least 4 hours apart); or protein: creatinine ratio is ≥ 0.3 mg/dL.

-BP is 140 to 159 mmHg systolic and /or 90 to 109 mmHg diastolic and, in the absence of proteinuria, any of the following is present:

- 1.Thrombocytopenia, platelets count <100,000/uL.
- 2.Serum creatinine ≥ 1.1 mg/L or a doubling of the serum creatinine concentration in the absence of other renal disease.
- 3.Impaired liver function, elevated blood concentrations of liver transaminases to twice normal concentration.
- 4.Pulmonary oedema.
- 5.Cerebral or visual disturbances.

METHODS

1. We identified aspect of best practice on management of cases with preeclampsia. This practice depends on evidence based medicine, according to (ACOG, 2013) recommendations

2. Data of the cases were collected from obstetric archive and then recorded in special check list sheet

3. Data was analyzed. Compared (the actual practice) with guidelines (ideal practice) and the gap of defect was identified as regard to the ideal practice.

Statistical analysis

The collected data were statistically analyzed using the Statistics Package for Social Sciences (SPSS) version, 21 and results were expressed as number (%). Comparison between categorical data was performed using Chi square test. The difference was considered to be statistically significant if P< 0.05.

The study was approved by the Ethics Board of Al-Azhar University.

RESULTS

About 33% of studied cases developed featured of severe pre-eclampsia. Vaginal delivery was only in 31.4% of cases. The clinical audit was nearly adherence to standards of mild pre-eclampsia management but was very poor in asking about symptoms of severe disease only obtained for 7.4% of cases, family history was neglected completely, lower limb examination was fairly done in 60.2% of cases, pelvic examination was done in 74.1% of cases and no case had chest or heart examination. 24 hours protein collection and protein creatinine ratio were not done. Only 9.3% of cases were assessed and managed by consultants and 90.7% of cases were assessed and managed by obstetric specialists. Only 13.9% of cases were assessed and managed by anesthetic specialist. Umbilical artery Doppler U/S was for 9.8% of cases

Table (1): History taking for studied group versus guidelines in management of mild pre-eclampsia

Audit criteria	Women’s in obstetrics & gyneco department No (108)				Guidelines vs. Sohag General Hospital
	Yes	%	No	%	P-value
Personal history	108	100	0	0	
Menstrual history	108	100	0	0	
Obstetric history	108	100	0	0	
Past history	108	100	0	0	
Present history: symptoms of organs involvement (headache, vomiting and epigastric pain)	8	7.4	100	92.6	0.0001*
Family history	0	0	108	100	

* High significant.

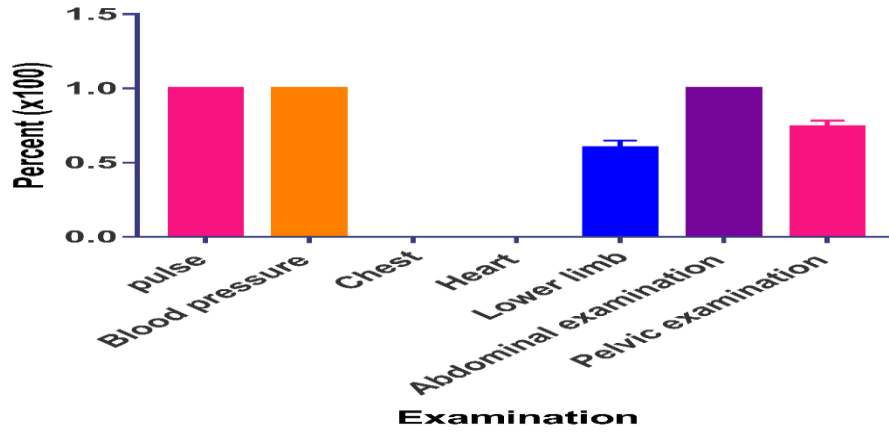


Figure (1): Adherence to audit standards regarding examination for maternal assessment for studied group

