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Study of Maternal Mortality in a Tertiary Care Hospital, KGH

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Abstract: Background: Maternal mortality is the death of a woman while pregnant or within 42 days of termination of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from the accidental or incidental causes. Maternal mortality is a key indicator of health services provided to population and reflects the health status of community. **Methodology:** This is a retrospective study of maternal deaths that occurred in King George Hospital, Visakhapatnam over a period of 1year (January 2019 to December 2019). Data is analysed using case sheets. Various causes of maternal deaths in this teaching hospital are identified. **Results:** In the study period there were 7568 deliveries and 69 maternal deaths. The direct causes accounted for 45 with hypertensive disorders, haemorrhage, sepsis as leading causes of maternal mortality. The indirect causes accounted for 24 with dengue fever, anaemia, heart disease and jaundice as leading causes of maternal mortality. **Conclusion:** Health education, regular antenatal checkups, early recognition of high risk cases, timely intervention, early referral, better transportation services in remote and tribal areas are needed to reduce maternal mortality.
Keywords: Maternal mortality, hypertensive disorders, haemorrhage, sepsis, anemia.

Introduction

Who are those behind the numbers? Their stories? They have left not only their families and dreams but also clues as to why their lives ended so early. A maternal death is the outcome of a chain of events and disadvantages throughout a woman's life. Every time a woman in the third world becomes pregnant, her risk of dying is 200 times higher than the risk run by a woman in the developed world. The world has come a long way from the times when a woman surviving childbirth was considered to be blessed with a 'second life' to the present, as the WHO theme for the year 2005 states, "every mother counts"! Maternal mortality is the death of a woman while pregnant or within 42days of termination of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from the accidental or incidental causes[1].

In spite of marked fall in maternal mortality in recent years, every day about 830 women die from pregnancy or childbirth-related causes. These deaths are preventable. Goal of United Nations is to reduce MMR by 75% by 2015. There is a wide variation in MMR in India and variations in the regional states. Multiple factors like social factors, economic status, literacy, patient care, hospital care, infrastructure facilities in the referral units etc has its impact on maternal death. The United Nations Population Fund (UNFPA), 2017 report is as follows: one woman dies every two minutes and 20 to 30 women have suffer with severe morbidity for every one woman who dies[2]. Global ratio of maternal mortality is 400 per one lakh live births. India has made significant progress in reducing

maternal mortality. MMR ratio has declined from 556 per one lakh live births in the year 1990; to 167 in 2011-13; to 130 in 2016 and 122 per one lakh live births in the year 2017. Approximately 44000 maternal deaths occur in India. Millennium Development Goals mandate a further reduction in MMR to 103.[5]

Maternal death review process initiated by the Government of India in 2010 by analysing and identifying lacunae in the healthcare systems to improve the quality of obstetric services. Approximately 1.4 lakh women die every year. The target of MMR set for India was 139 per one lakh live births. This had to be achieved by the year 2015 and India has achieved MMR of 122 per one lakh live births by the year 2017. As per sustainable developmental goals India has aimed to reducing MMR to less than 70 per one lakh live births.[7]

Aims and Objectives of the Study

(i) To analyse and assess the direct and indirect causes of maternal mortality aimed at preventing the maternal deaths. (ii) To analyse the specific causes and factors of maternal mortality in this institute. (iii) To identify the leading cause of death in our institution during the study period. (iv) To identify the requirements and deficiencies in the management of preventable deaths in our institute.

Materials and Methods

A retrospective study was conducted in King George Hospital, Visakhapatnam which is a tertiary care hospital that caters the North coastal districts of Andhra Pradesh. A total of 69 maternal deaths were recorded during the period of 1 year (January 2019–December 2019). All the maternal deaths were analysed using case sheets manually and relevant statistical tests were applied.

Observation and Analysis of Results

There were 7568 deliveries conducted with 7044 live births from January 2019 to December 2019 and 69 maternal deaths during the same period.

