**ORIGINAL ARTICLE**

**Maternal and perinatal outcomes of pregnancies complicated by eclampsia at Tikur**

**Anbessa Hospital - A five year retrospective study**

**1Anbesse Jima, 2 Eyasu Mesfin**

**Abstract**

**Introduction:** *Eclampsia is an important and mostly preventable cause of maternal and perinatal morbidity and mortal- ity. Its incidence varies from 4 - 6 cases per 10,000 live births in developed countries to 6 - 100 cases per 10,000 live births in developing countries. Maternal complications occur in up to 70% of women with Eclampsia.*

**Objective:** *To describe perinatal and maternal outcome of eclampsia in Tikur Anbessa Hospital and explore avoidable factors contributing to the adverse outcome.*

**Methods:** *A hospital – based retrospective, cross sectional study of all eclamptic mothers admitted to Tikur Anbessa Hos- pital (TAH) in the time period of Meskerem 1, 1996 - Nehase 30, 2000 E.C. The main outcome measures were mater- nal and perinatal mortality & morbidities from Eclampsia.*

**Results***: During the study period, there were a total of 13,606 deliveries in TAH, of which 78 were eclamptic mothers making a prevalence of 5.7/1000 deliveries. Majority of convulsions (94.37%) occurred during the antepartum period. Aspiration pneumonia was the commonest maternal complication (34.3%), followed by HELLP syndrome (15.8%). The case fatality of Eclampsia in this study was 11.9% (8/67). And of total 71 babies, 20 (28.2%) of them were still births and four (5.6%) were ENND, making a perinatal mortality rate 338/1000 deliveries.*

**Conclusions and recommendations:** *Eclampsia is still a common complication of pregnancy and one of the im- portant causes of maternal and perinatal mortality in our set up. Further study on the subject preferably prospective with larger sample size is recommended to further assess the condition and improve its generalizability.* **(Ethiopian Journal of Reproductive Health, 2014, Volume 7(1), 22-30).**

1&2 Department of Obstetrics and Gynecology, School of Medicine, AAU, Addis Ababa

**Introduction**

Eclampsia, defined as occurrence of seizures dur- ing pregnancy or within 10 days of delivery in a setting of pre eclampsia, remains to be a leading cause of maternal and perinatal morbidity and mortality (1). The incidence of eclampsia has been relatively stable at 4 to 6 cases per 10,000 live births in developed countries. In developing coun- tries, however, the incidence varies widely: from 6 to 100 cases per 10,000 live births (1). An eclamp- tic seizure occurs in approximately 0.5 percent of mildly preeclamptic women and 2-3 percent of severely pre-eclamptic women (2). According to World Health Statistics 2012 released by the World Health Organization: every year some 287

000 women die of complications during pregnancy or childbirth globally, 18% of these maternal deaths are due to hypertensive disorders of preg- nancy, particularly eclampsia (3).

About a century ago eclampsia was a major cause of maternal mortality in developed countries. The steep decline in case fatality rate in these countries is mainly due to better perinatal care; effective treatment of pregnancy induced hypertension and rigorous assessment with early intervention. Mater- nal complications occur in up to 70% of women with eclampsia and include abruptio placenta, dis- seminated intra vascular coagulopathy, acute renal failure, hepatocellular injury, intracranial hemor- rhage, aspiration pneumonia, acute pulmonary edema, and postpartum hemorrhage (4). Brain damage from hemorrhage or ischemia may result in permanent neurologic sequelae and is the most common cause of death in eclamptic women (5,

6).

Eclampsia is also associated with high rates of pre- term delivery, intrauterine growth restriction and perinatal death (4). Perinatal mortality ranges from

9 to 23 percent and is closely related to GA (7, 8). Premature delivery, abruption placenta, and intra- uterine asphyxia are the primary causes of perina- tal death in eclamptic pregnancies.

