

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20231559>

Original Research Article

Maternal near miss and maternal death among women with hypertensive disorders in pregnancy: an observational study in a selected hospital in West Bengal

Sima Maity^{1*}, Snehamay Chaudhuri², Pramit Ghosh³

¹Department of Health and Family Welfare, DPHNO, Purba Medinipur, West Bengal, India

²Department of Obstetrics and Gynaecology, Midnapore Medical College and Hospital, Paschim Midnapore, West Bengal, India

³Department of Scientist-E and OSD Office of DG-ICMR, New Delhi, India

Received: 17 April 2023

Accepted: 09 May 2023

***Correspondence:**

Sima Maity,

E-mail: simamaity08@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Aim of the this study was to assess the prevalence of hypertensive disorder in pregnancy and the incidence of maternal death and maternal near miss from the hypertensive disorders of pregnancy and utilization of maternal health care services by them.

Methods: An observational study was performed at Purba Medinipur District Hospital, West Bengal from 1st April 2018 to 31st December 2020. The main outcome measures included incidence of potentially life threatening conditions, life threatening conditions maternal near miss cases and mortality developed due to PIH/preeclampsia/eclampsia and utilization of maternal health care services by them.

Results: Present study reflected that the prevalence of hypertensive disorder in pregnancy was 9.01% (3543/39310) of total admission. The incidence of maternal mortality due to complication of hypertensive disorder was 7 out of total maternal mortality 30 during that period i.e. 23.3% of total mortality and incidence of MNM was 82 out of total 249 MNM cases during the same period i.e. 32.9% of total MNM cases. Utilization of maternal health care services revealed that there is a scope to increase the service delivery.

Conclusions: Health care programmes need to enhance the existing efforts to improve timely health seeking behavior of women. There is a need of better quality antenatal care and extra resources are needed for identification and transportation of the women to reach hospital when the women develops complications. There is also a need of improvement of critical care in women who are suffering from life threatening condition.

Keywords: Eclampsia, maternal death, Maternal death surveillance and response, Mortality index, Maternal mortality, Pre-eclampsia, Potentially life threatening condition

INTRODUCTION

Pregnancy and childbirth are natural processes, which comes up with multiple consequences. A hypertensive disorder is one of the pregnancy consequences which is a major alarming cause for maternal, perinatal morbidity and mortalities. The term hypertension in pregnancy is commonly used to describe a wide spectrum of the patient

who may have only mild elevations in blood pressure to severe organ dysfunction. Thus, it is accompanied by minor to major complications. Worldwide hypertensive disorder in pregnancy/HDP affects 5-22% and it is responsible for 5-10% of complications in all pregnancies.

PIH denotes women's systolic blood pressure/SBP ≥ 140 mmHg, and diastolic blood pressure/DBP ≥ 90 mmHg

on two or more consecutive measures without proteinuria after 20 weeks of gestation; pre-eclampsia is characterized as when pregnant women presented with SBP ≥ 140 mmHg and DBP ≥ 90 mmHg on two or more consecutive measures within 4 hours interval with the presence of proteinuria that occurs after 20 weeks of gestation whereas eclampsia denotes the occurrence of convulsion plus proteinuria +2 or more and sign and symptom of severe pre-eclampsia for the women who fulfil the definition of PIH.¹

Hypertensive disorders of pregnancy have been reported to account 14% of maternal deaths and a significant proportion of morbidities worldwide. The objectives of the study were to assess the prevalence of hypertensive disorder in pregnancy, determine the risk factors of hypertensive disorders in pregnancy, assess the incidence of maternal death and maternal near miss from the hypertensive disorders of pregnancy, and assess the utilization of maternal health care services by deceased women and MNM cases.

METHODS

A descriptive observational study was conducted at Purba Medinipur District Hospital, Purba Medinipur, Tamluk, during the period of 1st April 2018 to 31st December 2020. Purba Medinipur District Hospital is a 500 bedded referral hospital with the facilities of 24x7 Comprehensive Emergency Obstetric Care with 12 bedded critical care unit (CCU) which is shared by all departments, 20 bedded sick newborn care unit (SNCU), blood bank and dialysis facility without any availability of super specialty departments like cardiology. Patients are usually referred to Purba Medinipur district hospital from different block primary health centre, rural hospitals, 2 sub-divisional hospitals and from two super specialty hospital. The furthest referral unit is located at 70 Kilometer from Tamluk District hospital and requires 2 hours to reach at Purba Medinipur DH. Informed consent was obtained from the woman or from her primary care giver (near relatives) for inclusion in the study.

