

Trend and Factors among the Maternal Deaths Associated with Eclampsia at a Tertiary Care Centre: Retrospective Six Years Study

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Abstract

Background: Building on the momentum generated by Millennium Development Goal 5, the Sustainable Development Goals (SDGs) establish a transformative new agenda for maternal health is to reduce the global MMR to less than 70 per 100 000 deliveries by 2030. At the country level, India estimated 15% maternal deaths worldwide in 2015. Among the major complications, high blood pressure during pregnancy (pre-eclampsia and eclampsia) is one of them. As incidence of eclampsia is influenced by the availability and quality of antenatal care, eclampsia mortality remains important in settings of high maternal mortality. The present study carried out to analyze the trend and assess socio demographic characteristics of maternal deaths associated with eclampsia. **Methods:** The present retrospective record based study was carried out at an Obstetrics and Gynecology Department of a tertiary care hospital located at Northern Maharashtra region. The study extracted the information from the records during the period from 2010 to 2015. The variables like age, education, income, registration status, parity, etc. were also obtained from the records of deaths due to Eclampsia. All the collected data analyzed using Microsoft™ Excel 2010. Descriptive analysis and calculations of indicators were done. **Results:** Maternal mortality rate was 255 per 100000 deliveries for the period of 2010-2015. Eclampsia contribution in maternal deaths is decreased from 66.6 % in 2010 to 43.48% in 2015. Overall Eclampsia incidence was 26.9 per 1000 deliveries and the case fatality rate 3.76 per 100 cases. Age group of 18-22 yrs 31(60.8%), 35 cases i.e.68.6% rural area of residence, 68.6% primigravida,78.4% unregistered pregnancies & Antepartum eclampsia (70.5%) were common factors present in eclampsia deaths. **Conclusion:** Better antenatal care including effective identification of high risk cases for preeclampsia/eclampsia, evidence based protocols for management of hypertension in pregnancy at all levels of health care and robust referral systems are required for better maternal outcome.

Keyword: Eclampsia; Antenatal; Maternal; Maternal mortality rate.

Introduction

Maternal health has significantly improved over the years but still women continue to die as a result of pregnancy related complications every year. Building on the momentum generated by Millennium

Development Goal 5, the Sustainable Development Goals (SDGs) establish a transformative new agenda for maternal health is to reduce the global MMR to less than 70 per 100 000 live births by 2030. Globally, the MMR fell by nearly 44% over the past 25 years, to an estimated 216 maternal deaths per 100 000 live births in 2015, from an MMR of 385 (UI 359 to 427) in

1990. Developing regions account for approximately 99% of the global maternal deaths in 2015, with sub-Saharan Africa alone accounting for roughly 66%, followed by Southern Asia 21.8%. At the country level, India estimated 15% maternal deaths worldwide in 2015. The high number of maternal deaths reflects the inequities in access to health care services, inadequate services & gaps between the countries. Among the major complications that account for nearly 75% of all maternal deaths, high blood pressure during pregnancy (pre-eclampsia and eclampsia) is one of them. Preeclampsia occurs in 5–8% of pregnancies worldwide, and is the second leading cause of direct maternal and fetal deaths [3]. As incidence of eclampsia is influenced by the availability and quality of antenatal care, eclampsia mortality remains important in settings of high maternal mortality [4]. In developing countries like India, Eclampsia remains to be a common cause for maternal death. Most of which are preventable or treatable. The present study carried out to analyze the trend of maternal deaths associated with eclampsia and assess socio demographic characteristics of the deaths associated with Eclampsia at a tertiary care centre during the period of 2010-15.

Methodology

The present retrospective record based observational study carried out at an Obstetrics and Gynecology Department of a tertiary care hospital attached to Shri. Bhausaheb Hire Government Medical College, located at Northern Maharashtra region which is a rural area.

Maternal death⁵ is defined as “as death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by pregnancy or its management but not from accidental or incidental causes” (ICD-10). But for study purpose the deaths occurred in hospitals were included. Eclampsia defined as “ the occurrence of convulsions, not caused by any coincidental neurologic disease such as epilepsy, in a woman whose condition also meets the criteria of preeclampsia” [6]. Preeclampsia includes development of gestational hypertension and significant proteinuria after 20 weeks of gestation or during labor and/or within 48 hours of delivery [7].

