Original Research Article

Analysis of maternal deaths: autopsy study at tertiary health care center

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ABSTRACT

Background: Every day thousands women died due to complications of pregnancy and child birth globally. Almost all of these deaths occurred in low-resource settings, and most could have been prevented. Maternal mortality is a health indicator that shows very wide gaps between rich and poor, urban and rural areas, both between countries and within them. The present study was carried out with view to determine factors causing maternal deaths, causes of maternal deaths and utility of autopsy with autopsy record as a useful and adjunct data source for ascertainment of maternal deaths.
Methods: Total 95 cases of maternal deaths which were brought for postmortem were studied during period of August 2012 to July 2014.
Results: Maximum number of maternal deaths were seen in age group of 21 to 25 years comprising 38 (40.0%) and with maximum cases from low socioeconomic strata. Analyzing the pregnancy outcome, live birth to child were given by 66 (69.5%) against negative outcome in 29 (30.5%) of cases. Post-partum hemorrhage remains the leading cause followed by sepsis 13 (13.7%) in direct causes of maternal deaths. In indirect causes hepatitis leads the list with 4 (4.2%) cases.
Conclusions: Despite the improved methodology, global database on maternal mortality remains weak. Hence forensic pathologist plays important role in identifying these cases with appropriate cause of death. Review of autopsy findings along with hospital records can prove to be one of the useful sources to identify pregnancy related deaths and elucidating the emerging trends.

Keywords: Autopsy, Death, Maternal mortality, Pregnancy

INTRODUCTION

In developing country like India, in the patriarchal society the social position of a vast majority of women is not up to the mark. This creates a dreadful public health problem of high Maternal Mortality Ratio (MMR). MMR is defined 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".[1] The reasons that women die in pregnancy and childbirth are many layered. Behind the medical causes are logistic causes, failure in health Care system, lack of transport etc. and behind these are social, cultural and political factors which together determine the status of women, their health, fertility and health seeking behavior.[2]

The objectives of this study were to describe various causes of maternal death with help of detailed autopsy and relevant records. Hence forensic pathologist plays important role in identifying these cases with appropriate

cause of death. Review of autopsy findings along with hospital records can prove to be one of the useful sources to identify pregnancy related deaths and elucidating the emerging trends.

METHODS

The present cross sectional and observational study was carried out at tertiary health care and teaching institute in the Department of Forensic Medicine and Toxicology, LTMMC & GH, Sion Mumbai during period of 2 years from August 2012 to July 2014. Total 95 cases of maternal deaths which were brought for postmortem were studied during this period.

All maternal death cases, brought dead and indoor cases during pregnancy or within 42 days after the delivery which were included. Any pregnant female death associated with incidental or accidental cause and late maternal death after 42 days of delivery was excluded from the study. The variables like age (years), residence (urban or rural), occupation, stay in the hospital, gravidity, trimester of pregnancy and method of delivery were used to classify and analyze the data from the autopsies and hospital record.

All cases underwent through examination with special reference to maternal death and also on guidelines of royal college of Landon for maternal death. Organs were preserved in 10% formalin. Blood culture and culture of other specimens was done when indicated.

The autopsy records with clinical notes were analyzed; gross and histopathology specimens and slides were studied to establish the accurate cause of maternal deaths. Each case was studied, examined as per the preformat specially designed for the study purpose. All the observations were carefully scrutinized and tabulated, highlighting the various aspects of the study for better understanding and evaluation of results.

RESULTS

It is observed from Figure 1 that out of 95 deaths, maximum number of maternal deaths were seen in age group of 21 to 25 years comprising 38 (40.0%), and 7(7.4%) cases each were found in the age group less than 20 and 36 to 40 years of age.