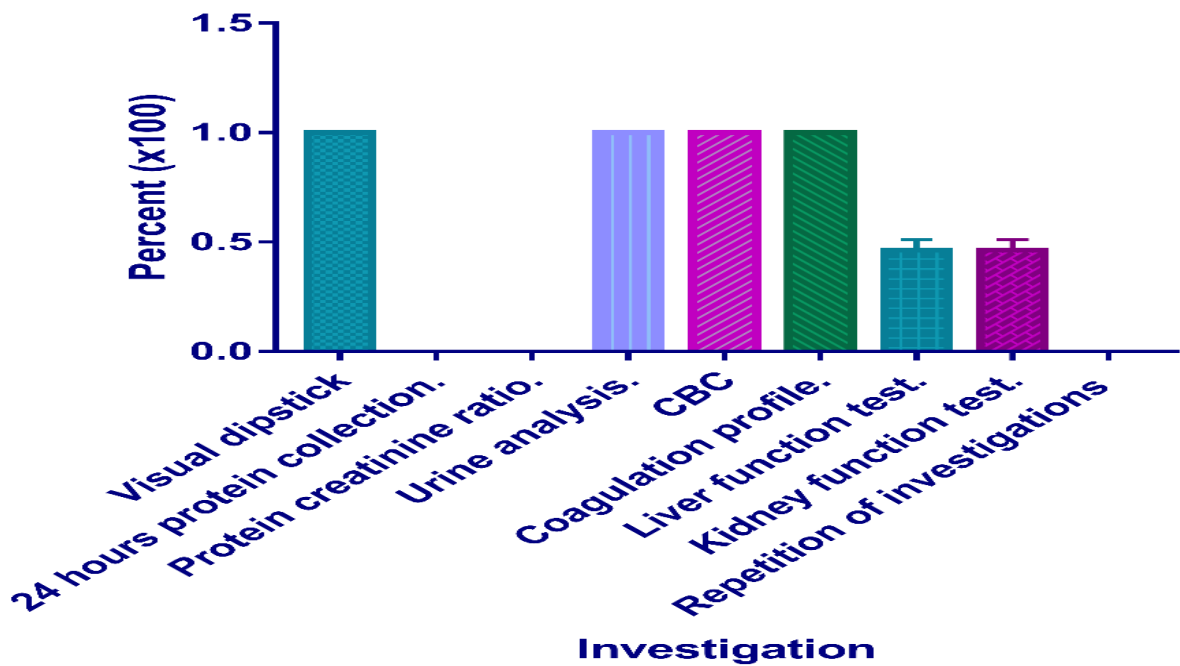


Figure (2): Adherence to audit standards regarding investigations for maternal assessment for studied group.

Table (2): Personnel involved in assessment and management for studied group versus guidelines in management of mild pre-eclampsia.

Audit criteria	women's in obstetrics & gynecology department No (108)				Guidelines vs. Sohag General Hospital
	Yes	%	No	%	P-value
Assessment and management by:					
A) Consultant.	10	9.3	98	90.7	0.0001
B) Specialist.	98	90.7	10	9.3	0.0001
C) Senior resident.	0	0	108	100	
D) Junior resident.	0	0	108	100	
Evaluation for anesthesia done by:					
A) Consultant.	0	0	108	100	
B) Specialist.	15	13.9	93	86.1	0.0001
C) Senior resident.	93	86.1	15	13.9	0.0001
D) Junior resident.	0	0	108	100	

Table (3): First aid management for studied group versus guidelines in management of severe pre-eclampsia and eclampsia.

Audit criteria	Mild pre-eclampsia patients turned to Sever features and eclampsia. No (36)			
	Yes	%	No	%
Keeping the patient in dark and quit room.	36	100	0	0
Inserting wide bore IV cannula.	36	100	0	0
Inserting Foley catheter to monitor urine output.	36	100	0	0
Starting the loading dos of MgSO4 4-6 gm diluted in 200 ml IV fluid solution over 5-10 minutes	36	100	0	0

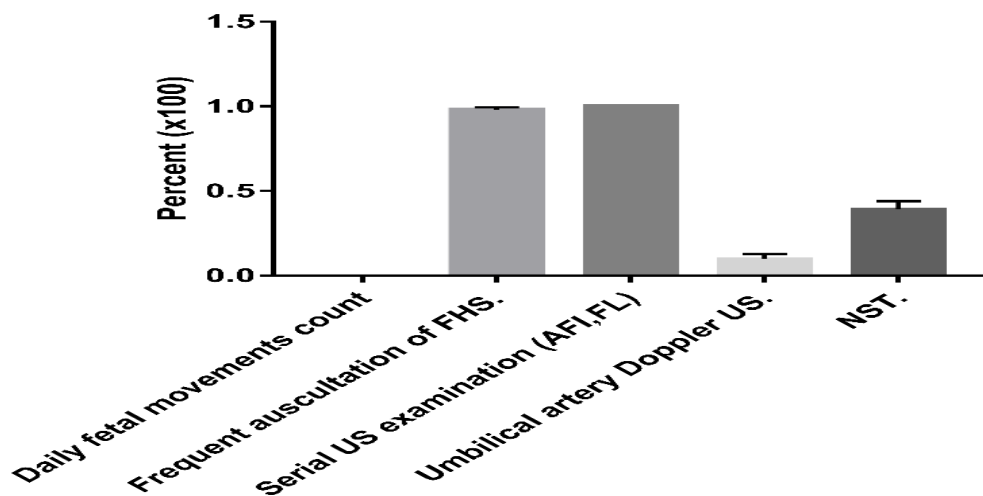


Figure (3): Adherence to audit standards regarding fetal assessment and monitoring for studied group.

