

Original Article

MATERNAL DEATH DUE TO HYPERTENSIVE DISORDERS IN PREGNANCY: A RETROSPECTIVE STUDY

Swarna Nandi¹, Vasundhara Singh², Chaitali Sarkar³, Ranita Roy Chowdhury^{4*}, Prof Manidip Pal⁵

ABSTRACT

Introduction: Hypertensive disorders of pregnancy specifically eclampsia contributes greatly to maternal mortality as well as morbidity in developing nations like India. It is observed that of all pregnancies, 5-10% are complicated by hypertensive disorders. Maternal mortality due to hypertensive disorders of pregnancy in developing country is shockingly high, almost 50 per 10,000 deliveries, whereas it is only 1.6 per 10,000 deliveries in developed nations. Naturally in a developing country like India, to decrease MMR, decreasing PIH and a timely intervention is much needed. PIH is further categorised into, pre-eclampsia, eclampsia, pre-eclampsia superimposed on chronic hypertension.

Materials and methods: Our study is a hospital based retrospective study on maternal deaths due to PIH.

Results: In this study we found that MMR for the study period was much higher than the national average. 22% deaths were due to PIH. Most of them had history of ominous signs and symptoms which were neglected. Deaths were mostly found in unbooked, illiterate, aged less than 25 years, primigravid, referred in cases. Most deaths occurred within 48 hours of hospital admission and most common cause of death being pulmonary oedema.

Conclusion: Maternal mortality is a serious issue and strong actions to be taken in order to decrease it. This study analysis will help us to detect pre-existing conditions leading to death due to pre-eclampsia and eclampsia and give us an insight on how to decrease the death toll.

Keywords: PIH, Pre-eclampsia, Eclampsia, MMR.

INTRODUCTION

Hypertensive disorders complicate 5% to 10% of all pregnancies. ⁽¹⁾ With haemorrhage and infection, pregnancy induced hypertension (PIH) forms a lethal trio and contributes significantly in maternal death. Maternal mortality is defined as the death of any

woman while pregnant or within 42 completed days of termination of pregnancy, irrespective of the duration or site of pregnancy, from any cause related to or aggravated by pregnancy, but not from accidental or incidental causes ⁽²⁾.

In spite of several global and regional interventions and initiatives from governments

and concerned agencies, in Sub-Saharan Africa and India, maternal mortality continues to be very high with eclampsia as a major cause. Preeclampsia is one of the four categories associated with hypertensive disorders of pregnancy. The other three categories include chronic hypertension, gestational hypertension, and preeclampsia superimposed on chronic hypertension.

Preeclampsia, the precursor to eclampsia, has had an evolving definition over recent years. The definition for preeclampsia initially included proteinuria as a diagnostic requirement, but this is no longer the case as some patients had advanced disease before proteinuria detection.

Preeclampsia is defined as a new-onset of hypertension with systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg after 20 weeks of gestation with proteinuria and/or end-organ dysfunction (renal dysfunction, liver dysfunction, central nervous system disturbances, pulmonary oedema, and thrombocytopenia).

Eclampsia is defined as the new onset of generalized tonic-clonic seizures in a woman with preeclampsia. Eclamptic seizures can occur antepartum, 20 weeks after gestation, intrapartum, and postpartum. Seizures before 20 weeks are rare but have been documented in gestational trophoblastic disease. ⁽³⁾

MMR i.e., maternal mortality ratio is an index which gives an overall idea about quality of healthcare provided to the women in the country during pregnancy. In India during 2014 to 2016 MMR was 130. During 2015-2017 was 126 and maternal mortality ratio between 2016- 2018 is 113. This decrease in maternal mortality ratio reflects an overall progress in terms of good maternity care in India. ⁽⁴⁾ According to the special bulletin on MMR released by the Registrar General of India March 14, 2022 current MMR is 103.

Reported incidence of eclampsia is 1.6 to 10 per 10,000 deliveries in developed countries, but in developing countries, the figure goes to 50 per 10,000 deliveries. This huge difference in the numbers might be due to poor access to healthcare, late detection of pre-eclampsia and unpreparedness of the maternity units for prompt care and referrals to tertiary units ⁽⁵⁾

Given these indices, it is important to find out the maternal deaths occurring due to PIH and possible ways to combat them.

