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AUTOPSY STUDY OF MATERNAL DEATHS

Pathology

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ABSTRACT

Background : Reduction in maternal mortality is a global health priority. WHO claims some progress towards reduction in maternal mortality especially in the past few decades. The key requirement in further reduction is to understand the causes of deaths and formulate effective policy and health program strategies.

Aim: Evaluation of causes of maternal deaths based on autopsy findings and their categorization as per WHO application of ICD 10 Maternal Mortality(MM) .

Materials and Methods : The present study comprised of 160 cases of maternal deaths .The complete autopsy was done by a team. Detailed external, in situ and gross examination of organs was done. Representative bits from all organs were taken and processed as per the standard protocol. Slides were examined to establish the cause of death.

All deaths were categorized as per WHO application of ICD 10 MM. The causes of deaths were analyzed.

Results:

- Direct causes outnumbered indirect causes. Amongst direct causes obstetric haemorrhage topped the list (56.64%) followed by pregnancy induced hypertension (26.55%). Amongst indirect causes a wide range was found involving different systems. Contributory causes were found in (119)74.37 % of cases.

Conclusion: Majority of maternal deaths were due to direct causes (70.62%). Potentially preventable causes were haemorrhage and sepsis. Present study emphasizes categorization of maternal deaths as per WHO application of ICD10MM coding system as it gives leading cause as direct or indirect causes and contributory causes of maternal deaths.

KEYWORDS

Maternal death, Hemorrhage, Hypertensive disorders of pregnancy.

Introduction:

Maternal death is the biggest tragedy for any family. Every 10 minutes a woman dies in India due to complication of pregnancy or child birth. Reduction in maternal mortality has long been a global health priority and is one of the key targets in millennium development goals. It needs extensive efforts by health care policy makers to adapt the effective strategies for safe motherhood. The fundamental requirement is to understand the etiology and causes of maternal deaths. WHO defines maternal mortality as the death of a woman whilst pregnant or within 42 days of delivery or termination of pregnancy from any cause related to or aggravated by pregnancy or its management but excluding deaths from incidental or accidental causes. [1]

ICD 10(MM) classifies maternal deaths into two broad groups [2]

- Direct obstetric deaths resulting from obstetric complications of pregnancy state (pregnancy, labour, and the puerperium) from interventions, omissions, incorrect treatment or from a chain of events resulting from any of the above.
- Indirect obstetric deaths resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes but which was aggravated by physiologic effects of pregnancy.

Late maternal death is the death from direct or indirect causes more than 42 days but less than a year after termination of pregnancy.[2]

According to WHO application of ICD 10 (MM) to maternal deaths, direct causes include abortion, hypertensive disorders, obstetric haemorrhage, pregnancy related infections, other obstetric complic ation, unanticipated complications .[2]

Amongst indirect causes include non obstetric complications, unknown/undetermined, coincidental causes.[2]

Materials and Methods:

This is a retro-prospective autopsy study comprising of 160 cases of maternal deaths during a period from January 2013 to June 2016 over a span of 3and a 1/2 years. The study was conducted after the approval of institutional ethics committee. All the maternal autopsies during the study period were done by a committee comprising of forensic experts, pathologist, gynaecologist and a medical officer. Autopsy protocol was similar to other pathological autopsies. Detailed gross examination of all organs was done. Special emphasis was given to examination of pelvic organs, search for embolism, acute fatty liver of pregnancy. Organs were dissected as per standard protocol. Representative bits including pathological area of all organs were submitted for histopathological examination. Sections were processed for paraffin embedding and H and E staining. Special stains were employed wherever necessary. Culture studies of body fluids were done as per the need of the case .Pertinent clinical data required for interpretation of autopsy findings were retrieved from hospital record . Only after thorough microscopic examination in the light of clinical findings and available investigations the cause of death was ascertained .

All cases were categorized into direct and indirect maternal deaths as per WHO application to ICD 10 (MM) and further analysis was done. The contributory causes were also analyzed.

Results

Final autopsy diagnosis of total 160 consecutive maternal deaths during study period was done and categorized as per WHO application of ICD 10 (MM) .Analysis of final autopsy diagnosis was done.