In a retrospective study done in Sudan, Gadarif Hospital from March 2007 to April 2009, the prev- alence of Eclampsia was 5/1,000 (45 / 8,894 deliv- eries). About 62% of first convulsions occurred antepartum, 15.5% occurred intrapartum, and the rest (11.1%) occurred postpartum (9). In Ethiopia, the literature on this subject is scarce. A study done by Jackson at Princes Tsehai Memorial Hos- pital (1966-1969); the prevalence of eclampsia was

3.3 per 1,000 deliveries (35 / 10,704 deliveries). Two studies done by Mekbib T. in Yekatit 12 hos- pital and Misganaw A. & Zufan L in two teaching hospitals in Addis Ababa (Oct 1994-sept 1999) reported incidences of 3.1/1000 and 7.1/1000 (257/35,741) deliveries respectively (10,11,12). Maternal mortality rates of 0 to 14 percent have been reported in eclamptic women (5,6, 13). Ma- ternal mortality and severe morbidity rates are low- est in developed western society. In evaluation of

245 cases, at the Parkland Memorial Hospital, there was only one maternal death (0.4%) (13). In a 5 – year review of maternal mortality associated with eclampsia in a tertiary institution northern Nigeria, case fatality rate was 22.3% (52 deaths /

225 eclamptic cases) (14). In a pregnancy outcome evaluation of 791 eclamptic cases in Vijayanagar Indian hospital 43(5.4%) mothers died (15). In the study done in Sudan, the maternal case fatality rate was 22.2% (10/45 cases) (9).

In Ethiopia, Jackson 34 years back reported a ma- ternal case fatality rate from Eclampsia of 17.1% (6 / 35 cases) (10). The 5 years retrospective review of Misganaw A. and Zufan L. reported case fatality rate of 13%. Eighty – four women (38.9%) had antenatal care, 157 (72.7%) were nuliparas and 69 (31.8%) were aged below 20years. Convulsions occurred ante-partum in 133(61.6%), intrapartum in 49 (22.7%) and postpartum in 34 (15.7%) mothers. Ninety nine (45.8%) women in this study were delivered by cesarean section (12).

Perinatal out come in eclampsia is closely related to GA. In a 12 years review of 254 cases of eclamp- sia in Tennessee University, the total perinatal mortality was 11.8%. The majority of deaths were related to either abruption of placenta or extreme prematurity. The cesarean delivery rate in this study was 49% (124/263), commonest indication being fetal distress (13).

In Ethiopian 5 year retrospective review of 216 cases managed in two teaching hospitals, of total

221 fetuses delivered, 197 single and 12 sets as twin, there were 44 still births and 25 early neona- tal deaths, making gross perinatal mortality rate

312.2/1000 and the corrected perinatal mortality rate of 244.4/1000 deliveries (15 fetuses with weight <1000gms excluded) (12).

The general objective of this study is to describe perinatal and maternal outcome of eclampsia in Tikur Anbessa Hospital and explore avoidable fac- tors contributing to the adverse outcome.

Risk of eclampsia appears to be reduced by close maternal monitoring and timely intervention. The purpose of this study is to assess the magnitude of the problem, possible risk factors and causes of maternal and perinatal deaths in the index preg- nancy. The results of this study may benefit wom- en at risk of developing eclampsia and involved health professionals.

**Methods**

This is a hospital – based retrospective, cross sec- tional descriptive study of all eclamptic mothers admitted to maternity wards and surgical ICU of Tikur Anbessa hospital in the time period of Mes- kerem 1, 1996 - Nehase 30, 2000 E.C. Tikur Anbessa Hospital is a specialized central referral and teaching Hospital in Addis Ababa, Ethiopia. Data were collected by trained data collectors us- ing a structured data collection format designed for the study and prepared in English language.

The department’s patient registry and log books of the hospital were used to identify target study cases (eclamptic mothers and their neonates) and re- trieve their cards. Data were cleared prior to entry and data analysis was made using SPSS version 15 soft ware. Ethical clearance was obtained from the research and publication committee of the depart- ment of Obstetrics & Gynecology and IRB of Ad- dis Ababa University.