Our main objective will be to find out relationship between PIH and maternal mortality. factors which predispose PIH and the warning signs which healthcare workers should be aware of, in order to prevent PIH and maternal deaths due to PIH and eclampsia.

MATERIALS AND METHODS

This is a retrospective hospital-based study carried out in a tertiary care referral centre of West Bengal Nadia district. This study is conducted for a period of one year from June 2021 to May 2022. Data were retrieved from records section of the institute and closely evaluated. There was total 6287 live births during this period and there were 22 maternal deaths and out of them 5 were having pregnancy induced hypertension as an antecedent cause. Pregnant women with known seizure disorders and women with pre-existing hypertension were excluded from the study. The study was approved by the institutional ethics committee.

RESULTS

In this present study out of total 22 deaths, 22% is due to PIH as an antecedent cause.

3 cases out of 5 mortalities were unbooked to this institute. 2 of the unbooked cases had no antenatal visits at all.

Age wise distribution (years)	Number of mortalities
<19	1
19-24	1
25-30	0
30-35	2
>35	1

TABLE 1: AGE WISE DISTRIBUTION OF MATERNAL DEATH

Majority of deaths occurred beyond the age of 30 and strikingly there were no deaths in the age group of 25-30 years.

MMR or maternal mortality ratio is defined as

maternal death per 100000 live births. There were 6287 live births in this 1-year duration of study period, and total 22 maternal deaths; giving an MMR of 349.

80% of the study population were residents of rural area and 60% of study population were illiterate. Most of the mothers who lost their lives were primigravida (60%). All deaths were unbooked cases of the institute with only one case booked elsewhere. 3 out of 5 cases were referred in from other institutes.

They all had convulsive episodes in pre operative antenatal period after 20 weeks of gestation. They all were delivered by caesarean section with 100% live births; out of them only one was non-viable as the pregnancy was of 27 weeks.

Pre monitoring signs	No of deceased mothers having it as chief complaint
Headache	4
Blurring of vision	3
Epigastric pain	2
Nausea vomiting	2
Shortness of breath	3

TABLE 2: DISTRIBUTION OF PREMONITORY SIGNS IN THE DECEASED MOTHERS

Most of them had headache and blurring of vision as their premonitory signs. They also complained of shortness of breath which was later corroborative with the severe pulmonary oedema that those patients developed.

Urine protein	No of cases
+/-	0
1+	1
2+	0
3+	4

TABLE 3: CASES AND THEIR URINE DIPSTICK RESULTS

Out of 5, 4 of them had a urine protein dipstick result of 3+ corroborating to more than 300mg/dl protein excretion.

Out of these 5 diseased mothers; 3 were further complicated with hepatic derangements with 3

fold's elevated liver enzymes and increased LDH. 1 was also having severe anaemia with haemoglobin <7gm%.

Most of them (80%) conceived naturally and only one elderly primigravida had an history of ART for conception.

Most of the deaths (60%) occurred in late of third trimester with period of gestation >37 completed weeks, one in early third trimester and one death in late second trimester.

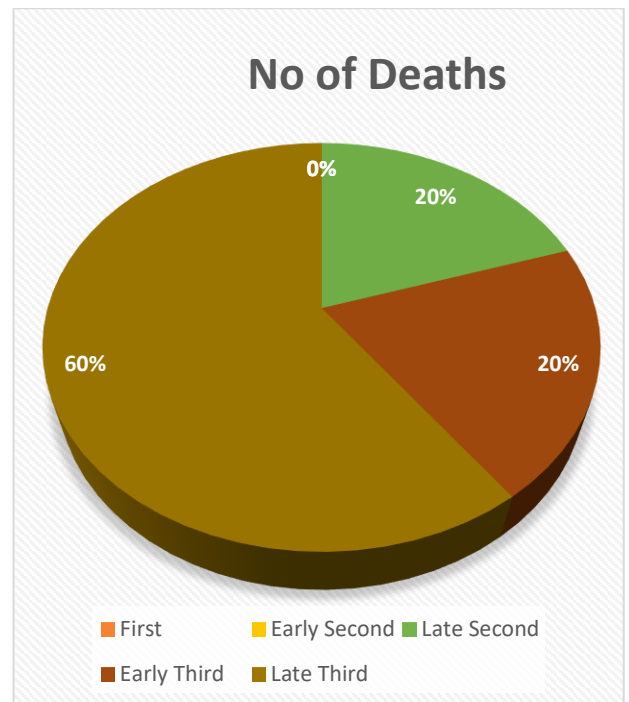


FIGURE 1: PIE CHART SHOWING NUMBER OF DEATHS IN TRIMESTERS

Cases	Duration of hospital admission to death
Case 1	36 hours
Case 2	28 hours
Case 3	10 hours
Case 4	7 days and 12 hours
Case 5	24 hours