The information was extracted from the records during the period 2010 to 2015. The information includes the year wise number of deliveries conducted

in the hospital, year wise number of maternal deaths, cases with eclampsia & year wise deaths due to eclampsia were recorded as per the definition criteria. Cases with known seizure disorders, incomplete records & maternal deaths occurred before coming to hospital were excluded from the study. The records of death associated with eclampsia during study period were segregated to extract the necessary information. Data pertaining to their age, locality, literacy, socioeconomic status as per Kuppaswamy classification [8], Registration status, Parity, etc. were also obtained from the records of deaths due to Eclmpasia.

All the collected data entered and analyzed using Microsoft™ Excel 2010. Descriptive analysis which includes frequency distribution showing number and percentages were generated for each identified variables. The maternal mortality rate was calculated as the number of maternal deaths per 1, 00,000 deliveries. The case fatality rate for eclampsia was calculated as number of deaths due to eclampsia Per 100 eclampsia during the year. The incidence of eclampsia was calculated as per the number of eclampsia cases per 1000 deliveries.

Results

A total of 50281 deliveries recorded in the tertiary care hospital during the period of 2010 to 2015.

A total of 128 maternal deaths recorded with maternal mortality rate 255 per 100000 deliveries. The MMR in 2015 is 250 as compared to 204 per 100000 deliveries in 2010. Maximum MMR i.e. 394 per 100000 deliveries reported during 2012, while minimum recorded during 2014 which was 157 per 100000 deliveries. 51 out of 128 i.e. 39.84 % of maternal deaths were associated with Eclampsia during the study period. The trend shows that contribution of eclampsia in maternal deaths is decreased from 66.6% in 2010 to 43.48% during 2015. But variation reported with maximum (71.4%) in a year 2014 while minimum (9.3%) during the year 2012. Overall 1356 deliveries were associated with eclampsia during the study period with incidence 26.9 per 1000 deliveries and case fatality rate 3.76 per 100 cases (Table 1).

The year wise incidence is showing increase in trend from 25.06 to 33.84 per 1000 deliveries during 2010- 2015. The sudden drop of incidence was observed in 2012(16.8 per 1000 deliveries) and 2014(27.7 per 1000 deliveries). The case fatality rate due to eclampsia reported to be 5.43 per 100 cases during 2010 which decreased to 3.22 per 100 cases in 2015 but a rise was seen in 2014 i.e. 4.02 as compared

to previous year (Graph 1).

Table 2 shows the maternal factors among the eclampsia deaths occurred during the study period. Maximum deaths i.e. 31(60.8%) out of 51 reported from the the age group of 18-22 yrs followed by 19.6% from 23-26yrs of age group. 35 i.e.68.6% belongs to the rural area of residence. Nearly 12 out of 51 i.e. 23.4% & 25(49.1%) were illiterate and having primary

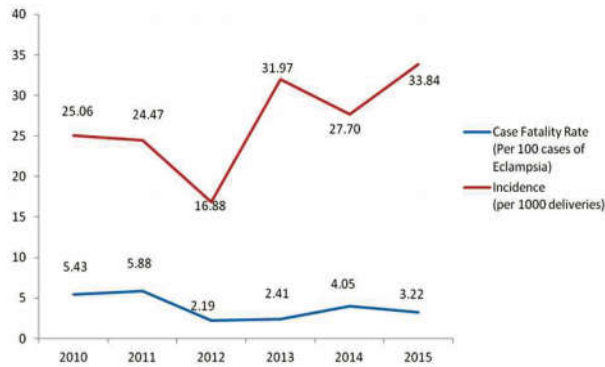
education respectively. Kuppuswamy classification shows 25 out of 51 i.e. 49.1% belongs to upper lower class followed by 13 i.e. 25.4% belongs to lower class. 35 i.e. 68.6% were primigravida. 40 i.e. 78.4% are unregistered pregnancies. Gestation age wise distribution shows 26(51%) deaths were between 32-35 wks of pregnancy. Antepartum eclampsia was majority observed among the 36(70.5%) deaths followed by postpartum (21.6%).