**Results**

During the study period from Meskerem 1, 1996 – Nehase 30,2000E.C, there were a total of 13,606 deliveries in TAH, of which 78 were eclamptic mothers making a prevalence of 5.7/1000 deliver- ies. Eleven cases were excluded because of incom- plete record. There were a total of 71 newborns with 8 (11.3%) of them being twins. Most of the eclamptic mothers were in the age group of 20 to

24 years (38.8%), followed by age group of 25 to

29 years (35.8%). Majority of them, 74.6% (50/67), were married. Forty eight (72.5%) of the

63 mothers were from Addis and the rest 19 (28.4%) were from outside Addis. Most of the mothers were primigravidas which accounted for

77.6% (52/67) of cases. Most of the mothers,

73.1% (49/67) had ANC follow up.

Gestational age at the time of convulsion was not known in the majority, 64% (43/67), of the cases while preterm, term and post term cases account for 22% (15/67), 10% (7/67) and 3% (2/67) re- spectively. Majority of convulsions (94.37%) oc- curred during the antepartum period while intra- partum and postpartum periods each account only

2.8 % as times for onset of convulsions.

Forty five (67.2%) of the mothers delivered by ce- sarean section, making it the commonest mode of delivery. The other modes of delivery include in- strumental followed by spontaneous vaginal deliv- ery, hysterotomy and craniotomy with percentage distributions of 18.8% (12/67), 10.5% (7/67),

3.9% (2/67) and 1.5% (1/67) respectively.

Fetal distress was the commonest indication for cesarean section accounting for 33.3% (15/45) indications followed by failed induction, extreme prematurity with unfavorable cervix and others accounting for 26.7% (12/45), 22.2% (10/45) and

17.8% (8/45) respectively.

Aspiration pneumonia was the commonest mater- nal complication (34.3%), followed by HELLP syn- drome (15.8%). Eight (12.8%) of the mothers died making the case fatality of Eclampsia in this study to be 11.9% (8/67) (See Table -1 below).

**Table 1:- Frequency distribution of maternal outcomes of eclamptic mothers at TAH, Meskerem 1, 1996- Nehase 30, 2000 E.C**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Number** | **Percent** |
| Aspiration pneumonia | 23 | 34.3 |
| Pulmonary edema | 7 | 10.5 |
| PPH | 2 | 3.9 |
| ARF | 7 | 10.5 |
| HELLP | 10 | 15.8 |
| Neurologic complication | 7 | 10.5 |
| Maternal death | 8 | 12.8 |

Table 2 below, summarizes adjusted case fatality rates by socio demographic characteristics of the eclamptic mothers. The highest case fatality, 20 % (1/5), was in mothers of older than 35 years. And the lowest case fatality rate, was in the age category of 30 to 34 years in which none of the eclamptic

mothers died.

Those eclamptic mothers referred from outside Addis had the highest case fatality (26.3%). Grand multiparas had the highest case fatality among par- ity category groups (20%), followed by primigravi- das with case fatality rate of 13.5%.

**Table -2: Adjusted case fatality rate by socio demographic characteristics of eclamptic mothers in TAH, Meskerem 1, 1996-Nehase 30, 2000 E.C**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Cases of Eclampsi**  **No** | **a**  **%** | **Number**  **of death** | **Case fatality (%)** |
| Maternal age in years |  |  |  |  |
| 15-19 | 8 | 11.9 | 1 | 12.5 |
| 20-24 | 26 | 38.8 | 2 | 7.7 |
| 25-29 | 24 | 35.8 | 4 | 16.7 |
| 30-34 | 4 | 6.8 | 0 | 0 |
| >=35 | 5 | 7.5 | 1 | 20 |
| Total | 67 | 100 | 8 | - |
| Marital status |  |  |  |  |
| Married | 50 | 74.6 | 5 | 10 |
| Divorced | 2 | 3.9 | 0 | 0 |
| Single | 6 | 9.9 | 1 | 16.7 |
| Widowed | 2 | 3.9 | 0 | 0 |
| unknown | 7 | 10.5 | 2 | 28.6 |
| Total | 67 | 100 | 8 | - |
| Address |  |  |  |  |
| Addis | 48 | 72.5 | 3 | 6.2 |
| Outside Addis | 19 | 28.4 | 5 | 26.3 |
| Total | 67 | 100 | 8 | - |
| Parity |  |  |  |  |
| 0 | 52 | 77.6 | 7 | 13.5 |
| 1-4 | 10 | 15.8 | 0 | 0 |
| ≥5 | 5 | 7.5 | 1 | 20 |
| Total | 67 | 100 | 8 | - |
| ANC |  |  |  |  |
| No | 17 | 25.4 | 4 | 23.5 |
| Yes | 49 | 73.1 | 3 | 6.1 |
| Unknown | 5 | 7.5 | 1 | 20 |