Maximum deaths occurred in the age group of 18-25 years accounting for 52.9% of cases followed by 41.93% cases in the age range of 26-35 years.

Causes of Maternal Deaths -

Table No 1 Causes of Maternal Deaths according to WHO application of ICD10(MM)

	(n = 160)	Number of cases	Percentage (%)
Direct causes	Pregnancy with abortive outcome	0	00
	Hypertensive Disorders in Pregnancy	30	26.55
	Obstetric Hemorrhage	64	56.64
	Pregnancy related infections (Sepsis)	14	12.39
	Others (Ruptured Uterus)	05	4.42
Total		113	70.63
Indirect Causes	Non obstetric complications	46	28.75
Total			28.75
Undetermined cause			
Coincidental causes		01	0.62.
Total		160	100

The table depicts the direct and indirect causes of maternal deaths . Direct causes obviously outnumbered indirect causes comprising of 70.62% as against 28.75% from the latter category. Amongst direct causes obstetric haemorrhage (56.64%) was the leading contributor followed by PIH (26.55%). Pregnancy related infections (Puerperal sepsis), other obstetric complications (Ruptured uterus), were seen in a minority of cases comprising of 12.39%, 4.42% respectively. Amongst indirect maternal deaths a wide range of causes was found involving different systems. Amongst indirect causes respiratory system involvement was found in 30(65.22%) cases. Pneumonia was the king of death found in 27 cases followed by ARDS in three cases. Renal involvement in the form of acute tubular necrosis was seen in 6 (13.05%) of cases. Gastro-intestinal lesions were seen in 5 (10.87%) of cases, of which 4 mothers had focal hepatic necrosis & a case had hepatitis. The cause of necrosis could not be ascertained but it could be because of drugs. A single case of severe burns as a coincidental cause was encountered during study. None of the cases had unanticipated complications, undetermined cause. HIV infection and tuberculosis together claimed 6.52% deaths. A single case of rheumatic heart disease with MS, MR and PH was found who died of CCF in the course of disease. A case of cerebral infarct secondary to cavernous venous sinus thrombosis was also encountered .

Table No 2 Contributory Causes of Maternal Deaths

Contributory Causes n=119		Number of Cases	Percentage (%)
Cardiac disease		1	0.84
Central nervous system condition	Meningitis Meningoencephalitis Intracranial bleed Infarct	5 2 2 4	4.2 1.68 1.68 3.36
Gastrointestinal tract and hepatobilliary conditions	Submassive hepatic necrosis Hepatitis	13 5	10.9 4.2
Respiratory condition	Pneumonia Ault respiratory distress syndrome (ARDS)	45 7	37.82 5.88
Genitourinary conditions	Acute tubular necrosis Acute pyelonephritis Chronic pyelonephritis	79 6 6	66.39 5.04 5.04
Infections	HIV Tuberculosis	3 2	2.52 1.68
Others		-	-

Contributory causes include the conditions that may exist prior to development of the underlying cause of death or develop during the chain of events leading to death and which by their nature, contributed to the death.2

Contributory causes were found in 119 (74.37%) of cases. There was a wide range of causes involving many systems. Many mothers had multiple contributory causes with multi system involvement. Renal causes were predominant followed by respiratory and gastrointestinal causes comprising of 76.47%, 43.7% and 15.13% respectively.

Amongst renal lesions the main bulk was formed by acute tubular necrosis comprising of 66.39% of cases. Chronic pyelonephritis and acute pyelonephritis each were preexisted in 5.04% of cases . Respiratory lesion as contributory causes were seen in 43.7% of women ,in which pneumonia was the leader seen in 37.82% of cases. ARDS was observed in 7(5.88%) mothers. The cause of ARDS could not be ascertained.

Amongst central nervous system involvement contributory causes were found in 10.92% of women, where 5(4.2%)and 4((3.36%) had meningitis and cerebral infarct respectively. Meningoencephalitis and intracerebral bleed was observed in 2(1.68%) women each.

These lesions developed during the illness.
About 18 (15.13%) mothers had hepatobilliary lesions. Out of 18 mothers 13 (10.9%) developed hepatic necrosis during the periparturation period whereas 5 (4.2%) women had hepatitis. Infections not related to pregnancy were found in 5 (4.2%) cases which included HIV infection in three and tuberculosis in two cases. A single case of congestive cardiac failure secondary to anemia was also encountered during study.These causes contributed or certainly increased the risk of maternal outcome. In most of the cases it was developed in peripartum period as the chain of events , but in few cases few lesions were preexisted.

