PERINATAL AND MATERNAL OUTCOME OF PREECLAMPSIA WITH SEVERITY FEATURE MANAGED EXPECTANTLY AT ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE (SPHMMC), 2021, ADDIS ABABA, ETHIOPIA, A CROSS SECTIONAL STUDY

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ABSTRACT

BACKGROUND: Preeclampsia refers to the new onset of hypertension and proteinuria after 20 weeks of gestation in a previously normotensive woman. It is labeled as preeclampsia with severe features when one of the severity signs occurs (1). Worldwide, preeclampsia occurs in up to 7.5 percent of pregnancies.10 - 15 % of direct maternal deaths are associated with preeclampsia and eclampsia.The majority of adverse maternal and perinatal outcome occur in preeclampsia with severe features and when preeclampsia occurs remote from term (1, 2).

OBJECTIVE: The main objective of this study was to determine the maternal and perinatal outcome of preeclampsia with severe features managed expectantly at SPHMMC in one year period.

MATERIALS AND METHODS: A facility based cross-sectional study was conducted. The study participants were selected consecutively by including all mothers admitted during the study period (January 2021 to December 2021 G.C.) with the diagnosis of preeclampsia with severe features to SPHMMC that fulfill the inclusion criteria. Data was obtained from patient charts and a direct patient interview using pre-tested & structured questionnaire. Collected data was entered in to Epi info version 7 and analysis was made through SPSS version 25. Descriptive statistics, tables, and figures were used to describe the study findings.

RESULT: The mean days of prolongation of pregnancy was 11.5 days with slight increment of maternal complication from expected proportion that completely resolved postpartum. The most common maternal complications were HELLP syndrome (15.1%) and abruptio placenta (7.2%). There were 21 perinatal deaths (8 still births and 13 neonatal deaths) that give perinatal mortality rates of 276 per 1000 live births. The rate of NICU admission was 66.7% and the neonatal survival to seventh day was 71.7%.

Only 66(90.4%) of the women were a good candidate for expectant management. Magnesium sulphate and steroid (dexamethasone) at admission was given to100% but 8.2% of the mothers didnot get magnesium sulphate during intrapartum or postpartum period. Among mothers admitted to SPHMMC for the purpose of expectant management 36(49.3%) of them had optimal maternal and fetal monitoring/surveillance in the ward.

CONCLUSION / RECOMMENDATION: Proper selection of pregnant mothers with pre-eclampsia with severity feature and close and frequent maternal and fetal surveillance during expectant management is associated with a good perinatal outcome without significant difference in maternal complication.

KEYWORDS: pre-eclampsia ,perinatal outcome, maternal complication.

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INTRODUCTION

Preeclampsia refers to the new onset of hypertension and proteinuria after 20 weeks of gestation in a previously normotensive woman. It is labeled with severity feature when one of the following conditions occurs : cerebral symptoms (visual disturbance, headache), symptoms of liver capsule distention (Right upper quadrant or epigastric pain),hepatocellular injury(serum transaminase concentration ≥ twice normal), severe blood pressure elevation(systolic blood pressure ≥160 mm Hg or diastolic blood pressure ≥110 mm Hg on two occasions at least four hours apart), thrombocytopenia(<100,000 platelets/microL), or pulmonary edema or cyanosis[1].

Preeclampsia occurs in up to 7.5 percent of pregnancies worldwide[2].Women with preeclampsia are at an increased risk for life-threatening events, including placental abruption, acute renal failure, cerebral hemorrhage, hepatic failure or rupture, pulmonary edema, disseminated intravascular coagulation, and progression to eclampsia(1.2). Abruptio placenta is infrequent (less than 1 percent) in women with preeclampsia without severe features, but has been reported in 3 percent of those with severe disease[3].

Worldwide, 10 to 15 percent of direct maternal deaths are associated with preeclampsia and eclampsia[4]. In the United States, preeclampsia/eclampsia is one of four leading causes of maternal death, along with hemorrhage, cardiovascular conditions, and thromboembolism[5-7]. There is approximately one maternal death due to preeclampsia-eclampsia per 100,000 live births, with a case-fatality rate of 6.4 deaths per 10,000 cases[8, 9].