Total 67 100 8 - 25

Mothers with unknown GA had the highest GA adjusted case fatality rate (14.9%), followed by those with GA less than 34 weeks (12.8%) and term gestation respectively (14.3%). Those moth- ers with GA between 34 to 36 weeks and post term gestation had the least adjusted case fatality rate (0 %). Fetal heart status was found to have significant association with maternal mortality at significance level of 0.004. Both aspiration pneu- monia and SBP were also found to have significant

association with significance value of 0.001 each.

But there was no significant association between maternal mortality and factors such as, convulsion delivery interval, number of fits before arrival, anti- convulsant used and onset of convulsion in rela- tion to onset of labor. GA was also found not to be associated with maternal mortality on fisher’s exact test. There was also statistically significant associa- tion between maternal death with pulmonary ede- ma and maternal neurologic complication (See Table -3).

**Table 3: Comparison analysis of selected medical characteristics of eclamptic mothers by maternal death at**

**TAH, Meskerem 1, 1996-Nehase 30, 2000 E.C**

**Variables Characteristics Maternal death Exact significance**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | **No** | **%** |  |
| **Convulsion delivery interval** | <5hr | 1 | 11.1 | **0.516** |
|  | 5-10 | 0 | 0 |  |
|  | 11-15 | 0 | 0 |  |
|  | 16-20 | 2 | 22.2 |  |
|  | >20hrs | 4 | 14.3 |  |
|  | Unknown | 1 | 20 |  |
| **No of fits before arrival** | none | 1 | 9.1 | **0.968** |
|  | 1-4 | 5 | 17.2 |  |
|  | 5-10 | 2 | 11.1 |  |
|  | >10 | 0 | 0 |  |
|  | Unknown | 0 | 0 |  |
| **Anticonvulsant used** | MgSo4 | 2 | 16.7 | **0.800** |
|  | diazepam | 6 | 12 |  |
|  | MgSo4&diazepam | 0 | 0 |  |
| **ANC follow-up** | No | 4 | 25 | **0.073** |
|  | Yes | 3 | 6.5 |  |
|  | unknown | 1 | 20 |  |
| **FHB** | Positive | 3 | 5.5 | **0.004** |
|  | negative | 5 | 41.7 |  |
| **Aspiration pneumonia** | Yes | 7 | 30.4 | **0.001** |
|  | No | 1 | 2.1 |  |
| **Time of convulsion** | Antepartum | 7 | 11.1 | **0.387** |
|  | Intrapartum | 1 | 50 |  |
|  | Postpartum | 0 | 0 |  |
| **SBP** | 140-150 | 5 | 62.5 | **0.001** |
|  | 160-179 | 2 | 4.6 |  |
|  | >180 | 1 | 6.7 |  |
| **DBP** | 90-99 | 0 | 0 | **0.460** |
|  | 100-109 | 3 | 17.6 |  |
|  | >=110 | 5 | 9.4 |  |
| **GA** | <34 | 1 | 11.1 | **0.942** |
|  | 34-36 | 0 | 0 |  |
|  | Term | 1 | 12.5 |  |
|  | Post term | 0 | 0 |  |
|  | Unknown GA | 6 | 13.3 |  |
| Neurologic complica- tion | Yes | 4 | 57.1 | **0.002** |
|  | No | 4 | 6.7 |  |
| Pulmonary edema | Yes | 3 | 5 | **0.03** |
|  | No | 5 | 8.3 |  |