Table 1. Age wise distribution of deaths

Age	No. of deaths	% of deaths
Less than 20 years	19	27.53
21-25 years	26	37.68
26-30 years	16	23.18
31-40 years	8	11.59

Majority of the mothers 37.68 % were in the age group of 21-25 yrs. Teenage pregnancies constituted about 27.53%. Maternal deaths in age group above 25 yrs were 34.77%

Table 2. Booked versus Un booked cases

	No. of deaths	Percentage
Booked	03	4.34
Un booked	66	95.65

Majority of the mothers were unbooked cases constituting of about 95.65% and booked were only 4.34%.

Table 3. Tribal versus Non-tribal case distribution of deaths

	No. of deaths	Percentage
Tribal	15	21.73
Non-tribal	54	78.26

Among the deaths non-tribal population are about 78.26% and tribals were 21.73%

Table 4. Admission death interval

Time interval	No. of deaths	Percentage
<1hr	5	7.24
1-24 hr	14	20.28
3days	11	15.94
4-7days	20	28.98
>7days	19	27.53

Within 1 day of admission 27.57% of deaths occurred. Most of them were in moribund state at the time of admission. In 56.51% of cases deaths occurred after 4 days of admission.

Table 5. Maternal deaths in relation to period of gestation

	No. of deaths	Percentage
Antenatal	17	24.63
Intra natal	01	1.44
Postnatal	47	68.11
Post abortal	03	4.34
Ectopic	01	1.44

Most of deaths occurred in post natal period. Antenatal deaths include 24.63%. Deaths due to post abortal complications accounted for 4.34% and the rest of the 1.44% were ectopic pregnancies.

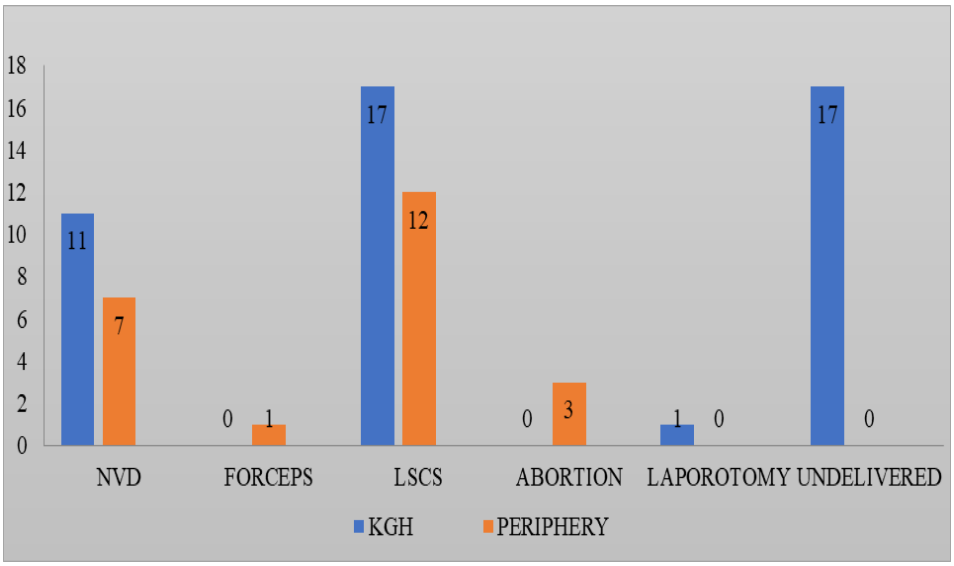

Figure 1. Nature of delivery among maternal deaths

Undelivered mothers were 24.63%. Normal vaginal delivery was conducted in 24.63% of cases among which one third of deliveries were at peripheries. Caesarean section was performed among 42.02%, two fifths were performed in KGH after being referred from periphery.

Post abortion complications led to 4.34% of deaths, which were attempted at periphery and following usage of over the counter drugs. Laparotomy was performed at KGH for rupture ectopic in 1.44% of cases. Forceps was applied in 1.44% of cases.