According to the World Health Organization (WHO) in 2008, hypertensive disorders in pregnancy contributed to 12% of maternal deaths. It is the second most common cause of maternal death, following hemorrhage (accounting for 27%) in developing countries[10].

In Ethiopia, pregnancy and childbirth complications are among the leading causes of mortality among women, with an estimated maternal mortality rate (MMR) of 402per100,000 livebirths in2015 and a neonatal mortality rate of 37 deaths per 1,000 live births[11].

Pre-eclampsia/eclampsia complicated 1.2% of all institutional deliveries in Ethiopia. Given the low institutional delivery rate and an expected incidence of 2% to 8% of all deliveries, this implies that only a small fraction (3.8%) of all women with pre-eclampsia/eclampsia received care at health facilities; 11% of all maternal deaths and 16% of direct maternal deaths were due to this obstetric complication[12].

Women with preeclampsia with severity features are usually delivered promptly to prevent maternal and fetal complications. Since the disease is progressive and there is no medical treatment, delivery is always in the best interest of the mother. However, preterm delivery is not always in the best interest of the fetus; therefore, a decision to delay delivery can be considered under certain circumstances[9].

The rationale for delaying delivery in these pregnancies is to reduce perinatal morbidity and mortality by delivery of a more mature fetus and, to a lesser degree, to achieve a more favorable cervix for vaginal birth. The risk of prolonging pregnancy is worsening maternal endothelial dysfunction and continued poor perfusion of major maternal organs with the potential for severe end organ damage to the brain, liver, kidneys, placenta/fetus, and hematologic and vascular systems[13, 14,15].

Given the fact that our neonatal set up is not well developed, aggressively managing preeclampsia with severity futures at the time of diagnosis will adversely affect the perinatal outcome.Therefore some selected patients who can fulfill the criteria for expectant management are admitted to hospital, despite its risks on the maternal health, by balancing the maturity of fetus. The institutional protocol is to consider expectant management in cases of preeclampsia with severe features less than 34 weeks of gestation and in some selected cases of less than

37 weeks based on individualization using WHO 2011 criteria after appropriate patient selection using maternal and fetal criteria. Since there are no data that evaluate the safety of this management option in our setting , this study will add additional evidence to this management option[16,17]. This study will also be a very important input for developing national management guideline.

METHODS AND MATERIALS

Study design /setting

This is a facility (institution) based cross-sectional study done to assess the maternal and perinatal outcome of preeclampsia with severity features managed expectantly between January 1st, 2021 to December 31st, 2021 at SPHMMC , Addis Ababa, Ethiopia. SPHMMC is one of the national referral and teaching hospitals. The hospital provides services for those referred from all corners of the country. The hospital provides service under different clinical disciplines including obstetrics and pediatrics. The college is peculiar in the country because of its new and integrated modular and hybrid problem-based curriculum. The college has both Obstetrics and Gynaecology postgraduate and fellowship program in different disciplines.

Sample size and sampling procedure

Convenience sampling technique was used to include all pregnant women with the gestational age of 28 completed weeks to 33 weeks plus 6 days, who were admitted with the diagnosis of preeclampsia with severe features to maternity wards of SPHMMC for the purpose of expectant management from January 1st, 2021 to December 31st, 2021.

The study participants were selected consecutively by including all mothers admitted during the study periodthat fulfill the inclusion criteria However, women managed expeditiously (whose pregnancy was terminated with in 48 hrs of admission for any reasons), women admitted with the diagnosis of severe preeclampsia only for completion of corticosteroid,and those women who declined to give consent were excluded.

Data collection tool and procedures

The study was approved by the institutional review board of SPHMMC. Prior to the main study, a 2 days training was given for the data collectors. A standardized, structured pre-tested questionnaire which includes all the necessary variables in accordance with the objective of the study was prepared. The questionnaire has variables on the socio-demographic, obstetric, and maternal and neonatal outcome extracted from the participants and their charts.