As per records, Hindu 69 (72.6%), Muslim 23 (24.2%) and 3 (3.2%) cases were categorized in others community and 92 (96.8%) married, 2 (2.1%) unmarried and 1 (1.1%) female was separated from her husband. By education, 35 (36.8%) had only secondary education; whereas 30 (31.6%) cases were uneducated. As per occupation, 78 (82.1%) house wives, 11 (11.6%) daily wages workers, and 3 (3.2%) each were running small home business and working in private sector. With reference to socio-economic status, maximum cases 48 (50.5%) of lower socio-economic status, 43 (45.3%) middle socio-economic group, and 4 (4.2%) were from high socio-economic status. Maximum cases 58 (61.1%) were residing in urban area where as rest 37 (38.9%) belonged to rural area.
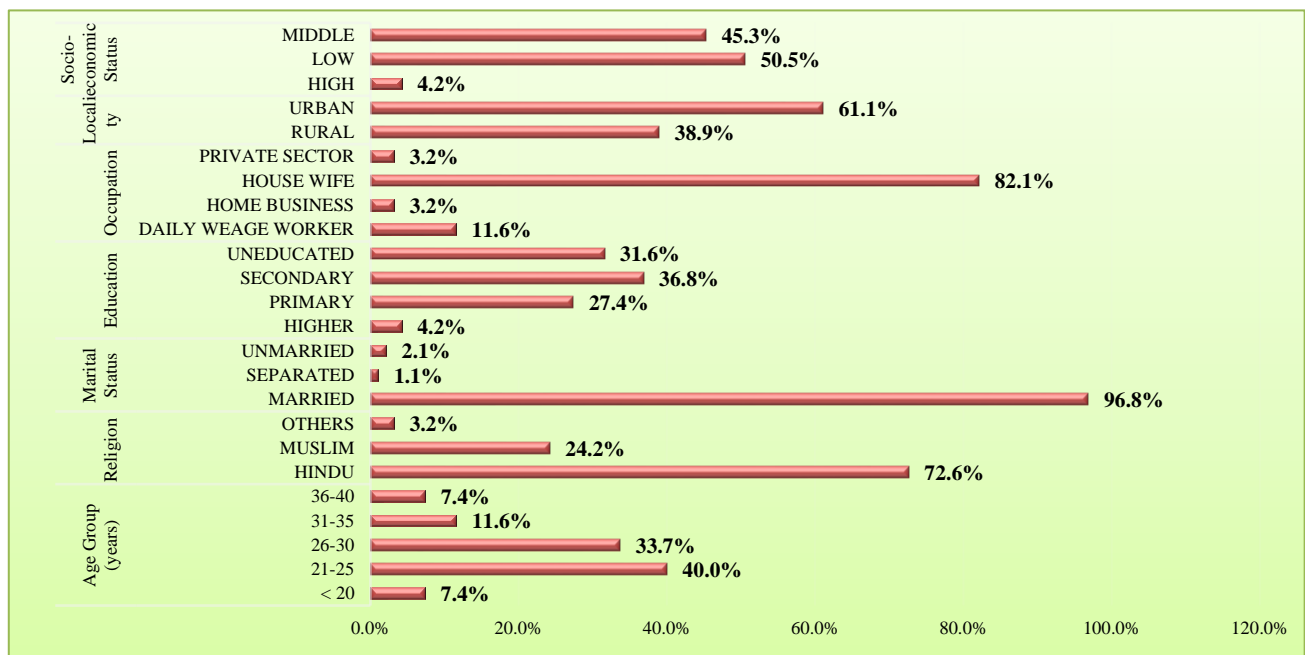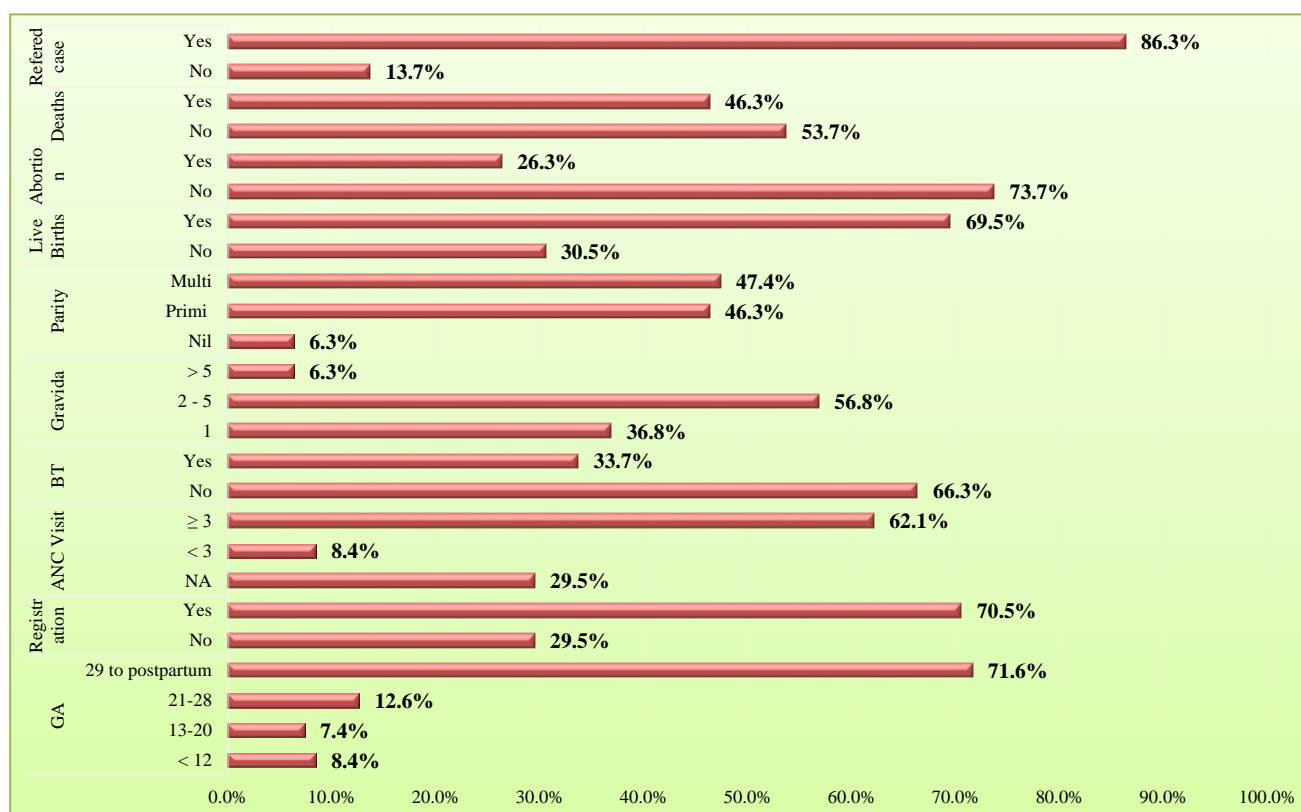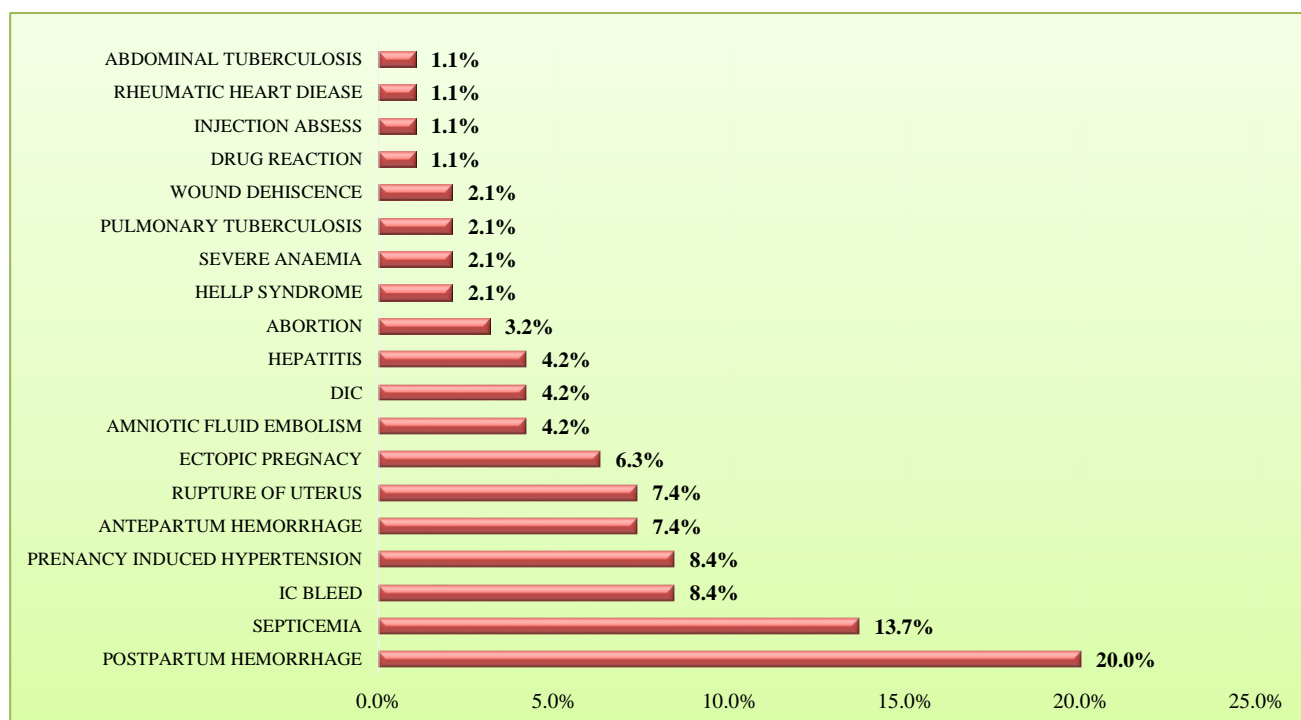