Table (4): Maternal management and monitoring for studied group versus guidelines in management of pre-eclampsia

Audit criteria	women's in obstetrics & gynecology department No (108)				Guidelines vs. Sohag General Hospital
	Yes	%	No	%	P-value
Follow the basic principles of ABC for patients with eclampsia.	6 *	100	0	0	
Monitoring symptoms indicating disease severity.	38	35.2	70	64.8	0.0001
Control of BP by oral drugs if BP < 160/ 100.	72	66.7	36	33.3	0.0001
Control of BP by IV drugs if BP uncontrolled by oral drugs.	0	0	108	100	
Maintenance dose of MgSO4 1 gm/ hr by slow IV drip.	30 **	100	0	0	
Deep tendon reflex every 1 hour.	0	0	30**	100	
Urinary output every 4 hours. **	5	16.7	25	83.3	0.0001
Corticosteroids if GA < 34 weeks. ***	34	70.8	14	29.2	0.0001

* Number of cases with eclampsia was 6 cases.

** Number of cases with severe features was 30 cases.

*** Cases with pre-eclampsia with gestational age < 34 weeks were 48 cases.

Table (5): Management of delivery for studied group versus guidelines in management of pre-eclampsia

Audit criteria	women's in obstetrics & gynecology department No (102) *				Guidelines vs. Sohag General Hospital
	Yes	%	No	%	P-value
The decision of delivery should be made by senior personnel, until the woman is stable and controlled BP.	102	100	0	0	
Mode of birth depends on fetal gestational age, fetal presentation, cervical status, maternal and fetal condition.	80	78.4	22	21.6	0.0001
Continuous electronic fetal monitoring for patient in labor.	32 **	100	0	0	
No Ergometrine for management of 3 rd stage of labor.	30**	100	0	0	
Epidural or spinal anesthesia preferred over general anesthesia in case of CS. ***	60	85.7	10	14.3	0.0009
Attendance of pediatrician.	52	51	50	49	0.05

* Number of cases was 102 because 6 cases were postpartum eclampsia.

** Number of women's in labor was 32 cases.

*** Number of cases delivered by cesarean section was 70 cases.

Table (6): Postpartum management for studied group versus guidelines in management of pre-eclampsia.

Audit criteria	women's in obstetrics & gynecology department No (102) *				Guidelines vs. Sohag General Hospital
	Yes	%	No	%	P-value
After delivery, the woman must remain on delivery suite for at least 8 hours.	102	100	0	0	
The decision to transfer the patient to the ward done by senior personnel.	102	100	0	0	
Follow up clinical signs& symptoms.	102	100	0	0	
Continued antihypertensive drugs as indicated by BP.	102	100	0	0	
Continue fluid balance chart.	102	100	0	0	
Review of investigations.	80	78.4	22	21.6	0.0001
Stay in the hospital for 72 – 96 hours postnatal.	10	9.8	92	90.2	0.0001

* Number of cases was 102 because 6 cases were postpartum eclampsia.

Table (7): Discharge and follow up for studied group versus guidelines in management of pre-eclampsia.

Audit criteria	women's in obstetrics & gynecology department No (102) *			
	Yes	%	No	%
Patient must be given formal postnatal review to discuss all events of pregnancy.	0	0	102	100
Instructions to the patients for follow up (BP daily for 1 st week, 6 weeks postnatal assessment of BP and proteinuria.	0	0	102	100

* Number of cases was 102 because 6 cases were postpartum eclampsia.