Inclusion criteria

Inclusion criteria were the women who were pregnant, in labour, or who delivered or aborted up to 42 days ago arriving at the facility with any of the listed conditions or those who developed hypertension in pregnancy, preeclampsia and eclampsia were included in the study. Women admitted without any complications but developed complication (PIH, Preeclampsia, eclampsia) during hospitalization were also included in the study.

Exclusion criteria

Women who referred to higher centre and took LAMA were excluded from the study.

Study technique

All women with obstetric complications were screened irrespective of the severity of complications. Depending on the diagnosis the women with hypertensive disorders were identified. Then the identified women with hypertensive disorders were further screened with the help of WHO Near Miss criteria. Data were collected by interviewing the women and her primary care giver (near relatives who accompanied the women) during their stay at hospital depending on the clinical condition of the woman. Data collection was done by the investigator by doing daily visit to the antenatal ward, postnatal ward, labour room, CCU by using following tool (i) Structured interview schedule on background data of women:- Applied for all women who were fulfilling inclusion criteria, (ii) Maternal near miss tool of WHO for screening⁴: Applied for all women who were fulfilling inclusion criteria (iii) Questionnaire on utilization of maternal health care services: Applied for all women who were fulfilling inclusion criteria (iv) Facility based maternal near miss review proforma (as per Operational guideline from Govt. of India): Applied for women who became maternal near miss as per WHO maternal near miss criteria. (v) Maternal death review proforma (as per MDSR guideline): Applied for women who died due to complication related hypertensive disorders during pregnancy or childbirth or within 42 days of termination of pregnancy.

Statistical analysis

Data were collected in a proforma specially designed for this purpose and entered into a data base utilizing Microsoft Excel software.

RESULTS

As shown in Figure 1 and Table 1, out of total admission of 39310 women, 26476 women had undergone the process of delivery and resulted 26332 live births and 10313 women were identified as women with obstetric complications. Out of total 10313 high risk cases 3543 (9% of total admission) mothers were high risk due to hypertensive disorders. Among those 3543 women 368 had potentially life threatening conditions (PLTC) and among those women with PLTC, 101 women were eligible for inclusion in the study as per WHO criteria of Life threatening condition (near miss). However 12 women out of 101 excluded as they were referred to higher centre or took LAMA. Thus, 89 women were analyzed in the study, of which 82 women became maternal near miss and 7 maternal death occurred.

The analysis of the data in Table 2 showed that among 82 MNM cases 34.1% (28/82) women were less than 19 years of age, 43.9% (36/82) women aged between 19 yrs to <25 yrs, 17.1% (14/82) of MNM women aged between 25 to <30 yrs, 4.88% (4/82) women were aged between 30yrs to <35yrs. 74.4% (61/82) were Hindu, 25.6% (21/82) were

muslim, 96.3% (79/82) women were from rural community, 6.1% (5/82) women were educated upto higher secondary level where as 36.6% (30/82) of them educated up-to secondary level, 45.1% (37/82) women had education up to primary and 12.2% (10/82) were illiterate. 63.4% (52/82) women were primi para and rest of them 36.6% (30/82) were multipara. The gestational age at the time of admission were between >26wks and <34wks- 4.88% (4/82), 34wks to 37wks- 47.6% (39/82) and >37wks and <42wks-41.5% (34/82) and 6.1% (5/82) admitted in post-partum period.

(2/7) women were belong the age group of 30yrs to <35 yrs. 100% women were belong to Hindu religion and were from rural community only. 28.57% (2/7) women were illiterate, 42.86% (3/7) women were educated upto primary level and 28.6% (2/7) women were educated upto secondary level, 28.57% (2/7) women were primi para whereas 71.43% (5/7) were multipara. The gestational age at the time of admission were between >12wk to 26 wks - 12.5%, >26wks and <34wks-28.57%, 34wks to 37wks- 14.29% and >37wks and <42wks-43.86%.

Table 1: Incidence of MNM and maternal death due to hypertensive disorder in pregnancy.

Variables	No
Total admission	39310
Total obstetric High risk	10313
Obstetric high risk due to hypertensive disorder	3543
PLTC due to hypertensive disorder during pregnancy	368
MNM among PIH/Eclampsia	82
Maternal death due to PIH/Eclampsia	7

In case of maternal death, 14.29% (1/7) women was <19 years of age, 42.86% (3/7) women were belong to the age group between 19yrs to <25 yrs, 14.29% (1/7) women were belong the age group of 25yrs to <30 yrs and 28.57%