Figure 1: Distribution of maternal deaths by socio-demographic variables.

BT – Blood transfusions, GA- Gestational age

Figure 2: Obstetrical and medical history.

DIC – Disseminated intravascular coagulation, IC Bleed – Intracerebral bleeding

Figure 3: Causes of maternal death.

From Figure 2, with reference to gestational age in weeks' maximum number of cases 68 (71.6%) were in between 29 weeks to postpartum, 12 (12.6%) between 21 to 28 weeks, 8 (8.4%) less than 12 weeks, and 7 (7.3%)

had gestation between 13 to 20 weeks. 67 (70.5) cases were registered for routine antenatal checkup. Greater than or equal to 3 ANC visits was seen in 59 (62.1%) cases and rest 8 (8.4%) cases had less than 3 ANC visits. Maximum number of cases 54 (56.8%) were gravida 2nd to 5th, 35 (36.8%) primigravida and 6 (6.3%) were greater than 5th gravida. Maximum number of cases were found to be multipara that is 45 (47.4%), 44 (46.3%) cases were primi para while 6 (6.3%) cases had not attained the parity. 66 (69.5%) cases had living children and 29 (30.5%) cases didn't have live children. 25 (26.3%) cases had history of abortion. History of dead born, still born or death of child was seen in 44 (46.3%) cases. Out of 95 cases, 82 (86.3%) cases were referred from other health centers to the hospital. History of blood transfusion of whole blood or its component during pregnancy and treatment was seen in 32 (33.7%) cases.

It is observed from Figure 3, that 85 (89.4%) cases died due to direct causes of maternal deaths and rest 10 (10.5%) cases died from indirect causes.

Out of 85 cases with direct cause of maternal death, 19 (20.0%) died due to postpartum hemorrhage, 13 (13.7%) septicemia, 8 (8.4%) pregnancy induced hypertension, 8 (8.4%) intracerebral bleeding, 7 (7.4%) antepartum hemorrhage, 7 (7.4%) rupture of uterus, 6 (6.4%) ectopic pregnancy, 4 (4.2%) amniotic fluid embolism, 4 (4.2%) disseminated intravascular coagulation, 3 (3.2%) complications of abortion, 2 (2.1%) HELLP syndrome, 2 (2.1%) wound dehiscence, 1 (1.1%) complications of drug reaction during treatment, 1 (1.1%) injection abscess and gas gangrene. Out of 10 cases with indirect cause of maternal death, 4 (4.2%) hepatitis, 2 (2.1%) pulmonary tuberculosis, 2 (2.1%) severe anemia, 1 (1.1%) rheumatic heart disease and 1 (1.1%) abdominal Koch's.

