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RESEARCH ARTICLE

RETROSPECTIVE ANALYSIS OF MATERNAL MORTALITY IN A TERTIARY CARE CENTRE OF NORTHERN INDIA

Seema Dwivedi, *Uruj Jahan, Neena Gupta and Kavita Verma

Department of Obstetrics and Gynecology, GSVM Medical College, Kanpur, Uttar Pradesh, India

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WHO: World health organisation
MDG: fifth millennium development goal
MMR: Maternal mortality ratio
IMR: Infant mortality rate
TFR : Total fertility rate

ABSTRACT

Background: High Maternal mortality continues to be a challenge in reaching millennium development goal-5 target. The WHO has reported that two-thirds of maternal deaths occur in just 11 countries, with India topping that list at 17%.

Objective: The main objective of study is to identify major cause of maternal deaths and to suggest recommendations for improvement.

Methods: Details of all maternal deaths analysed over a period of 6 years i.e. from January 2011 to December 2016, occurred in obstetrics and gynecology department, GSVM Medical college, Kanpur, Uttar Pradesh.

Results: In this retrospective study, total number of maternal deaths were 422 over the period of 6 years. Maximum number of deaths reported in illiterate, rural women of low socio-economic status, of age group of 25-31years. Most of women were antenatal, unbooked, referred and had one or other form of delay in seeking or receiving care before death. Most common cause of death was hypertensive disorders of pregnancy (31.27%) followed by haemorrhage (24.17%) and sepsis (6.63%).

Conclusion: Most common cause of deaths was triad of hypertension, haemorrhage and sepsis and majority of these deaths could be prevented by improvement in peripheral health care system, timely referral to tertiary care hospitals and increasing social awareness.

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INTRODUCTION

According to World Health Organisation (WHO), "A maternal death is defined as death of a woman while pregnancy 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" (Special bulletin on maternal mortality in India 2007-09). The WHO has reported that two-thirds of maternal deaths occur in just 11 countries, with India topping that list at 17%. Maternal mortality has been identified as a priorty on health policy and research agendas for developing countries (Ramos *et al.,* 2007). Therefore the fifth millennium development (MDG) goal concerns improving maternal mortality by 75%. Recent reviews of MDG revealed that the MMR globally decreased by 47% (global scenario) and 60% (Indian scenario) between 1990 and 2013 (WHO, 2014). According to estimates in India, the MMR has reduced from 254 per lakh live births in 2004-06 to 167 per lakh live births in 2011-2013 and in UP, MMR has reduced from 440 to 285 per lakh live births during 2004-06 to 2011-2013 but unfortunately UP still has second maximum number of maternal deaths in India (NITI Aayog, 2017). With the advancement of medical science the average life span of people has increased greatly in recent years; but the rate of decrease of MMR is not up to the mark. Particularly most of these maternal deaths are preventable. Of all maternal deaths, 26% are estimated to be prevented by introducing antenatal, community based interventions. Access to quality, essential obstetric care can prevent 48% of maternal deaths (Khan *et al.,* 2006). Therefore the government of India has launched the national rural health mission in 2005 with the aim of decreasing MMR, IMR and TFR (Taneja, 2013). This study aims to review the hospital data of maternal mortality to identify the major cause of MMR in district and suggest the remedial measures to reduce the same.

MATERIALS AND METHODS

Details of all maternal deaths noted over a period of 6 years i.e. from January 2011 to December 2016, occurred in obstetrics and gynecology department, GSVM Medical college, Kanpur,

***Corresponding author:* Uruj Jahan,**
Department of Obstetrics and Gynecology, GSVM Medical College, Kanpur, Uttar Pradesh, India.

UP. We include all causes of deaths resulting from medical cause related to pregnancy that occur during pregnancy, at delivery or within 42 days of delivery or termination. The cases were analysed in respect to maternal age, socio-economic status, parity, gestational age, intranatal care, past medical history, factors related to delivery and fetal outcome.