**Perinatal outcome:** Most of the neonates born to the eclamptic mothers, 71.8% (51/71), were live at birth while 28.2% (20/71) were still born. Out of

32 neonates admitted to NICU, 87.5% (28/32) were discharged alive making the overall propor- tion of live neonates on discharge and ENNDs to be 66.2% (47/71) and 5.6% (4/71) respectively. Prematurity was the cause of death in the 3

ENND’s and the forth one was stated due to

MAS.

Mode of delivery and birth weight were significant- ly associated with perinatal mortality on Fisher’s exact test with significance value of 0.004 and 0.03 respectively. There was no significant association of perinatal mortality with variables such as type of eclampsia, GA, BP level and level of urine protein (See Table -4 below).

**Table 4: Incidence of perinatal death stratified by predisposing factors at TAH, Meskerem 1,**

**1996-Nehase 30, 2000 E.C**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variables | Characteristics | Cases | Perinatal death | Percentage | Fisher exact significance |
| **Type of eclamp-** | Antepartum | 67 | 24 | 35.8 | **0.399** |
| **sia** | Intrapartum | 2 | 0 | 0 |  |
|  | postpartum | 2 | 0 | 0 |  |
| **Gestational age** | <34 | 9 | 4 | 44.4 | **0.864** |
|  | 34-36 | 7 | 2 | 28.6 |  |
|  | Term | 8 | 2 | 25 |  |
|  | Post term | 2 | 0 | 0 |  |
|  | Unknown GA | 45 | 16 | 35.6 |  |
| **SBP** | 140-159 | 9 | 3 | 33.3 | **0.708** |
|  | 160-179 | 46 | 17 | 37 |  |
|  | >=180 | 16 | 4 | 25 |  |
| **DBP** | 90-99 | 1 | 0 | 0 | **1** |
|  | 100-109 | 17 | 6 | 35.3 |  |
|  | >110 | 53 | 18 | 34 |  |
| **Urine protein** | NIL | 14 | 5 | 35.7 | **0.792** |
|  | <2+ | 38 | 14 | 36.8 |  |
|  | >=2+ | 19 | 5 | 26.3 |  |
| **Mode of deliv-** | Non instrumental | 8 | 6 | 75 | **0.004** |
| **ery** | Instrumental | 12 | 4 | 33.3 |  |
|  | Craniotomy | 1 | 1 | 100 |  |
|  | C/S | 48 | 11 | 22.9 |  |
|  | Hysterotomy | 2 | 2 | 100 |  |
| **Birth weight** | <1000 | 3 | 3 | 100 | **0.03** |
|  | 1000-1499 | 9 | 6 | 66.7 |  |
|  | 1500-1999 | 14 | 4 | 28.6 |  |
|  | 2000-2499 | 22 | 6 | 27.3 |  |
|  | 2500-2999 | 14 | 2 | 14.3 |  |
|  | 3000-3499 | 8 | 3 | 37.5 |  |
|  | >=3500 | 1 | 0 | 0 |  |

In addition, multiple logistic regressions were done for those variables significantly associated with PNM on Fisher’s exact test.

And, only two of them (birth weight and sex of the neonate) were found to have significant influence on PNM rate (p value<0.05 for both) (See Table -5

below).