Two trained residents filled the socio demographic, obstetric and clinical data. Consistency of filled data was checked by one supervisor every other day. Five percent of the filled data was checked for accuracy by the supervisors.

Data analysis

Collected data was entered in to Epi info version 7 and analysis was made through SPSS version 25.Frequency output and sorting was used to check missing values and outliers. Descriptive statistics, tables,and figures were used to describe the study finding.

Operational definition

- Expectant management of sever preeclampsia- the decision of prolonging the pregnancy beyond 48 hours after completing steroid.
- Candidate for expectant management - A mother with preeclampsia with severity feature after 28weeks of gestation who fulfill the international maternal and fetal criteria for expectant management
- Maternal complications - mother who developed any consequence of preeclampsia with severity feature that leads to termination of the pregnancy
- Good/ optimal follow up - is considered when all of the following are fulfilled: fetal surveillance done daily, CBC and OFT-done every other day, preeclampsia chart filled twice a day, and

kick chart filled daily.
- Suboptimal follow up of the mother is considered when one of the monitoring parameter is filled incompletely
- Good APGAR score – If fifth minute APGAR is greater than seven.

RESULTS

During the study period, 9531 women delivered in SPHMMC. Seventy three mothers with the diagnosis of preeclampsia with severe features between 28 and 34 weeks of gestation were admitted to maternity wards for expectant management. The mean age of the mother at admission was 25.6yrs and 28(40.6%) were primigravida. (Table1).

The mean number of days of pregnancy prolongation was 11.5 days. The days gained were significantly higher among those who had expectant management between 28.1 and 30 weeks (22.2 days), compared with the other two groups—30.1–32 weeks (14 days) and 32.1–34 weeks (7 days). The mean GA at admission calculated from 45 mothers who know their GA was 30.3wks and the mean weight was 1642.8gm.

Table-1. Baseline characteristics of the mothers admitted to SPHMMC for expectant management of preeclampsia with severity features, 2021.

	Numbers	Percentages
Religion		
Orthodox	31	42.5
Muslim	22	30.1
Protestant	18	24.7
Other	2	2.7
Ethnicity		
Amhara	13	17.8
Oromo	37	50.7
Gurage	8	11.0
Tigre	5	6.8
Other	10	13.7
Marital status		
Married	65	89.0
Single	4	5.5
Divorced	3	4.1
Widowed	1	1.4
Place of residence		
Urban	48	65.8
Rural	25	34.2
Educational status		
No formal education	22	30.1
Primary school	32	43.8
Secondary school	16	21.9
Above Secondary school	3	4.1
Occupational status		
Government Employee	11	15.1
Merchant	12	16.4
Daily laborer	5	6.8
House wife	30	41.1
Farmer	7	9.6
Other	8	11.0

Raised blood pressure that required antihypertensive was found in 94.5% of mothers as isolated criteria for admission and in 33.8% of mothers with other severity features, mainly cerebral symptom. (Table 2)

Table-2 Criteria for admission for mothers with preeclampsia with severity features admitted to SPHMMC for expectant management,2021.

	Numbers	Percentages
Raised BP that required antihypertensive	69	94.5
Transient thrombocytopenia	5	6.8
Cerebral symptoms	43	58.9
Others	2	2.7

There were 11(15.1%) cases of HELLP syndrome, 5 (7.2%) abruptio placentas, and 6(8.7%) pulmonary edema. Despite the use of magnesium sulfate, two of the mothers developed eclampsia in the hospital. (Table 3) There were no instances of maternal death, cerebrovascular accident, or DIC among the 73 women. None of them required adult intensive care admission.

Table-3 The maternal complications developed in the ward for those mothers admitted to SPHMMC for expectant management of preeclampsia with severe features, 2021.