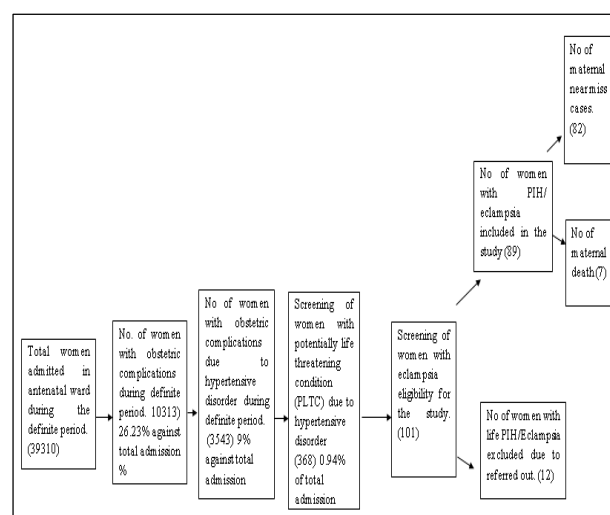


Figure 1: Flow chart of obstetric events.

Table 2: Distribution of maternal near miss and maternal death cases due to PIH/eclampsia as per background data.

Variable (Background data)	Maternal near miss n=82		Maternal death n=7		
	No	%	No	%	
Age	Less than 19 yrs	28	34.1	1	14.29
	19 yrs to <25 yrs	36	43.9	3	42.86
	25 yrs to <30 yrs	14	17.1	1	14.29
	30 yrs to <35 yrs	4	4.88	2	28.57
	>35 yrs	0	0	0	0
Religion	Hindu	61	74.4	7	100
	Muslim	21	25.6	0	0
	Others	0	0	0	0
Residence	Rural	79	96.3	7	100
	Urban	3	3.66	0	0
Educational qualification	Illiterate	10	12.2	2	28.57
	Primary	37	45.1	3	42.86
	Secondary	30	36.6	2	28.57
	Higher secondary	5	6.1	0	0
	Graduate and above	0	0	0	0
Parity	Primi	52	63.4	2	28.57
	Multi	30	36.6	5	71.43
Gestational age	>12 wks and <26 wks	0	0	1	12.5
	>26 wks and <34 wks	4	4.88	2	28.57
	>34 wks and <37 wks	39	47.6	1	14.29
	>37 wks and <42 wks	34	41.5	3	42.86
	Post partum period	5	6.1	0	0

Table 3: Process and outcome indicators related to specific health condition.

Indicators	Number	Percentage (%)
Anticonvulsants for pre-eclampsia/eclampsia		
Target population: women with pre-eclampsia /eclampsia	89	
Magnesium sulphate	89	100
Other anticonvulsants	9	10.11
Mortality	7	7.86

Table 3 showed that 100 women (89/89) treated with Inj. Magnesium Sulphate and rate of mortality was 7.86% (7/89).

Analysis of data regarding utilization of maternal health care services in Table 4 revealed that among the 82 MNM cases 95.12% (78/82) pregnancies were registered at SC, out of which 74.39% (61/82) were registered within 12 wks of pregnancy, 100% (82/82) pregnant women received Inj. TT/Td. Out of 82, only 59 women were eligible for 4th antenatal care. Out of those 59 PW, 83.05% (49/59) had 4th ANC checkup. During ANC check-ups body weight, blood pressure measurement, Hb testing, Urine for albumin and sugar were done for 89.02% (73/82) cases. WBFPT were done for 86.59% (71/82) cases during

ANC. 62.20% (51/82) women consumed iron folic acid supplied by SC and 54.88% (45/82) women consumed calcium supplied by SC. For 79.27% (65/82) women deworming done by giving Tab. albendazole. Quality care including counseling regarding diet, rest, danger signs pregnancy and family planning received by 62.20% (51/82). 59.76% (49/82) had at least one check up by a MO during pregnancy period, majority of women 59.76% (49/82) reached health facility after 2 hour from onset the of problems and 35.36% (29/82) reached after 1hr but before 2 hrs. 74.39% (61/82) availed of Nischay jan car as transport. There were the evidence that 25.61% (21/82) MNM cases were checked by MO within 30 mins of admission and rest 71.95% (59/82) within 1hr and 2.44% (2/82) examined by MO after 1hr.

Table 4: Comparison of utilization of maternal health care services among the MNM and maternal death cases due to hypertensive disorders during pregnancy.