**Table 5:- Multiple logistic regression analysis comparing predisposing factors and perinatal mortality in eclamptic mothers at TAH, Meskerem 1, 1996 - Nehase 30, 2000 E.C**

**Variables Beta P- value**

|  |  |  |
| --- | --- | --- |
| Mode of delivery | -0.449 | 0.096 |
| Birth weight | -0.725 | 0.005 |
| ANC follow up | -0.222 | 0.700 |
| Sex of neonate | -1.229 | 0.043 |
| constant | 3.119 | 0.010 |

**Discussion**

The prevalence of eclampsia in this study,

5.7/1000 deliveries, is comparable with that of most developing countries, which is 6 to100 cases per 10,000 live births and even higher in some countries (16). The prevalence is less than the one reported by Misganaw A. and Zufan L (12) which was 7.1/1000 deliveries & higher than the

3.3/1000 and 3.1/1000 deliveries prevalences re- ported by studies of Jackson and Mekbib T respec- tively (10,11).

Fifty two (77.6%) of the cases were nuliparas which is comparable to the 72.7% in Misganaw A. study. Majority were booked (69%) unlike the Mis- ganaw A. study in which majority were (61.1%) unbooked. This may be due to the fact that Saint Paul’s Referral Hospital included in Misganaw A. study which has much higher cases from country- side. Majority were married (78.1%) and so are those in Misganaw A. study (61.9%).

Maternal age adjusted case fatality rate was highest in age group of 35 or more years (20%), and this is similar to the Nigerian study (14). Those mothers referred from outside Addis had higher case fatali- ty than those from Addis. This may be due to the late medical intervention. Grand multiparty had the highest case fatality rate (20%) in this study in contrast to Nulliparity in the Nigerian study (14).

Mothers without ANC follow up had the highest case fatality rate (23.5%), which is similar to most studies (12, 14). Over all Case fatality rate of ec- lampsia in this study was 12.8% which is lower than both studies done in Ethiopian before by Jackson (17.1%) & Misganaw A. (13%) and Nige- rian study (22.3%) (14). But far higher than devel- oped countries (13).

Gestational age was unknown for majority of them at time of convulsion, 43(68.2%). This is in con- trary to the Nigerian study, 67.3% of which were in the GA of 25 to 30 weeks (14). This may be our late ANC initiation and most mothers tend to forget their LMP. The adjusted case fatality rate was also highest in this group with unknown GA (14.9%) in this study.

Most of the patients, 67.2% delivered by C/S in this study, in contrary to Misganaw A. study in which most (54.2%) delivered by vaginal route. This figure is also higher than the 17.3% C/S rate of Nigerian study but similar to the Turkey study (14, 17). The most common indication for C/S was fetal distress (33.3%) in our study but CPD in the Turkey study (17). This increased fetal distress rate in this study may be due to late arrival to the study facility after repeated fits and utero-placental insufficiency.

Aspiration pneumonia was the commonest com- plication in this study 34.3% (23/67), followed by HELLP syndrome, which occurred in 15.8% (10/67) of the cases unlike the Indian and Turkey studies in which pulmonary edema and abruptio placentae rather were the commonest complica- tions respectively. In these studies aspiration pneu- monia was the second most common complication (15,17). Most of the convulsions in this study oc- curred antepartum, which similar to the Indian study (18).

Still births accounted for the majority of perinatal deaths (28.2%), which goes with the Nigerian study (14). Four neonates (5.6%) were ENND &

47(66.2%) were alive on discharge, making perina- tal mortality of 338/1000 deliveries and corrected PMR= 295.8/1000 which is higher than the

244.4/1000 of Misganaw A., but less than the

411/1000 of Nigerian study (12,19).

There was also significant association between mode of delivery and birth weight with perinatal death on fisher’s exact test. Adjusted still birth rate was found to be significantly associated with sex of the neonate and mode of delivery with significance of 0.033 and 0.000 respectively, which is similar to the Nigerian study (14). However, only sex of the neonate and birth weight was found to have signif- icant effect on PNM, with multiple logistic regres-

sions.

SBP was the only factor which affected PNM on multiple logistic regressions of predisposing factors in the Indian study (18). Birth weight of <1000 grams had the highest adjusted case fatality rates which is consistent with most of the studies (20).