Complications	Numbers	Percentages
Uncontrolled blood pressure	8	11.0
Low Platelets	5	6.8
Raised LFT	4	5.5
Raised RFT	6	8.2
Abruption	5	6.8
Persistent Cerebral symptoms	3	4.1
Pulmonary edema	6	8.2
Eclampsia	2	2.7
HELLP	2	2.7
Total	**50**	**68.4**

In 20.5% of the mothers the pregnancy was terminated because of attainment of gestational age of ≥ 34wks; the rest of the mothers' pregnancy was terminated as the result of complications/ end points like (severe growth restriction, uncontrolled blood pressure, eclampsia, HELLP syndrome, pulmonary edema, and abruptio placenta) that developed during the expectant management. (Table 4)

Table -4 -Indications for termination of pregnancy of the mothers admitted to SPHMMC for expectant management of preeclampsia with severe features, 2021.

Complications	No	Percentage
Abruption	3	4.1
Eclampsia	2	2.7
EFW>2.5 kg	2	1.4
GA of ≥ 34 weeks	15	21.9
HELLP syndrome	4	5.5
IUFD	4	5.5
IUGR with AEDV	7	9.6
low platelet (<100,000)	4	5.5
NRBPP	4	5.5
Persistent cerebral symptopm	3	4.1
Preterm labour	2	2.7
Pulmonary edema	6	8.2
Raised LFT	3	4.1
Raised RFT	6	8.2
Uncontrolled HTN	8	11.0

18(24.7%) of all mothers had co-morbidities at admission and the most common co-morbiditiy was chronic hypertension in 38.8% of mothers.

The rates of caesarian deliveries (CD) in these mothers were 53.4 (Figure 1). The most common indications were non-reassuring fetal heart rate pattern (NRFHRP) in 41% of the cases, followed with failed induction that contributed for 20.5%.

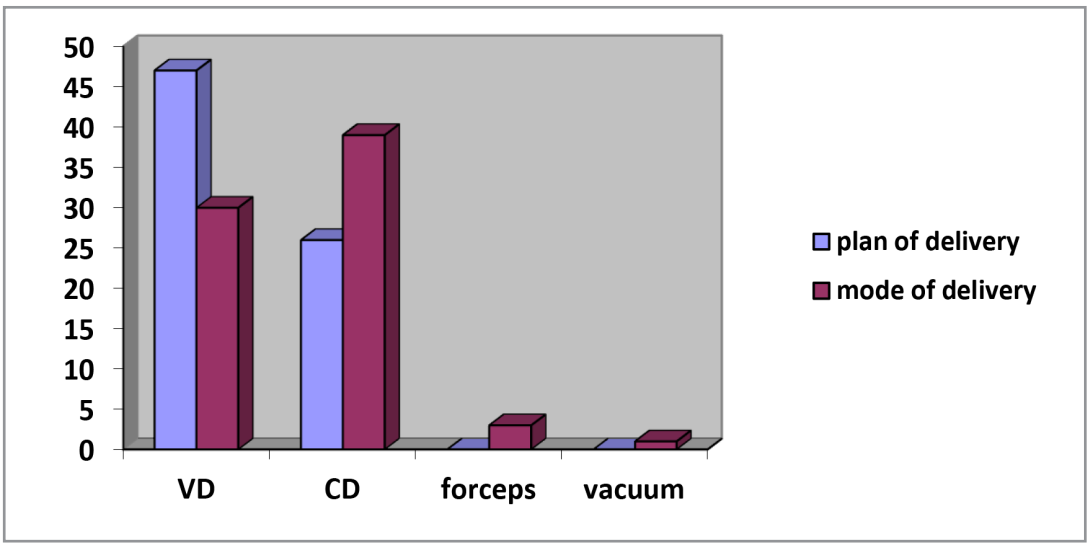

Figure 1. Planned and actual mode of delivery of mothers admitted to SPHMMC for expectant management of preeclampsia with severity features, 2021.

Out of all mothers admitted to the ward 68(93.2%) of them required antihypertensive drugs and 50 (68.5%) of them took single drug that was methyldopa., The other 18 mothers required an additional drug (nifedipine).(Figure 2).