TABLE 3: CASE WISE DISTRIBUTION OF DURATION OF HOSPITAL STAY BEFORE THEY SUCCUMB TO DEATH

It is seen that 40% death occurred within 24hours of hospital stay; 40% within 48 hours of hospital admission.

Case	Mode of Death
Case 1	Respiratory failure with cardiac asystole with pulmonary oedema
Case 2	Pulmonary embolism with severe PET
Case 3	Cardiac asystole due to Eclampsia
Case 4	Acute congestive heart failure in a post operative Eclampsia with heart disease
Case 5	Type II respiratory failure with pulmonary oedema with PIH

TABLE 4: CASE WISE MODE OF DEATHS

While reviewing modes of death it is seen pulmonary oedema is the leading cause in these eclamptic mothers, which ultimately led to acute congestive heart failure.

DISCUSSION

As per the current study, a good antenatal care could have saved lives as majority (60%) of the cases were unbooked to the institute.

As per our study the MMR during the study period was calculated to be 349. This MMR is way beyond the Indian average MMR of 103. (4) Not only that, a timely referral also plays a major role in preventing mortality as we can see that the majority deaths occurring within 48 hours of hospital admission as the patient condition were already deteriorated when they were admitted to this institute. In our study 3 out of 5 cases were referred in from other institution when the disease had already taken an ugly turn. In an article by Berhan a high maternal and perinatal mortality was shown in Ethiopia due to 3 delays model; delay in healthcare seeking behavior, delay in getting access to health facility and delay in getting proper treatment. (6) In our study to a similar picture is evident where there is significant delay is seen in healthcare seeking and getting a delayed access to proper healthcare facility is observed.

All these patients had to undergo HDU admission for better monitoring and support of these patients. 2 of them required intubation for respiratory support. In a 4-year population

based retrospective study in Reunion Islands, it has been seen that out of 482 preeclampsia cases, 94 women needed an ICU transfer. (7)

Also, the age of the mothers playing a vital role as the deaths are mainly in the age group of <25 years or in >30 years. This picture also supported by a study conducted in Wuhan; China which showed relative to mothers aged between 25-29 years, maternal age >30 years carried more risk of GDM, PIH and caesarean delivery. (8) So, we need to educate the society on decreasing the trends of teenage pregnancy. Illiteracy, ignorance and cultural beliefs are major road blocks in our society.

Majority of the cases in our study had various premonitory signs of eclampsia like headache, blurring of vision, epigastric pain which they failed to understand and convey in order to get a timely intervention. In a study done by Shamil D cooray et. All in Tanzania; 80% of their study population had headache and 45% had visual disturbances as neurological symptoms. (9)

Hence in India the Auxiliary Nurse Midwifery (ANM) and Accredited Social Health Activist (ASHA) workers have a major role to educate mothers about these warning signs so that timely interventions can be done and the deaths are prevented.

From the investigation point of view, majority had a urine protein >300mg/dl corroborating to a 3+ urine dipstick result. In a study by James Airoidi et. All it was seen acute onset of proteinuria and worsening of hypertension in women with chronic hypertension is suggestive of superimposed preeclampsia which increases adverse outcome. (10)

In another study with 407 pre-eclampsia patients, a statistically low 5 min APGAR score of neonates was found in patients with proteinuria. (11)

Only good outcome was out of 5 cases 4 had a live neonate due to timely caesarean delivery, of which 2 required SNCU admission due to Poor APGAR at 0 and 5 minutes. In a study done by Lal AK et. All; low birthweights and low mean gestational age was reported in eclampsia group. Also, low 5 min APGAR, Respiratory distress syndrome, neonatal seizures were significantly higher in eclampsia cohort. (12)

The main drawback of this study is the duration of the study, which is only of one year. By

increasing study duration, the number of study population would have increased, which would have given us a clearer view in this topic.