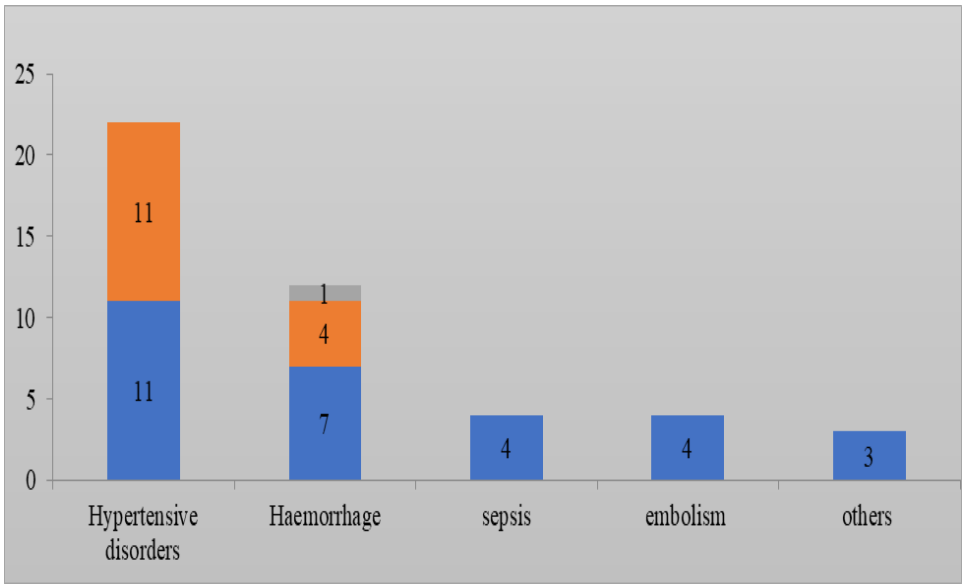

Figure 2. Distribution of direct causes of maternal deaths

Hypertensive disorders of pregnancy is the leading cause of maternal death, accounting for about 22 cases, among which 11 due to eclampsia and 11 due to severe preeclampsia. Among them 8 were due to pulmonary oedema, 6 due to renal failure, 3 due to CVA, 3 due to liver failure, 1 due to circulatory failure and 1 due to hypertensive encephalopathy.

Haemorrhage is the second leading cause of death accounting for about 12 maternal deaths, among which 7 due to atonic postpartum haemorrhage, 4 due to traumatic postpartum haemorrhage, 1 due to antepartum haemorrhage. There were 2 deaths due to rupture uterus, 1 due to secondary postpartum haemorrhage, 1 due to retained placenta (placenta percreta), 1 due to colporrhexis.

Sepsis accounted for 4 deaths, all are due to puerperal sepsis. Pulmonary embolism accounted for 4 deaths. Remaining direct causes of maternal deaths are due to PPCM (3 cases), aspiration pneumonia (2 cases).