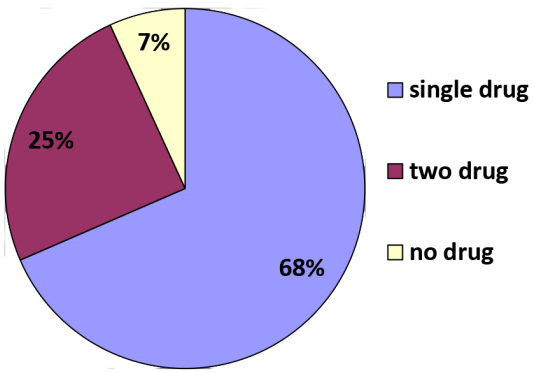

Figure 2- Antihypertensive drug use among women admitted to SPHMMC for the purpose of expectant management of preeclampsia with severe features, 2021

Out of 73 mothers included in the study, there were 3 twin pregnancies that make the total number of babies born 76. There were 8 (10.9%) stillborn and 68 of the babies were born alive. The total NICU admission rate was 66.7%. (Table 6) Two thirds of live born neonate had 5th minute APGAR score of > 7. (Figure 3)

Table-6 Perinatal outcome mothers admitted to SPHMMC for expectant management of preeclampsia with severe features, 2021.

Perinatal outcome	Numbers	Percentages
Still birth	8	10.5
Live born	68	93.2
Fifth minute APGAR score > 7	34	46.67
NICU referral (69 live born)	46	66.7

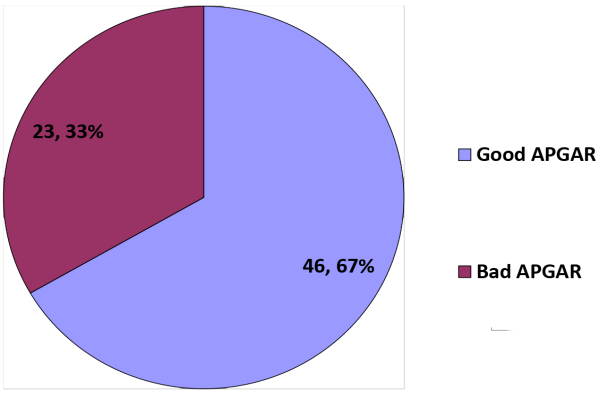

Figure 3-Fifth minute APGAR score of neonate delivered from the mother admitted to SPHMMC for expectant management of preeclampsia with severe features, 2021.

The median gestational age of the liveborn babies was 33.1weeks and the median birth weight was 2002g. Neonatal survival up to 7days of their life was 71.7%. (Table 7).

There were 21 perinatal deaths (13 neonates died in NICU and 8 stillbirths) that give perinatal mortality rates of 276 per 1000 live birth.

Table -7 Neonatal status at seventh day of NICU of newborns of the mothers admitted to SPHMMC for expectant management of preeclampsia with severe features, 2021.

Neonatal conditions	Numbers	Percentages
Discharged with improvement	6	13
At NICU with good condition	16	34.8
At NICU with bad condition(critical)	11	23.9
Died	13	28.3
Total	46	100

Only 66(90.4%) of the women were a good candidate for expectant management. Magnesium sulphate and steroid (dexamethasone) at admission was given 100% of the time, but 8.2% of the mothers didnot get magnesium sulphate during intrapartum or postpartum period. Among mothers admitted for the purpose of expectant management, 36(49.3%) of them had optimal maternal and fetal monitoring/ surveillance that meet the recommendation given by ACOG (1), while 18(24.7%) of them had incomplete preeclampsia follow up charts and 7(9.6%) of them had incompletely filled kick charts. (Figure 4)

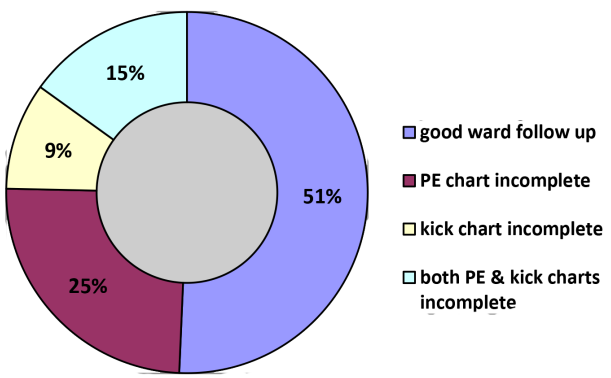

Figure 4- Follow up patterns of mothers admitted to SPHMMC for expectant management of preeclampsia with severe features, 2021.