RESULTS

In this retrospective study, total number of maternal deaths were 422 over the period of 6 years. Maximum number of deaths reported in age group of 25-31years and women belongs to rural area. Majority of women were illiterate and of low socio-economic status (Table 1). 70.6% women reported in antenatal period but mostly in late 3rd trimester and during labour; rest admitted in post-partum period (Table 2). Most of the women were unbooked (88.15%) and had not taken iron folic supplementation (85.07%). Even after so much effort, one women was not immunised with tetanus toxoid injection (Table 3). Being tertiary care center, majority of women were referred (73.22%) but only 14.93% women were bought by ASHA. It was observed that all women had one or other form of delay in seeking or receiving care before death. In most of the women (74.88%), there was delay at first level and in 22.5% women there was unavailability of ICU (Table 4). Majority of women delivered vaginally (72.9%) at hospital (71.4%) and 6.39% women remain undelivered (Table 5). Most of women were anemic (81.04%), 4.02% were known cardiac and 3.32% women were hypertensive (Table 6). Most common cause of death was hypertensive disorders of pregnancy (31.27%) followed by haemorrhagic disorders (24.17%) and sepsis (6.63%) (Table 7).

Table 1. Patient Profile (n=422)

Age group	Number	Percentage
18-24 yrs	57	13.45%
25-31 yrs	205	48.67%
>32 yrs	160	37.91%
Residence		
Rural	289	68.48 %
Urban	133	31.51 %
Literacy		
Illiterate	390	92.41%
Literate	32	7.58%
Socioeconomic Scale		
Class 1	13	3.08 %
Class2	42	9.95 %
Class3	89	21.09 %
Class4	178	42.18 %
Class 5	100	23.69 %

Table 2. Gestational Age (n=422)

Gravidity	298	70.61%
Primigravida	131	43.95 %
G2	59	19.79 %
G3	52	17.44 %
G4/>	56	18.79 %
Parity	124	29.38%
Para 1	45	36.29%
Para2	24	19.35%
Para3	30	24.19%
Para4	25	20.16%
Antenatal	298	70.61%
1st trimester	16	5.36%
2nd trimester	37	12.41%
3rd trimester	245	82.21 %
Postnatal	124	29.38%
Within 24hrs	71	57.25 %
Within 1 week	42	33.87 %
Within 1 month	11	8.87 %

Table 3. Intranatal care (n=422)

	Number	Percentage
Intranatal Care		
Booked	12	2.84 %
Unbooked	372	88.15 %
Irregular ANC visits	38	9.02 %
Iron folic acid supplentation		
Received	63	14.93 %
Irregular	45	10.66 %
Regular	18	4.27 %
Not Received	359	85.07%
Tetanus Immunization		
Received	421	99. 76 %
Not received	1	0.24%

Table 4. Referral status & delay at different levels

Referral status		
Referred	309	73.22 %
Not referred	113	26.78 %
Brought by ASHA	63	14.93 %
Delay at different levels		
First level delay: at patient's level		
Delay in seeking care	316	74.88%
Remote areas(delay in reaching the health care facilities)	96	22.75 %
Second level delay:		
Delay in transportation	289	68.48%
Delay in treatment	216	51.18 %
Delay in timely referral	190	45.02 %
Third level delay :		
unavailability of ICU bed	95	22.51 %
unavailability of Donor	8	1.89 %

Table 5. Factors related to delivery (n=422)

Pregnancy outcome (n=422)		
Undelivered	27	6.39%
Aborted	11	2.60%
Vaginal	280	66.35 %
Caesarean section	104	24.64 %
Place of delivery (n=384)		
Home	110	28.64 %
Hospital	274	71.46 %

Table 6. Past medical history

	Number	Percentage
Heart disease	17	8.94 %
Diabetes	2	0.10 %
Tuberculosis	12	6.31 %
Anemia.	165	39.09 %
Hypertension.	14	7.65 %
Renal diseases.	7	0.04 %
Jaundice	23	8.92 %
Hepatitis B	2	0.10%
HIV	2	0.10%
Malaria	2	0.10%

Table 7. Causes of Death (n=422)

	Number	Percentage
Haemorrhagic disorders	102	24.17%
ante partum hemorrhage	56	54.90 %
post partumhemorrhage	46	45.10%
Hypertensive disorders	132	31.27%
pre eclampsia	80	60.60%
ecplampsia	52	39.40%
sepsis	28	6.63%
rupture uterus	17	4.02%
unsafe abortions	11	2.60%
ectopic	5	1.18 %
CHF with severe anemia	31	7.34%
RHD	17	4.02%
Other Medical disorders	52	12.32%
Obstructed labour	7	1.66%
Uterine inversion	3	0.71%
Placenta acreta	5	1.18%
Retained placenta	3	0.71%
Blood transfusion disorder	4	0.95%
Others	5	1.18%

Table 8. Fetal Outcome (n=411)

IUD	295	71.2 %
Live birth	89	21.7%
Nicu admission	35	8.5%
Perinatal deaths	21	5.1%

Total number of live birth was 89 (21.7%) and percentage of still birth and IUD was 71.2%.