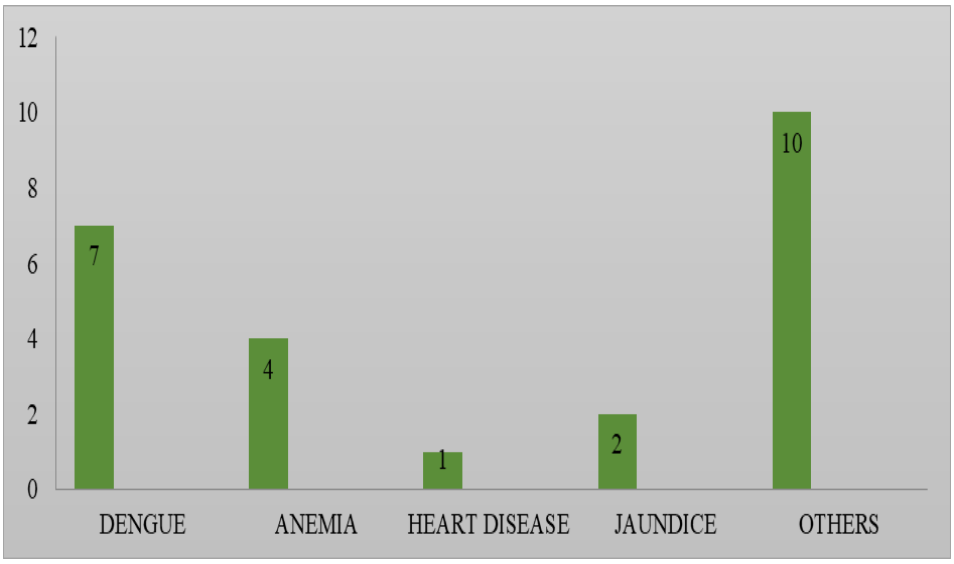

Figure 3. Distribution of indirect causes of maternal deaths

Indirect causes accounted for 24 maternal deaths, 7 due to dengue, 4 due to anemia, 2 due to jaundice, 1 due to heart disease and other indirect causes include 6 due to infections, 1 ovarian malignancy, 1 CVA due to AV malformations, 1 due to SLE complications. Infections include meningoencephalitis, pneumocystis carinii pneumonia, swineflu, febrile illness.

Table 6. Preventable vs Non preventable

	No. of deaths	Percentage
Preventable	35	50.72
Non preventable	34	49.27

There were about 50.72% of preventable causes of death which is remarkable. The remaining 49.27% deaths are due to non-preventable causes.

Discussion

Table 7. Comparative analysis of main causes of deaths

Author	Hmg	Htn	Sepsis	Anemia	Jaundice	Heart diseases
Bangal et al.[7]	21.05%	10.52%	7.89%	2.63%	21.05%	13.15%
Saini, Gupta[8]	23.9%	7%	21.1%	8.4%	9.8%	2.8%
Priya et al.[9]	35.05%	27.83%	18.55%	25.7%	-	-
Yadav et al.[10]	43.6%	33.09%	12.67%	55.7%	23.06%	-
Puri et al.[11]	22.22%	31.94%	43.05%	32.7%	34.61%	3.48%
Devi et al.[3]	27.84%	23.71%	15.46%	7.22%	4.12%	2.06%
Present study	17.39%	31.88%	5.79%	5.79%	2.89%	1.44%

Death of mother directly reflects on the upbringing of the surviving children. Reduction of maternal mortality is the aim of millennium development goals.[4]

In the present study, there were 69 maternal deaths amongst 7568 deliveries with 7044 live births. King George hospital Visakhapatnam is a tertiary care centre covering the North Coastal areas of Andhra Pradesh. Delayed referrals and moribund patients at the time of admission inflated the maternal deaths. Similar observations were made in studies from other teaching hospitals where the maternal deaths ranged between 30 to 194.[5-10.]

Early marriage is still a custom among the rural population, 37.68% deaths were in age group 21-25 and 23.18% deaths among ages 26-30 and 27.53% deaths were due to teenage pregnancies, 11.59% deaths in mothers above 30 years. These findings correlate with that reported by other studies. Devi et al.[3] reported 48.45% deaths in age group 21-25 years, 26.8% deaths in age group 26-30 years, 17.53% were due to teenage pregnancies and 7% deaths above 30years. Bangal et al.[7] reported 55.2% deaths in age group 19-24, 15.79 % deaths in <19 years. Saini, Gupta,[8] reported 81.69% deaths in age group 21-30 years. Priya et al,[9] reported 74.22% deaths in 21-30 years. Yadav et al.[10] reported 72.68% deaths among 20-29 years. Puri et al.[11] showed 71.53% of deaths occurred in 21-30 years age group. Reduction in child marriage reduces teenage pregnancies and thus deaths.

In the present study, 52.17% deaths occurred in multigravida and 47.82% among primi was observed, comparable to other studies. Devi et al.[3] reported 57.73% deaths occurred in multigravidae and 42.27% among primigravida. Bangal et al.[7] reported 57.89% deaths among multigravida and 42.10% among primi; Saini, Gupta.[8] reported 83.49% of deaths among multigravidas. Priya et al.[9] showed 49.48% were multigravidae. Yadav et al.[10] reported 56.7% deaths among multigravida and Puri et al.[11] reported 51.53% of deaths among multigravida. In this study, 68.11% deaths occurred in postnatal period followed by 24.63% deaths in the antenatal period. Similar results have been obtained in other studies; Devi et al.[3] showed 60.82% deaths occurred in the post natal period followed by 22.68% deaths in the antenatal period. Purandare et al.[6] showed 73.33% deaths occurred in postpartum period and 26.66% in antenatal period. Saini, Gupta,[8] reported 66.1% of post natal deaths. Priya et al.[9] showed 62.8% postpartum deaths. Yadav et al.[10] reported 72.16% post natal deaths; Puri et al.[11] showed 63.08% of deaths in postnatal period.