As all retrospective studies, this also carries a risk of recall bias, which we have tried to decrease by collecting details from written documents on the case sheets as retrieved from the records section.

CONCLUSION

Maternal mortality is very disturbing to the treating doctors and also distressing to the family of the diseased. Hence utmost care to be taken to reduce the maternal mortality due to any cause.

The picture is quite pitiful and gloomy as majority of cases could have been prevented by increasing their socioeconomic status, literacy rate, nutrition and early detection of danger signs.

This study analysis will help us in future to detect pre-eclampsia, and thereby preventing eclampsia at an early stage. It will also help us understand the pathophysiology and the nature of the disease better. Early and timely interventions will reduce maternal mortality as well as morbidity and help us achieve a decrease in MMR.

REFERENCES

1. Cunningham FG, Leveno KJ, Bloom SL. *Williams Obstetrics*. New York: McGraw-Hill; 2018. *Hypertensive disorders*; pp. 710–754.
2. Ministry of Health and Family Welfare; <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1697441>
3. *Trends in maternal mortality: 1990–2010 – estimates developed by WHO, UNICEF, UNFPA and the World Bank*. 2012
4. Wilkerson RG, Ogunbodede AC. *Hypertensive Disorders of Pregnancy*. *Emerg Med Clin North Am*. 2019 *sDisorders in Pregnancy*. *Obstet Gynecol Clin North Am*. 2018 Jun;45(2):333–347.
5. Fishel Bartal M, Sibai BM. *Eclampsia in the 21st century*. *Am J Obstet Gynecol*. 2022 Feb;226(2S).
6. Berhan Y, Berhan A. *Commentary: Reasons for persistently high maternal and perinatal mortalities in Ethiopia: Part III-Perspective of the "three delays" model*. *Ethiop J Health Sci*. 2014 Sep;24 Suppl(0 Suppl):137–48.
7. Tran PL, Randria JM, Ratsiatosika AT, Winer A, Schweizer C, Omarjee A, Peretti V, Dumont C, Dennis T, Lazaro G, Robillard PY, Boukerrou M. *Admission into intensive care unit in preeclampsia: a four-year population-based study in Reunion Island*. *J Matern Fetal Neonatal Med*. 2020 Nov 18:1–6.
8. Cao J, Xu W, Liu Y, Zhang B, Zhang Y, Yu T, Huang T, Zou Y, Zhang B. *Trends in maternal age and the relationship between advanced age and adverse pregnancy outcomes: a population-based register study in Wuhan, China, 2010–2017*. *Public Health*. 2022 May;206:8–14.
9. Cooray SD, Edmonds SM, Tong S, Samarasekera SP, Whitehead CL. *Characterization of symptoms immediately preceding eclampsia*. *Obstet Gynecol*. 2011 Nov;118(5):995–999.
10. Airoidi J, Weinstein L. *Clinical significance of proteinuria in pregnancy*. *Obstet Gynecol Surv*. 2007 Feb;62(2):117–24.
11. Xu X, Wang Y, Xu H, Kang Y, Zhu Q. *Association between proteinuria and maternal and neonatal outcomes in pre-eclampsia pregnancy: a retrospective observational study*. *J Int Med Res*. 2020 Apr;48(4)
12. Lal AK, Gao W, Hibbard JU. *Eclampsia: Maternal and neonatal outcomes*. *Pregnancy Hypertens*. 2013 Jul;3(3):186–90.

Received on 14.5.22

Accepted on 18.6.22

Published 15.7.22

Citation: Nandi S, Singh V, Sarkar C, Chowdhury RR, Pal M. Maternal death due to hypertensive disorders in pregnancy: a retrospective study. . *J Indian Acad Obstet Gynecol*. 2022;4(1):7–12.

<ol style="list-style-type: none">1. Post graduate trainee2. Resident medical officer3. Assistant professor4. Associate professor5. Professor <p>Dept of obstetrics and gynecology, COMJNM &H,WBUHS, Kalyani, Nadia. ✉ Mail: ranitasinha@gmail.com</p>
--