DISCUSSION

Clinical audit was defined as the critical and systematic analysis of the medical care quality, involving the methods that used for diagnosis and treatment, as regard to available resources and the resulting patient health outcome beside his quality of life ^[8]. Clinical audits use some criteria for assessment but not implicit judgments beside can permit numerical comparison of actual practice patterns versus these criteria ^[9]. The key component of clinical audit is that performance is reviewed to ensure that what should be done is being done, and if not it provides a framework to enable improvements to made ^[10]. Audit of obstetric care has become routine practice in many western countries but is slowly adopted in a number of developing countries. In developing countries there is so far little documented experience with audits of medical care, not only obstetric care. As developing countries face a number of constraints that may prevent the successful implementation of the audit ^[11]. Suboptimal care had been identified as one of the risk factors for maternal mortality ^[12]. This study evaluates the hospital care of patients with mild pre-eclampsia in a low income country and revealed several suboptimal factors that must be corrected in order to improve maternal and fetal outcomes. When we discuss management of mild preeclampsia in Sohag General Hospital and compare it with guidelines, as regard to history taking, most of items were fulfilled, with poor inquiring about symptoms of severe features of the disease that was obtained in only 7.4 % of cases, so that carry risk of misdiagnose of severe pre-eclampsia. Family history was neglected completely (table 1). As regard to examination, chest and Heart examinations were not done to any case; lower limb examination was fairly done for 60.2 % of cases. Pelvic examination was done in 74.1 % of cases which was considered fairly adherent to standard audit (figure 1). As regard to Investigations, proteinuria using Dipsticks was done to all cases but assessment of 24 hours proteinuria was not done that represents the more accurate for diagnosis and protein / creatinine ratio was not used. Complete blood count and coagulation profile were done to all cases. Kidney and liver function tests were done to 46.3 % of cases. As regard the diagnosis of cases of pre-eclampsia at the reception unit, was depended on BP level and proteinuria only (figure 2). Only 9.3 % of cases of pre-eclampsia with mild features were assessed and managed by obstetric consultants, 90.7% were assessed and managed by

obstetric specialist and only. 13.9% of cases were assessed and managed by anesthetic specialist and 86.1 % of cases were assessed and management by anesthetic senior residents, these results were poorly adherent to pre-set standard of care (table 2). These results came in a degree lower than many studied had been done in developing countries as that reported by *Olufemiwa et al.* in a Nigerian Teaching Hospital ^[13]. The first aid management of pre-eclampsia with severe features and cases with eclampsia had met the guidelines (table 3) these results agreed with what had been reported by *Olufemiwa et al.* ^[13]. As regard to fetal assessment and monitoring: Daily fetal movements count not done to any case, frequent fetal heart sound auscultation: this done to 98.1 % of cases, serial ultrasound (U/S) examination (amniotic fluid index and femur length): all cases initially evaluated by U/S at the emergency unit to confirm fetal viability, assess AFI and gestational age, umbilical artery Doppler U/S done only to 9.8 % of cases, non-stress test (NST) was done to 39.2 % of cases but biophysical profile was not done to any case (figure 3). Monitoring of symptoms indicating disease severity done only to 35.2% of cases, control of hypertension and seizure prophylaxis were done for all cases who developed severe pre-eclampsia and eclampsia with MgSO₄, clinical monitoring for detection of MgSO₄ toxicity was not done, urinary output every 4 hours was assessed only in 16.7 % of cases and as regard to fetal maturation: corticosteroids for promotion of fetal lung maturation was administered in 70.8% of cases with pre-eclampsia with gestational age < 34 weeks (table 4) and these results agreed with what had been reported by *Olufemiwa et al.* ^[13]. As regard to management of delivery: The decision of delivery was taken when women were stable, BP control was achieved and appropriate senior personnel was present, even for fetal concerns and this was done to all cases. Mode of birth depended on fetal gestational age, fetal presentation, and cervical status, maternal and fetal condition: this done to 78.4 % of cases and this higher than what had been reported by *Thaddeus* ^[14].

Continuous electronic fetal monitoring for patient in labor: this was done to 100 % of cases. Spinal anesthesia was the main method of anesthesia; this was in 85.7 % of cases, which is highly significant. Attendance of pediatrician was in 51 % of cases (table 5). It is recommended that, an intensive care unit (ICU) with standard facilities and off course optimal staffing strength must be established within the hospital maternity unit because eclampsia was the first obstetric diagnosis

for ICU admission [15] and [16]. After delivery, the woman remained on delivery suite for at least 8 hours, this done to all cases. The decision to transfer the patient to the ward was done by senior personnel. Follow up and continued antihypertensive drugs were done for all cases. Repetition of investigations until patients improved was done in 78.4 % of cases. Only 9.8 % of cases had stayed in hospital for 72 – 96 hours postnatal (table 6). Post-operative care fairly adherent to standard parameters but as regard to patient follow up weekly till 6 weeks post-delivery was not done to any patient (table 7). So improvement of hospital health services must include infrastructural services as power supply, sterilization, drugs and ICU available for 24 hours, also medical staffs, nurses and midwives must be present and trained and prepared for emergency in the same time accessory services as investigation laboratory and blood banks should be ready and working efficiently all the time to help best management of emergency cases.