DISCUSSION

Reducing maternal morbidity and mortality is of global concern and prime healthcare goal in developing countries. Maternal Death Review (MDR) is an approach advocated by the WHO to scrutinize practices and outcome of delivery at health facilities and in the community. It analyses deaths and its factors at all levels and is divided into Facility based and community based maternal death review. Understanding of the changes in the epidemiology provides important lessons for way forward to reach MDG-5 in India.[3]

In the present study, higher incidence of maternal deaths 38(40.0%) in the age group 21 to 30 years is in accordance with that observed by Yadav K et al, Alka P et al, Priya N, Zaman S et al, Bardale R et al and However relatively less number of cases was observed by Montgomery AL.[4-9] Higher number of maternal deaths in the group of 21 to 30 years in the present study may be attributed to the Indian tradition of early marriages and early pregnancy.

In the present study, maximum cases (72.6%) of maternal deaths belonged to Hindu community, whereas 24.2% were Muslims, only 3.2% cases were from others communities. These finding matches with those of Paul B et al and Montgomery AL et al who also observed maximum cases from Hindu religion.[9,10] Maternal mortality distribution according to particular religion greatly varies on basis of type of community having greater percentage in that society.

In the present study, 96.8% females were married, 2.1% were unmarried and one case 1.1% was separated from her husband the time of death. Present findings correlates with studies conducted by Montgomery AL et al who also reported maximum numbers of females (96.9%) as married and 3.1% female as unmarried.[9] However, Paul B et al observed all females in their study as married.[10] Lowest incidence maternal death in unmarried female is due to the social stigma of unmarried pregnancy in Indian culture.

Educational qualification of maximum females (36.8%) in the present study was up to secondary class only, followed by 27.4% females studying up to primary classes. Only 4.2% females had higher education. 31.6% females have never attended the school. Middle school education in 38.5% and 29.8% cases was similarly observed by Verma A et al and Priya N et al respectively.[6,11] However Bangal VD et al, Das R et al, Paul et al, Montgomery AL et al and Yadev K et al observed maximum females to be illiterate in their studies.[4,9,12-14] Higher maternal deaths in less educated and illiterate group can be attributed to lack of awareness regarding health problems, family planning and heath seeking behavior.

With reference to occupation, in the present study maximum (81.1%) females were house wives. In 11.6% cases, females were working on daily wages followed by 3.2% females running small home business and 3.2% females working in private sector for earning. This finding matches with the results of Bangal V et al in their study.[12] Higher incidence of maternal deaths in less empowered group compared to educated and working women indicates less autonomy and social status of females with respect to males in the Indian families.

In the present study, 61.1% females were residing in urban area and rest in rural areas. These results are in contrast with that observed by Pal A et al and Murthy MB et al who noted maximum maternal deaths in rural locality.[15,16] As this study was carried out at a tertiary care center and teaching institute of metropolitan city maximum cases belonged to urban area.

In the present study, maximum numbers of females 50.5% were from low socioeconomic status, followed by 43.5% from middle class and rest 4.2% belonged to higher economic group. Verma A et al, Priya N et al, and Yadav K et al reported 61.5%, 62.8% and 69.5% females

respectively from poor socioeconomic status in their study which correlates with the findings from present study.[4,6,11] However Das R et al reported maximum number 93.0% cases from low socioeconomic group.[13] Such high incidence of maternal deaths in low economic groups suggests poor resources and less affordability.

Higher maternal deaths in between 29th week of gestation to postpartum was similarly noted by Zaman S et al and Mantgomery AL et al who reported 55.55% and 82.8% cases respectively.[7,9] Significant proportion of complications usually arises prior to the onset of labour and in the postpartum period and hence access to emergency obstetrics care plays an important role in lowering maternal deaths.

On the basis of registration for ANC check-up and number of ANC visits by pregnant females during antenatal period shows 67 (70.5%) females were registered for routine antenatal check-up and whereas 28 (29.5%) females were not booked.