DISCUSSION

The study was undertaken to determine duration of pregnancy prolongation and maternal and perinatal outcome of preeclampsia with severe featuresbetween 28 and 34 weeks of gestation.

The analysis of this study revealed that the mean number of days of pregnancy prolongation was 11.5 days with a significantly greater period gained at earlier gestations. The mean days gained is comparable with most of other studies and a systematic review done by Magee et al. in 2009, which varies between 7 to 15.3 days.[3,8, 9].

Two prospective randomized controlled trials comparing expectant management with interventionist management have been published[3,8]. The first study, which included 38 patients, found a mean pregnancy prolongation of 7.1 days in the group of women who were given expectant management[8]. In a larger randomized controlled trial in which 95 patients were included, the mean pregnancy prolongation was 15.4 days[3]. In a similar study done by Swamy et al.with94 mothers, the mean duration of days was only 5 days, which was smaller than our study. The study done by Swamy et al. included clients starting from GA of 24 weeks, which is different patient selection from our study and may contribute to small duration of pregnancy prolongation[13].

The days gained were significantly higher among those who had expectant management between 28.1 and 30 weeks (22.2 days) compared with the other two groups—30.1–32 weeks (14 days) and 32.1–34 weeks (7 days). This finding is in line with other studies studies done by Odendaalet al. in 1990,Sibaiet al. in 1994 and Swamy et al. in 2012, though the study done by Swamy et al. include clients starting from GA of 24 weeks, which is differentpatient selection from our study[3,8,13.14].

The rate of maternal complications is similar to those reported in previous studies[13,18,14,19]. The rate of eclampsia was also in agreement with the finding of similar studies in India[13]. Severe maternal complications were less frequently observed. There were, however, no instances of

maternal deaths, cerebrovascular accidents, or severe acute renal failure necessitating dialysis in our study. On the whole, major complications resolved quickly without the need for adult intensive care admission, which is a reassuring finding. Despite the use of magnesium sulfate and careful control of blood pressure, we had two cases of eclampsia. The rate of eclampsia was also in agreement with the finding of similar studies in India[13]. It is important to note, however, that in the MAGPIE trial, magnesium sulfate was not associated with a significantly decreased rate of eclampsia in the subgroup of women included from countries with a low perinatal mortality[19].

Neonatal morbidity was clearly related to the gestational age at the onset of expectant management and this is in agreement with previous studies[13,15]. Increasing gestational age correlated with a reduction of respiratory distress syndrome[13,15].

Regarding perinatal and neonatal mortality rates, our observed perinatal and neonatal mortality rates were 10.4 and 18.8 %, respectively, which are acceptable in a developing country setting and the result is in agreement with the study done in India by Swamy et al. in 2012 which included clients starting from GA of 24 weeks, which is different to patient selection from our study[13].In contrast, our results are not in agreement with results of the trial which was undertaken in a developed country[3,8,14,15]. The study done by Sibai et al. on aggressive versus expectant management of severe preeclampsia did not have instances of perinatal deaths in women expectantly managed at 30 or more weeks of gestation[3]. More than half of the fetal deaths in our study were caused by abruptio placenta. Therefore our study cannot answer all inquiries that possibly arise in this area because we have not compared expectant management with interventionist management, which is one of the limitations of our study.

Only 66(90.4%) of the women were a good candidate for expectant management.Among mothers admitted to SPHMMC for the purpose of expectant management, 36(49.3%) of them had optimal maternal and fetal monitoring/ surveillance.

Our in-patient monitoring of mothers admitted to SPHMMC showed lower frequency of assessment of the parameters that could help to detect early appearance of complications as compared with other studies[3,8,14]. In our cases all mothers complete the course of corticosteroid,whichishigher than in the others studies. 8.2% of the mothers did not get magnesium sulphate during intrapartum or postpartum period.Gross audit of the quality of care implies the need for large scale in depth audit of expectant management of preeclampsia with severe features to explore practice of appropriate patient selection and optimal maternal and fetal monitoring/ surveillance with respect to the gold standard.