Table 1: Year wise indicators associated with maternal deaths during the study period from 2010-2015

Sr. No.	Variables	Year					Total	
		2010	2011	2012	2013	2014		2015
1	Total deliveries	7342	7643	8116	9072	8918	9190	50281
2	Eclampsia Cases	184	187	137	290	247	311	1356
3	Maternal deaths	15	23	32	21	14	23	128
4	Deaths due to Eclampsia (Numbers)	10	11	3	7	10	10	51
5	MMR	204	301	394	231	157	250	255
6	Eclampsia Contribution to maternal deaths (%)	66.67	47.83	9.38	33.33	71.43	43.48	39.84
7	Case Fatality Rate (Per100 cases)	5.43	5.88	2.19	2.41	4.05	3.22	3.76
8	Incidence (Per 1000 deliveries)	25.06	24.47	16.88	31.97	27.70	33.84	26.97

Table 2: Socio-demographic profile of the Eclampsia deaths during the study period from 2010-2015 (n=51)

Sr. No.	Variables	Numbers	%
1	Age (Yrs)		
	18-22	31	60.8
	23-26	09	19.6
	27-29	4	07.9
	>30	6	11.7
2	Residence		
	Rural	35	68.6
	Urban	16	31.4
3	Education		
	Illiterate	12	23.4
	Primary	25	49.1
	Upto 10th	10	19.6
	>10th	04	07.9
4	SE Status		
	Upper Middle	05	09.8
	Lower Middle	08	15.7
	Upper Lower	25	49.1
	Lower	13	25.4
5	Gravida		
	Primi	35	68.6
	Multi	16	31.4
6	Registration		
	Yes	40	78.4
	No	11	21.6
7	Parity		
	Primi	35	68.6
	2 nd	10	19.6
	>2 nd	06	11.8
8	Gestational age (wks)		
	36-40	20	39.2
	32-35	26	51.0
	<32	05	09.8
9	Eclampsia Type		
	Antepartum	36	70.5
	Intrapartum	04	07.9
	Postpartum	11	21.6



Graph 1: Yearwise percentage of case fatality rate and incidence of Eclampsia during the study period 2010-2015

Discussion

Maternal health is an important indicator for assessing the quality of health care services at community level as well as institution level. Large number of maternal deaths are related to direct causes like Haemorrhage, Sepsis and Eclampsia; fortunately which are preventable. A timely analysis of these causes and its factors is strongly needed to take substantive measures for control of maternal mortality. Hence the present retrospective record based study conducted at the Obstetrics and Gynecology Department of a tertiary care centre attached to a Government Medical College located at rural area of North Maharashtra. The study included records from the six years i.e. from 2010 to 2015.

In our study, the overall average of MMR of 255 per 100000 deliveries was observed in the last six years i.e. 2010-2015. India tended to reach the MMR 140 per 100000 live birth by 2015 [9]. The higher MMR in our study as compared to average for the country could be because of cases being reported at late stage of disease which increases mortality rate at an institutional level as well as its denominator includes the deliveries at institution only. This finding is almost similar with other studies conducted at institutional level. Dr Madhuri Barinath & Dr Karkal⁵ conducted study in a tertiary care centre located at north Karnataka and reported similar MMR of 277 per 100000 deliveries for the period of 2009-2014. Bhaskar Murthy et al [10] also reported MMR of 302.23/100000 deliveries in the study period of 2001-10. While the study conducted at the rural tertiary care centre of West Bengal reported more MMR i.e. 518.8 per 100000 deliveries [11]. But at this rate it will be difficult to achieve the Targets under SDG's.

We observed 51(39.8%) deaths due to eclampsia from 128 maternal deaths reported in the study period. Eclampsia is one of the major direct cause of maternal

deaths. The contribution of eclampsia as cause for maternal deaths declined from 66.6 % in 2010 to the 33.84% in 2015. This suggests availability of the referral mechanism from peripheral institutions or community and improved services at a tertiary care centre to some extent. The variation observed over the period could be contributed to the lack or incomplete records during that period or variation in programmatic inadequacy in terms of supply of medicine, transportation facility, manpower availability & referral mechanism etc. at periphery health institute or tertiary care centre. Dr Malay Sarkar et al¹² reported 45.36% of deaths contributed by eclampsia in a study conducted at a West Bengal. These findings are much higher as they are derived from the hospital based data as compared to that of the WHO report of 2005 [13] which reported 8% deaths contributed by Eclampsia. Most of maternal deaths and complications are due to lack of prenatal care, lack of access to hospital care, lack of resources, and inappropriate diagnosis and management of patients with preeclampsia-eclampsia in the developing countries [14].