While Das R et al, Singh R et al, Pal A et al, Tappo NA et al[18], Zaman S et al, Nishu P et al reported maximum unbooked cases with inadequate ANC care during antenatal period which is in contrast with findings of the present study.[6,7,13,15,17,18]

As the present study was carried out in a metropolitan city the numbers of registered cases were higher as compared to other studies. Adequate ANC registration with regular ANC checkup is helpful to prevent preventable causes of maternal death and identification of high risk pregnancy.

In the present study, 32 (33.7%) cases had history of blood transfusion during pregnancy and treatment period. Zaman S et al reported 49.3% cases with history of blood transfusion which is consistent with the present study.[7] Effective facility for blood transfusion is required in health care system to tackle maximum mortality occurring from obstetrical hemorrhage during pregnancy and in the postpartum period.

In the present study, 35 (36.8%) females were primigravida, 54 (56.8%) were gravida 2nd to 5th, and 6 (6.3%) cases were greater than 5th gravida. Higher incidence of maternal deaths after 2nd gravida was similarly observed by Yadav K et al, Das R et al, Singh R et al, Mundkur A et al and Toppo NA et al.[4,13,17-19] However, Paul et al noted maximum (48%) deaths in primigravida.[14]

In the present study, 86.3% cases were referred from other hospitals irrespective of period of gestation in view of higher and specialist treatment as our hospital is a tertiary care center and a teaching institute with facilities for emergency care. Enough facilities with adequate infrastructure at other health care center will be helpful to avoid more and delayed references to higher center.

In the present study, 44 (44.6%) cases had normal vaginal delivery, 29 (30.5%) delivered by lower segment caesarian section, 5 (5.3%) cases were of ruptured ectopic gestation, 3 (3.2%) cases had abortion and 1 (1.1%) case delivered by application of forceps. Undelivered constituted 13.7% of the cases. This is in accordance with studies of Mundkur A et al, Alka P et al, Kullima et al, Vimala KP who reported maximum cases with normal vaginal deliveries, followed by LSCS, and other cases as post abortion deaths.[5,19-21]

In our study, 75.8% cases had institutional and hospital deliveries whereas 4.2% cases delivered at home. Kullima AA et al and Montgomery AL et al similarly reported higher cases of institutional deliveries.[9,20] Higher percentage of institutional deliveries conducted by well trained personnel has always been the target of health sector to reduce the maternal mortality.

In the present study, 91.6% cases died in hospital, 7.4% cases died during transport to higher centers and rest 1.1% case died at home. Montgomery AL et al reported similar findings in their study with maximum number of cases dying in hospital and 13.8% cases during transport.[9] Death of pregnant lady during transport to the higher center for specialty treatment has always been a matter of concern and it concludes that there is a shortage of well-equipped transport facility and trained personnel.

With respect to admission to Death interval, Zaman S et al, Tappo NA et al, Verma A et al, Paul et al, Mukharjee S et al and Das R et al reported consistent findings with present study.[9,11,13,14,18,22] The present study was carried out at a higher tertiary care center and teaching institute which shears maximum burden of complicated referred cases from other hospitals.

In the present study, it is observed that 85 (89.4%) cases died due to direct causes of maternal deaths and rest 10 (10.5%) cases died from indirect causes. Das R et al, Montgo-mery AL et al and Yerpude PN reported consistent findings with present study.[9,13,23] Out of 85 cases with direct cause of maternal death, classical triad of postpartum hemorrhage or obstetrical hemorrhage 19 (20.0%), septicemia or sepsis 13 (13.7%), pregnancy induced hypertension or eclampsia 8 (8.4%) constituted major death toll. These findings are consistence with the findings of Yerpude PN, Montgo-mery AL et al and Das et al Ratan.[9,13,23] Out of 10 cases with indirect cause of maternal death, 4 (4.2%) cases died due to hepatitis, followed by pulmonary tuberculosis and severe anaemia 2 (2.1%), and 1 died due to rheumatic heart disease and abdominal Koch's each. These findings matches with the findings of Gumanga SK and Shah P et al.[24,25]

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