Maternal health care services	MNM n=82	%	Maternal death n=7	%
Registration of pregnancy was done at SC/any health facility.	78	95.12	6	85.7
Registration of pregnancy was done at SC/any health facility within 12 weeks of pregnancy.	61	74.39	5	71.4
Vaccination: Inj. TT was taken.	82	100.00	7	100
Four ANC check-ups were done during antenatal period. (eligible for 4th ANC-59 in MNM and 3 in MD cases)	49	59.76	2	66.7
4th ANC checkup was done at home by ANM.	49	59.76	2	66.7
Body weight was checked every time during ANC checkups.	73	89.02	5	71.43
Blood pressure was checked every time during ANC checkups.	73	89.02	5	71.43
Blood was checked for Hb% every time during ANC checkups.	73	89.02	5	71.43
Blood was checked for WBFPT (screening for HIV) was done during any ANC checkups.	71	86.59	4	57.14
Urine was checked for protein and sugar every time during ANC checkups.	73	89.02	5	71.43
Received and consumed daily Tab. Iron during pregnancy from SC	51	62.20	2	28.6
Received and consumed Tab. calcium daily during pregnancy from SC	45	54.88	2	28.6
Received and consumed Tab albendazole provided by Govt. at S/C for de-worming during antenatal period.	65	79.27	2	57.14
Counseling about the type of diet during pregnancy was done by health worker.	51	62.20	3	42.9
Counseling about the rest during pregnancy was done by health worker.	51	62.20	3	42.9
Counseling about the danger signs of pregnancy was done by health worker.	51	62.20	3	42.9

Continued.

Maternal health care services	MNM n=82	%	Maternal death n=7	%
Counseling about the family planning services was done by health worker.	51	62.20	3	42.9
At least one ANC checkup was done by Medical Officer during antenatal period.	49	59.76	4	57.14
Availed Nischay Jan for transport	71	86.59	4	57.14
Health condition checked by a doctor after admission at the hospital?		0.00		
If 'Yes' then answer				
i) Within 30 minutes	21	25.61	4	57.1
ii) After 30 minutes but within 1hour	59	71.95	3	42.9
iii) After 1hour but within 2 hours	2	2.44	0	0

Table 4 also revealed that among 7 maternal death 85.7% (6/7) pregnancies were registered at SC/Health facility, out of which 71.4% (5/7) were registered within 12 wks of pregnancy, 100% (7/7) pregnant women received Inj. TT/Td. Out of total 7 women 3 women were eligible for 4th ANC and out of that for 66.7% (2/3) 4th ANC was done. During ANC checkups body weight, blood pressure measurement, Hb testing, urine for albumin and sugar were done for 71.43% (5/7) cases. WBFPT were done for 57.14% (4/7) cases during ANC. 28.6% (2/7) women consumed iron folic acid and calcium supplied by SC and deworming done by giving Tab. albendazole. Quality care including counseling regarding diet, rest, danger signs pregnancy and family planning received by 42.9% (3/7). 57.14% (4/7) deceased women had at least one check up by a MO during pregnancy period. 57.1% (4/7) availed of Nischay jan car as transport, 42.9% (3/7) spent money by their own for reaching the facility. There were the evidence that 57.14% (4/7) cases were checked by MO within 30 mins of admission and rest within 1hr.

DISCUSSION

According to analysis of the collected data in present study the collected data reflected that the prevalence of hypertensive disorder in pregnancy was 9.01% (3543/39310) of total admission. The incidence of maternal mortality due to complication of hypertensive disorder was 7 out of total maternal mortality 30 during that period i.e. 23.3% of total mortality and incidence of MNM was 82 out of total 249 MNM cases during the same period i.e. 32.93% of total MNM cases.

In other studies Hema et al and Haque et al showed that the prevalence of hypertensive disorders in pregnancy was 8.3 and 8.75% respectively and which is close to present study where as Muti et al showed the PIH prevalence was 19.4% which was quite high.²⁻⁴

The data related to clinico social factors revealed that among 82 MNM cases 78% women were less than 25 years of age, 12.2% (10/82) women were illiterate and majority 45.1% (37/82) women had education up to primary level where as 36.6% (30/82) of them educated

up-to secondary level and 63.4% (52/82) women were primipara. The gestational age at the time of admission were mainly between 34wks to 37wks -47.6%.

In case of maternal death, majority 42.86% (3/7) women were belong to the age group between 19yrs to <25 yrs, 42.83% (3/7) women were educated upto primary level and 28.57% (2/7) women were educated up-to secondary level, maximum 71.4% (5/7) were multipara. For maximum women the gestational age at the time of admission were between >37wks and <42wks-42.86%.

In a study Hema et al showed that majority of the pregnant women were in the age group of 25-31 years i.e. 48.5% (26/70) followed by 18-24 years which constituted 27.1% (26/70) cases that is similar with present study.²

Babore et al showed in their study that women with a previous history of pregnancy-induced hypertension had increased risk of developing pregnancy-induced hypertension and Gudeta et al stated in their study that having family history of pregnancy induced hypertension and gestational age were predictors of pregnancy induced hypertension.^{1,5}

Total 100% women with preeclampsia and eclampsia were treated with magnesium sulphate and anti-hypertensive drug.