DISCUSSION

Maternal mortality is an index of reproductive health of society. This study attempts to analyse the cause of maternal deaths to have a clear understanding of trend and the magnitude of pregnancy related mortality. So that, comprehensive prevention strategies can be formulated to prevent these unanticipated deaths among women. In our study, maximum number of maternal deaths were in age group of 25-31 years; as highest number of births were reported in this age group. Most of women were illiterate, unbooked, belonged to rural area and of low socio-economic status. As these women are not able to access proper care throughout pregnancy and delivery due to various causes such as deficiencies in the health care delivery system, seeking health care, ignorance and lack of transport facilities. All our findings were similar to studies done by (Murthy *et al.,* 2013; Jain and Maharahaje, 2003; Jadhav and Rote, 2007; Pal *et al.,* 2005; Onakewhor and Gharoro, 2008; Shah *et al.,* 2008). In this study, majority of women were reported in antenatal period but late in pregnancy or during labour and were primigravida.But in other studies, most of maternal deaths noticed in multigravida (Murthy *et al.,* 2013; Jain and Maharahaje, 2003). Being tertiary care center, most of the women referred from rural and remote areas and unfortunately in many cases were referred very late, had delay at different levels and unaccompanied by any health care worker (85.07%).

In our study, most common cause of death was hypertension followed by haemorrhage and sepsis. Other studies also found the same triad but in contrast, haemorrhage was most common causative factor (Murthy *et al.,* 2013; Jain and Maharahaje, 2003; Jadhav and Rote, 2007; Pal *et al.,* 2005; Onakewhor and Gharoro, 2008; Shah *et al.,* 2008; Ahmed *et al.,* 2016; Khosla *et al.,* 2006; Sinha, 1986; Bardale and Dixit, 2007; Bangal *et al.,* 2016). According to WHO systemic review also, haemorrhage was found to be the largest cause of maternal death worldwide (Say *et al.,* 2014). Similar to our study, in South Africa, Latin America and Caribbean also, hypertension was commonest direct cause of maternal death (Moodley, 2007). Previously, obstetric haemorrhage was the major cause of maternal mortality in India in primary, secondary and tertiary care set up, but recently paradigm shift in the pattern of maternal mortality has been observed in tertiary care set up like medical colleges as also observed in our study and studies done by Sarkar and Das et al (Sarkar *et al.,* 2013; Das and Biswas, 2015). Decreased incidence of maternal death from obstetric haemorrhage in medical college may be because of better facilities to control bleeding by availability of oxytocin, prostaglandins, surgical interventions and blood banks. Even, balloon tamponade is saviour in most cases of haemorrhage in our hospital. In our study, most of deaths occurred in primigravida and eclampsia is also mainly seen in primigravida while haemorrhage noticed in multigravida. Now, in most of peripheral centers also, magnesium sulphate coverage was started but still overall mortality was not reduced. A WHO survey of delivery care in more than 300 health facilities in 29 countries highlighted that, even if coverage of magnesium sulphate is high in cases where coverage is needed, the overall mortality due to eclampsia was not reduced, highlighting the fact that more attention to other elements of quality of care is needed (Souza *et al.,* 2013). As most of patients were unbooked, referred very late, without any antenatal care or BP measurement could not be saved as they had lost their golden period of survival. Anemia, heart disease and jaundice were most common indirect cause of death. These findings were consistent with studies done by (Jadhav and Rote, 2007; Pal *et al.,* 2005; Onakewhor and Gharoro, 2008; Shah *et al.,* 2008). Government has launched many programs, policies and schemes for pregnant women such as JSY (Jananisurakshayojna) to motivate institutional delivery with incentives, care through ASHA worker; and NRHM encourages training of medical officers and staff nurses working in rural area by programs like basic emergency obstetrics care (BEMOC) and skilled attendant at birth (SAB) for proper antenatal care and management of labour. But inspite of all these efforts, we are not able to achieve millennium development goal because we have to maintain health care standards at grass root level and strongly implement them by interdisciplinary collaboration among doctors, midwives, auxillary nurses, other paramedical staff and community leaders and it also requires willful political drivet o improve present scenario.

Conclusion

At last, we concluded that most of maternal deaths are seen in rural, illiterate and socially deprived women and classical triad of hypertension, haemorrhage and sepsis still continues as most common causative factors and among them; hypertension was most common cause, which can be easily prevented by improvement in peripheral health care system, timely referral to tertiary care hospitals and increasing social awareness.

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