In the present study, 7.24% deaths occurred within an hour of admission, 20.28% deaths occurred within 24hrs of admission, 15.94% deaths within 1-3 days, 28.98% deaths within 4-7 days, 27.53% deaths occurred 1 week of admission. Devi et al.[3] showed 2.06% deaths within an hour of admission, 48.45% deaths within 24 hrs of admission, 27.83% deaths within 1-3 days, 14.44% deaths in 4-7 days of admission, 7.22% of deaths were after 1 week of admission. Results of other studies were similar, Purandare et al.[6] showed 3 women died within 30 minutes, 14 between 30 minutes and 6 hours, 7 between 6 and 24 hours and 6 after 24 hours.

Bangal et al.[7] reported 1 death within 1 hour of admission, 15.79% between 2-12 hours of admission, 21.05% between 13-24 hours of admission and 25.06% after 7 days of admission. Saini, Gupta,[8] reported 42.85% deaths within 24 hours of admission an 57.74% after 24 hours. Priya et al. [9] showed that 54.63% of deaths were within 24 hours of admission, 19.58% within 25-48 hours 10.30% within 49-72 hours and 15.46% after 72 hours of admission. Puri et al.[11] reported 45% of deaths within 24 hours of admission.

In the present study, direct causes contributed to 65.21% of deaths and 34.78% deaths due to indirect causes. Leading causes being hypertension 31.88% (eclampsia and severe preeclampsia), haemorrhage 17.39% (postpartum haemorrhage, antepartum haemorrhage, rupture uterus and rupture ectopic), sepsis 5.79% (post abortal and puerperal sepsis), embolism 5.79%. Indirect causes include dengue 10.14%, anaemia 5.79%, heart disease complicating pregnancy 1.44%, jaundice 2.89%. Similar results were seen in other studies, Devi et al.[3] observed direct causes 8-9.38% and 20.62% indirect causes; haemorrhage 27.4%, hypertensive disorders 23.71%, sepsis 15.46% embolism 9.28%, anaemia 7.22%, heart disease complicating pregnancy 4.12% and 2.06% jaundice. Purandare et al.[6] observed 70.83% deaths due to haemorrhage, 13.3% due to hypertension and 3.3% deaths due to sepsis. Bangal et al.[7] reported 21.05% deaths due to haemorrhage, 10.52% deaths due to eclampsia and pulmonary embolism and 7.89% due to sepsis, 13.15% deaths due to heart disease and anaemia as cause in only 2.63% of deaths.

In Saini, Gupta study,[8] 60.5% were direct deaths among which 23.9% were due to haemorrhage 21. 1% due to sepsis and 7% due to eclampsia and 39.43% were indirect causes of death. Priya et al.[9] showed postpartum haemorrhage 35.05% as the leading cause followed by hypertensive disorders 27.83% and anaemia 25.7%.

Yadav et al.[10] reported 73.19% as direct obstetric deaths of which haemorrhage 43.16%, hypertension 33.09%, sepsis 12.67%, 26.8% were indirect cause with anaemia as leading cause; while Puri et al.[11] and group reported sepsis 43.05% as leading cause followed by haemorrhage and eclampsia 22.22% and 31.94% respectively. Thus, direct causes- hypertensive disorders, haemorrhage and sepsis are still the leading causes of death.

Conclusion

The present study had aimed to analyse community factors and institutional factors contributing to maternal mortality. Hypertensive diseases of pregnancy presented as the most common cause of maternal mortality. Early antenatal care, health education, identification of hypertension at an early gestational age and timely intervention can reduce maternal morbidity and mortality. Postpartum haemorrhage can be controlled by active management of third stage of labour and employing newer techniques like SR cannula. Lack of life support equipment, ventilator and dialysis units with non-availability of blood products have contributed to maternal mortality. Services of experienced medical personnel where essential services are needed to identify high risk factors to reduce maternal mortality.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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