DISCUSSION

FIG 1.Comparison of Causes of Maternal Deaths

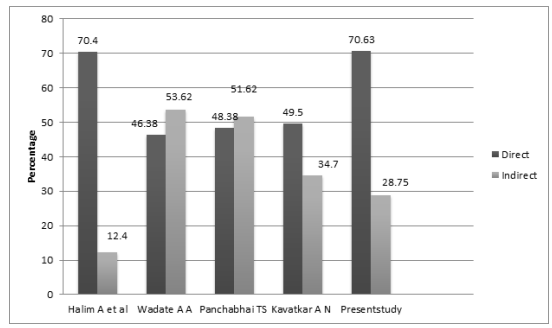
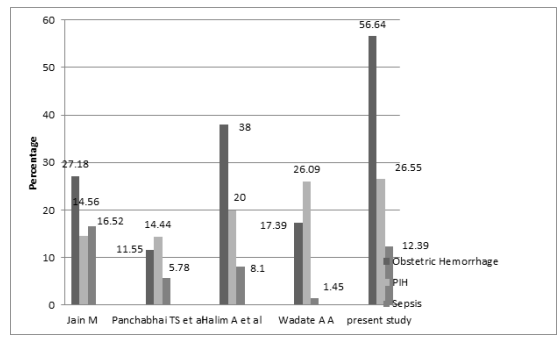


FIG 2 Comparison of Direct causes of Maternal Deaths



In a review article of the maternal autopsy , by D. Rushton quoted that maternal death due to direct obstetric causes are on decline , but T.S. Panchabhai[10] and Wadate et al [11] and Kavatkar et al[9] in their studies found direct maternal death in 58.62% and 46.38% and 49.6%of women respectivelyIn the present study direct causes outnumbered the indirect maternal deaths which are in agreement with other studies but present study found little higher percentage of direct maternal deaths (70.62%). This could be attributed to additional medical disorders complicating the pregnancy which contributed to increased risk for mortality. Other workers did not adopt the WHO application of ICD10MM which describes contributory causes. In the present study amongst direct causes ; obstetric hemorrhage was the leading cause which is in accordance with other studies. Various authors at various places found various causes of hemorrhage, which is of great concern and mandates the attention of health care policy makers to address this issue. In the present study death due to PIH was found in 26.55% of mothers .The similar observations were made by Halim et al[8] and Wadate et al[11] .Deaths due to PIH are much above the acceptable limit .This is due to the fact that most of the cases are unsupervised and

unregistered .The promotion of awareness at periphery regarding adequate antenatal care is urgently needed. Deaths due to sepsis are seen in minority of cases which fairly correlates with other studies.

Purandare et al found anemia as an indirect cause of death in 55.3% of mothers and hepatic disorders in 3.3% of cases .The study conducted by Clara Menendez et al found indirect maternal deaths in 61% of mothers in which HIV-AIDS related disorders and pyogenic pneumonia claimed 12% deaths each .Hepatitis was seen in 2% of mothers

The published data regarding the analysis of contributory causes of deaths are scant, but the authors are of the view that the causes of maternal mortality vary from place to place, zone to zone and institute to institute which is due to differences in demographic parameters, socioeconomic class of cases ,dietary habits and life style. The authors strongly believe that this is not only applicable to India but other countries also.

CONCLUSION

In the present study the triad of hemorrhage ,PIH and pregnancy related sepsis remains the dominant cause of maternal deaths as in other studies.

Autopsy and detailed histopathological examination are essential for accurate diagnosis in maternal deaths. Its categorization as per WHO application of ICD10MM coding system is important as it gives leading and contributory causes of maternal deaths and helps us in formulating a meaningful clinical groups.

It also provides uniformity in collecting and classifying the data from various sources which improves the quality of data. This gives an input and useful framework for statistical officers, researchers and health care providers to elucidate areas of weaknesses and helps to formulate effective health strategies and policies to reduce maternal deaths by appropriate resources and budgetary allocation.

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