Present study showed that pre termed pregnancy were 52.8% (47/89) and termed pregnancy were 47.19% (42/89) whereas in a study Hema et al observed that 78.5% cases had delivered at term gestation and 21.4% had preterm deliveries.²

Hypertensive disorder in pregnancy is a leading cause of severe maternal outcome in our study which is similar to other studies.^{6,7} Eclampsia is largely preventable and can be effectively treated without any development of life-threatening condition in most cases. This study indicates that in many women development of hypertension in pregnancy may not be detected early because of inadequate antenatal care. More over there may be delay in initiation of care following development of

complications as many women reached hospital after two hours or more. This is in agreement with the concept that the main preventive factors in decreasing maternal mortality are delays in the care process, from symptom identification by the patient to the provision of adequate treatment by healthcare professionals.⁸ Moreover many women were referred to higher centre with life threatening conditions from our setup. This points out deficiency in infrastructure in care of critically ill women which is evidenced from inadequate number of CCU beds for obstetric mothers.

The main strength of our study is prospective nature of large number of data collection with every case of life threatening conditions providing a complete account of events. The weakness of our study includes data collection was based at a government hospital and there was no scope to collect data from private sector. Moreover, a large number of women were referred to higher centre resulting in substantial amount of missing data.

CONCLUSION

Present study shows that the prevalence of hypertensive disorder in pregnancy was 9.01% of total admission. The incidence of maternal mortality due to complication of hypertensive disorder was 23.3% of total mortality and incidence of MNM was 35.34% of total MNM cases. Development of hypertension in pregnancy not detected early because of inadequate antenatal care and there may be delay in initiation of care following development of complications as many women reached hospital after two hours or more. So study indicates that there is a need of better quality antenatal care and extra resources are needed in identification and transport of the women to reach hospital when the women develops complications. There is also a need of improvement of critical care in women who are suffering from life threatening condition.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of Midnapore Medical College, West Bengal

REFERENCES

1. Babore GO, Aregago TG, Ermolo TL, Nunemo MH, Habebo TT. Determinants of pregnancy-induced hypertension on maternal and foetal outcomes in Hossana town administration, Hadiya zone, Southern Ethiopia: Unmatched case-control study. *Plos one.* 2021;16(5):e0250548.
2. Hema V, Yamuna S, Ujwala K, Anusha K, Mood M. Study of prevalence of pregnancy induced hypertension in pregnancy. *Inter J Clin Obstet Gynaecol.* 2020;4(5):148-51.
3. Haque MM Sarkar NC. Prevalence of pregnancy induced hypertension among the pregnant women: a study in Shaheed Ziaur Rahman Medical College Hospital, Bogura, Bangladesh, Saudi. *J Med Pharmac Sci.* 2020;6(1):53-7.
4. Muti M, Tshimanga M, Notion G T, Bangure D, Chonzi P. Prevalence of pregnancy induced hypertension and pregnancy outcomes among women seeking maternity services in Harare, Zimbabwe. *BMC Cardiovas Dis.* 2015;15:111.
5. Gudeta TA, Regassa TM. Pregnancy induced hypertension and associated factors among women attending delivery service at Mizan-Tepi University Teaching Hospital, Tepi General Hospital and Gebretsadik Shawa Hospital, Southwest, Ethiopia. *Ethio J Heal Sci.* 2019;29(1).
6. Woldeyes WS, Asefa D, Muleta G. Incidence and determinants of severe maternal outcome in Jimma University teaching hospital, south-West Ethiopia: a prospective cross-sectional study. *BMC Pregnancy Childbirth.* 2018;18(1):255.
7. Oppong SA, Bakari A, Bell AJ, Bockarie Y, Adu JA, Turpin CA, et al. Incidence, causes and correlates of maternal near-miss morbidity: a multi-centre cross-sectional study. *BJOG.* 2019;126(6):755-62.
8. Hadad SM, Cecatti JG, Souza JP, Sousa MH, Parpinelli MA, Costa LM, et al. Applying the maternal near miss approach for the evaluation of quality of obstetric care: A worked sample from a multicentre surveillance study. *Biomed Research International.* 2014;2014:989815.

Cite this article as: Maity S, Chaudhuri S, Ghosh P. Maternal near miss and maternal death among women with hypertensive disorders in pregnancy: an observational study in a selected hospital in West Bengal. *Int J Reprod Contracept Obstet Gynecol* 2023;12:1802-7.