**Conclusions**

In conclusion, eclampsia is still a common compli- cation of pregnancy in our set up with a prevalence of 5.7/1000 deliveries, which is comparable with that of most developing countries and more than

10 times higher than that in developed countries. It is also one of the important causes of maternal and perinatal mortality. The high maternal and perinatal case fatality rates in those without ANC follow up and referred from outside Addis implies importance of ANC follow-up and good referral & transfer system. Recognition of danger signs of eclampsia preeclampsia and early referral at com- munity level is also very important.

Further study on the subject preferably prospective with larger sample size is recommended to further assess the condition and improve its generalizabil- ity to the population at large.

The study population is not representative of the general population. Hence outcomes of the study may not be generalizable to the population of the country at large.

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**Author contact**[**: eyasumk@gmail.com**](mailto:eyasumk@gmail.com)

**References**

1. Errol R Norwitz, et al, Eclampsia, Last literature review version. Up-to-date 19.3, January 2011.

2. Baha M Saibai: Magnesium sulphate prophylaxis in preeclampsia. Am. J. obstetrics Gynecology 2004

Jun; 190(6): 1520-6

3. World health organization. World Health Statistics 2012: WHO 2012.

4. World health organization. The hypertensive disorders of pregnancy. Report of WHO study group.

WHO technical report series 758 Geneva: WHO 1987, pp 63-9

5. G.S. Melah, A.A., et al Pregnancy outcome of women with eclampsia in Gombe, Nigeria. Int. J. Gyne and obstet., (2006), 92; 251-252.

6. Okantoma, KA, Moodley, J. neurological complications associated with pre-eclampsia/eclampsia syn- drome. Int. J. gynecologist 2000; 71:223

7. Lopez –Lleram, Main clinical types and sub types of eclampsia. Am. J obstet. Gynecol. 1992 Jan; 166 (1pt1): 4-9

8. Douglas KA; Redman CW Eclampsia in the United Kingdom. BMJ 1994 Nov 25; 309 (6966): 1395-400

9. G.K Adam et al, maternal and perinatal outcome of eclampsia in Gadarif hospital, Sudan. Journal of ob- stetrics and gynecology 2009, vol 29, No 7, pages 619-620.

10. Jackson, A.P eclampsia in Addis Ababa, pattern and treatment. EMJ, 1970; 8:123

11. Mekbib TY and ketsela K., preeclampsia /eclampsia at Yekatit 12 hospital Addis Ababa EAMJ, 1991;

68:893.

12. Misganaw A, Zufan L: Eclampsia a 5 year retrospective review of 216 cases managed in two Teaching Hos- pitals in Addis Ababa. Ethiop. Med J. 2006, Vol 44 No 1.

13. Sibai BM. Clampsia VI. Maternal perinatal outcome in 254 consecutive cases. AM J. Obster. Gynecol.

1990 sept; 163(3); 1049-54; discussion 1054-5.

14. Abubakar Ali Kullima, a 5 year review of Maternal Mortality associated with eclampsia in a tertiary insti- tution in northern Nigeria. Annals of African medicine 2009. Vol 8, issue 2, page 81-84.

15. Gaddi sumans, somegowda, maternal and perinatal outcome in eclampsia in a district hospital. J. obstet.

Gynecol India vol: 57, No 4 July/August 2007.

16. World Health organization International collaborative study of hypertensive disorders of pregnancy. AM.

J obstet. Gynecol. 1988 Jan; 158(1): 80-3.

17. C.E. Taner et al. Prevalence, management and outcome of eclampsia. International Journal of Gynecolo- gy and obstetrics 53(1996)11-15

18. BS. Dhana njay, et al, A. study of factors Affecting perinatal mortality in eclampsia (JPBS 2009; volume

22No 2:2-5

19. Innocent O. George, Israel Jeremiah: Perinatal outcome of babies delivered to eclamptic mothers. A pro- spective study from Nigerian Tertiary Hospital; Int, J Biomed Sci 2009; 5(4):390-394

20. H.A Sharara, S.Y Othman, A review of eclampsia in Qatar international Journal of Gynecology and ob- stetrics 76(20020 177-178.