As a conclusion,proper selection of pregnant mothers with preeclampsia with severity feature, and close and frequent observation of maternal and fetal status during expectant management, is associated with a good perinatal outcome without increased risk for the mother. The main limitations of the study were: the result was limited to short term outcome during hospital stay. In addition, the study may lack generalizability as it has small sample size and it is a single center study. Therefore, further multicenter study with longer study period is recommended to know the actual maternal and neonatal outcome of preeclampsia with severity feature and also to determine possible associated factors.

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REFERENCES

1. ACOG Committee on Practice Bulletins-Obstetrics: Diagnosis and management of preeclampsia and eclampsia. ObstetGynecol 99:159, 2002.
2. Sibai BM, Caritis S, Hauth J, National Institute of Child Health and Human Development maternal-Fetal Medicine Units Network. What we have learned about preeclampsia. SeminPerinatol 2003; 27:239
3. Sibai BM, Mercer BM, Schiff E, et al. Aggressive versus expectant management of severe preeclampsia at 28 to 32 weeks' gestation: a randomized controlled trial. Am J Obstet Gynecol. 1994;171:818–22.
4. Duley L. The global impact of pre-eclampsia and eclampsia. SeminPerinatol 2009; 33:130.
5. Chang J, Elam-Evans LD, Berg CJ, et al. Pregnancy-related mortality surveillance--United States, 1991–1999. MMWR SurveillSumm 2003; 52:1.
6. Main EK. Maternal mortality: new strategies for measurement and prevention. CurrOpinObstetGynecol 2010; 22:511.
7. MacKAy AP, Berg CJ, Liu X, et al. Changes in pregnancy mortality ascertainment: United States, 1999-2005. ObstetGynecol 2011; 118:104.
8. Odendaal HJ, Pattinson RC, Bam R, et al. Aggressive or expectant management for patients with severe preeclampsia between 28-34 weeks' gestation: a randomized controlled trial. ObstetGynecol 1990; 76:1070.
9. Magee LA, Yong PJ, Espinosa V, et al. Expectant management of severe preeclampsia remote from term: a structured systematic review. Hypertens Pregnancy 2009; 28:312.
10. World Health Organization (WHO). 2008. The Global Burden of Disease: 2004 Update.Geneva: World Health Organization. Accessed December 15, 2011,
11. Hogan et al. 2010; Central Statistical Agency and ORC Macro 2006 and 2011
12. Gaym A,Et.al Disease burden due to pre-eclampsia/eclampsia and the Ethiopian health system's response, Int J Gynaecol Obstet. 2011 Oct;115(1)
13. Swamy et al,maternal and perinatal outcome during expectant management of sever preeclampsia between24 and 34wks.journal of ObstetGynecol of India 2012;62(4)413-416
14. Haddad B ,Deis S, Maternal and perinatal outcomes during expectant management of severe preeclamptic women between 24 and 33 weeks' gestation ,AJOG,Vol 190, Issue 6,June 2004, Pages 1590–1595
15. Manjusha Viswanathan et al. perinatal outcome of expectant management of early onset severe preeclampsia, Sch. J. App. Med. Sci., 2015; 3(2C):751-755
16. Seyom E, , Abera M, Tesfaye M and Fentahun N . Maternal and fetal outcome of pregnancy related hypertension in Mettu Karl Referral Hospital, Ethiopia, Journal of Ovarian Research (2015) 8:10
17. Wolde Z, Segni H, WoldieM.Hypertensive disorders of pregnancy in Jimma University Specialized Hospital, Ethiop J Health Sci. Vol. 21, No. 3 November ,2011.
18. Wagnew M, DessalegnM, Trend of Preeclampsia / Eclampsia, Maternal and Neonatal Outcomes among Women Delivering in Government Hospitals, Addis Ababa, Ethiopia
19. Magpie Trial Collaborative Group. Do women with preeclampsia and their babies benefit from magnesium sulfate? The Magpie Trial: a randomized placebo controlled trial.Lancet. 2002;359:1877–90.