CONCLUSION AND RECOMMENDATIONS

- 1) Most obstetricians reported pre-eclampsia and eclampsia are one of the major causes of maternal mortality. So the perfect management of these diseases can save many women lives.
- 2) Accesses to prenatal care, early detection and diagnosis of pre-eclampsia, well monitoring and suitable management are crucial elements in the pre-eclampsia prevention.
- 3) It is not possible to achieve a major change in outcome of pre-eclampsia unless the primary care providers play their role of early detection of pre-eclampsia, provide first aid and prompt refer to higher centers for definite management.
- 4) This study addressed the gap between the actual management of pre-eclampsia at Sohag General Hospital and the ideal management.
- 5) Audit can be a useful tool to measure, improve and monitor the quality of day-to-day obstetric practice.
- 6) Clinical audit is not just a data collection exercise; it involves measuring current patient care and outcome against explicit audit criteria.
- 7) Potential areas for further improvement in quality of care for management of cases with pre-eclampsia related to standardizing management guidelines, greater involvement of specialists in management of pre-eclampsia and continued medical education on current management of preeclampsia for junior staff.

REFERENCES

1. **Eiland E, Nzerue C and Faulkner M (2012):** Preeclampsia 2012. *Journal of pregnancy*, 2012: 1-7.
2. **Al-Jameil N, Khan F, Tabassum H (2014):** A brief overview of pre-eclampsia. *Journal of clinical medicine research*, 6(1): 1-5
3. **Okonofua F, Abejide A, Makanjuola R (1994):** Maternal mortality in Ile-Ife, Nigeria: A study of risk factors. *Stud Fam Plann.*, 23:319-324.
4. **ACOG (2013):** Hypertension in pregnancy. Report of the American College of Obstetricians and Gynecologists' task force on hypertension in pregnancy. *Obstetrics and gynecology*, 122(5): 1122-1129.
5. **Kaul A, Thlaganathan B and Rahman T (2014):** "PREGNANCY ASSOCIATED HEPATOBIILIARY DYSFUNCTION." *Fetal and Maternal Medicine Review*, 25(3-4): 318-331.
6. **Symonds E, Symonds I and Arulkumaran S (2013):** *Essential Obstetrics and Gynaecology eBook* ISBN 9780702056864 5th edition, Elsevier Health Sciences.
7. **Novo A, Ridanović Z and Marić V (2005):** Clinical audit as method of quality improvement of healthcare in patients with diabetes, stroke and in cesarean section. *Medicinski arhiv.*, 60(3): 185-189.
8. **Maresh M (1994):** *Audit in obstetrics and gynaecology.* Oxford, Blackwell Scientific Publications.
9. **Shaw CD (1990):** Criterion based audit: *BMJ.*, 300: 649-651.
10. **Duncan T, and Leng G (2014):** NICE's work towards a national clinical audit results database. *BMJ* ., 348: 23.
11. **Say L, Souza J and Pattinson R (2009):** "Maternal near miss—towards a standard tool for monitoring quality of maternal health care." *Best Practice & Research Clinical Obstetrics & Gynaecology*, 23(3): 287-296.
12. **Okonofua FE, Abejide A, Makanjuola RA (1992):** Maternal mortality in Ile-Ife, Nigeria: A study of risk factors. *Stud Fam Plann.*, 23:319-324.
13. **Olufemiwa N, Kayode O, Abimbola S et al. (2014):** Criteria based audit of the management of severe pre-eclampsia/eclampsia in a Nigerian Teaching Hospital. *Trop J Obstet Gynaecol.*, 31 (1);57-65.
14. **Thaddeus S, Maine D (1994):** Too far to walk. Maternal mortality in context. *Soc Sci and Med.*, 38; 109-110.
15. **Faponle AF, Adenekan AT (2011):** Obstetric admissions into the Intensive Care Unit in a sub- urban university teaching hospital. *NJOG* ., 6 (2): 33-36.
16. **Kebede S, Abebe Y, Wolde M, Bekele B, Mantopolous J, Bradley E (2010):** Educating leaders in hospital management: a new model in Sub- Saharan Africa, *Int J Qual Health Care*;, 22(1), 39-43.