It was also observed that the incidence of Eclampsia per 1000 deliveries increased from 25.06 to the 33.84 per 1000 deliveries from 2010 to 2016 respectively. The average incidence reported was 26.96 per 1000 deliveries. The other studies Ratan Das [11] (2.67% i.e. 26.7 per 1000 deliveries) & Swain S et al [15] (22/1000 hospital deliveries) reported similar incidence. The relatively high incidence of eclampsia could be correlated with the lack of antenatal care or late referral to higher centre. Poor MCH services operating at field level could be cause for no change in the trend of Eclampsia incidence [15]. Early detection of high risk pregnancies and referring them to a tertiary center at the earliest can further reduce the complications of high risk pregnancies [9].

The Case fatality rate was observed to be decreased from 5.43 per 100 cases to 3.22 per 100 cases in a period from 2010 to 2015 respectively. Case fatality Rate is comparatively lower than that observed by Ratan das et al [11] (8.61 %) as well as by RG Kar [7] medical college Calcutta India (16 percent) while other studies [16,17] reported similar incidence. However, the reduction in the case fatality rate in 2015 as compare to 2010 suggest the availability of better treatment modalities including specialists at the tertiary care centre. Eclampsia is a preventable cause of maternal mortality provided the treatment is instituted in time. Unfortunately, in many cases, patients were referred very late, in critical condition, unaccompanied by health care worker, travel a long

distance sometimes in a private vehicle to reach tertiary center. Most of these deaths are preventable if patients are given appropriate treatment at periphery and timely referred to higher centers [10].

The various socio-demographic factors may be associated with the maternal deaths due to eclampsia. We studied the some factors amongst the deaths due to Eclampsia and found that Age group of 18-22 yrs (60.8%), Rural area of residence (68.6%), Illiterate or primary education (72.5%), Lower SE class (74.5%), Primigravida (68.6%), Unregistered pregnancies (78.4%), 32-35 wks of duration of pregnancy (51%) & Antepartum eclampsia (70.5%) were present in majority of the deaths associated with eclampsia.

Maya Sarkar et al [12] also observed similar findings among eclampsia deaths, like more commonly occur in younger age group(68%), primigravida (70%), antepartum (75 %) & SE status low (85%) while reported 75% deaths in between 36-40 wks of pregnancy which is contradicting to our study. Madhuri badrinath [5] also reported similar findings i.e. 51.11% of primigravida women, rural areas-69.16%, unbooked patients (28.88%), and illiterate women -65% .Other studies also reported similar findings [10,11,18].

The most common factors like younger age group, primi gravida, low socioeconomic status, illiteracy and rural area are prone to have eclampsia deaths. These all factors tend to have early marriages and early child birth. The majority of deaths in our study were unregistered pregnancies, less than 36 weeks of gestation and having antepartum eclampsia. This may suggest poor health seeking behavior as well as poor antenatal check up including screening for preeclampsia/eclampsia at grass root level and late transfer of patients to the tertiary hospital. Studies done by Ratan das [11], Berha et al [19] & Pal A et al [20] also support our findings.

Conclusion

The overall incidence of eclampsia has remained the same during the study period suggests that the lack of inadequate antenatal care services during pregnancy as well as presence of socio-demographic risk factors among pregnant women. Effective screening of blood pressure for preeclampsia is needed to prevent complications and increase maternal survival. While contribution of eclampsia in maternal mortality and case fatality rate of eclampsia is reduced as compared to previous years suggests availability of transportation facility and improved services at a tertiary care centre. It can be

concluded that better antenatal care including effective identification of high risk cases for preeclampsia/eclampsia, Standard simplified protocols for management of hypertension in pregnancy at all levels of health care and robust referral systems are required for better maternal outcome.

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