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MATERNAL MORTALITY PROFILE: A TWO YEAR STUDY AT A TERTIARY HEALTH CARE CENTRE

Pathology

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ABSTRACT

Maternal mortality is defined as death of a woman during pregnancy or within 42 days of termination of pregnancy. Maternal mortality ratio (MMR) is number of maternal deaths per 100000 live births. MMR is very high in Africa and South East Asia. Present study was a retrospective study of 42 cases carried out in the Department of Pathology, GMC Akola from January 2018 to December 2019 with the aim of evaluating specific cause and factors leading to maternal mortality. Maximum age range of maternal mortality was 18-25 years, seen in 71% of multigravida and 29% of primigravida. More than 70% of maternal deaths in the present study are due to postpartum hemorrhage, pregnancy induced hypertension with eclampsia, puerperal sepsis. According to National and International Human Rights Commission **"Safe Motherhood Is Considered As A Human Right".**

KEYWORDS

Maternal mortality, Clinical Autopsy, PPH, Anemia

INTRODUCTION:

Maternal mortality is defined as death of a woman during pregnancy or within 42 days of termination of pregnancy irrespective of the duration and site of pregnancy from any cause related or aggravated by pregnancy or its management but not from accidental or incidental causes.[1] Maternal mortality ratio (MMR) is number of maternal deaths per 100000 live births. In developed and industrialized nations, MMR varies from 11-14, in developing nations it is 27- 546 and for India it is 130 per 100000 live births. For one maternal death at least 16 suffer from severe morbidities (Maternal Morbidity).[1] An estimated 6 lakh women die of maternal causes annually and 10 million women annually survive from adverse outcome of pregnancy worldwide.[2] MMR in India has reduced significantly over the years from 1000 per 100000 live births in 1959, 301 in 2003 and 122 on 9 Nov 2019. Thus India registers 26.9% decline in MMR from 2013.[2]

In India MMR is highest for Assam 229, second is Uttar Pradesh 216, third is Madhya Pradesh and least is Kerala at 42. In India, Maharashtra stands second in decline of MMR from 68 to 61 for which Maharashtra has received National award from Union Health Minister on 29th June 2019. Not only in India, it is one of the eight goals of United Nations (UN) to reduce MMR worldwide because a pregnant woman dies every 90 seconds in the world and every 7 minutes in India.[1]Majority of maternal deaths are preventable.

75% of maternal deaths occur in age group of 20-34 years in India. Maternal deaths occur from third trimester to first week after delivery. There is an inverse relationship between lifetime risk of maternal death and availability of health care facilities. In least developed countries like Sub Saharan Africa the risk is 1/41, in India it is 1/220 and in industrialized countries it is 1/ 3300.[2] Thus, it is a tragic situation that maternal mortality is the leading cause of death for women of reproductive age in many parts of the world. High MMR reflects upon not only poor health services of the country but also low socioeconomic status. Maternal mortality risk is highest within first two days of child birth. Risk is 3-4 times higher for pregnant women above 35 years. It is 3 times higher for multiparous women than primigravida due to higher chances of postpartum hemorrhage (PPH), mal-presentations and ruptured uterus.[1]

The causes of maternal deaths are classified as: 1) direct obstetric like antepartum and postpartum hemorrhage, toxemia of pregnancy, obstructed labor, unsafe abortions, puerperal sepsis, ectopic pregnancies 2) indirect like those resulting from or aggravated by preexisting illness like anemia, infections, malaria, accidents, cardiac, renal, hepatic, viral causes.[1] Social factors like age at child birth, parity, malnutrition, poverty, illiteracy, poor sanitation, too many and too frequent pregnancy also play a crucial role.[1]

Clinical / Pathological autopsy is undertaken to identify the exact cause and factors leading to maternal death and to study pathophysiological changes in various organs which lead to maternal mortality. Review of autopsy records is very useful to evaluate pregnancy related deaths. The present study was undertaken with the aim of 1) evaluating specific cause and factors of maternal mortality 2) discuss the utility of autopsy records as a useful adjunct to data source 3) discuss above causes in MMR meetings at Institution, State and National levels 4) to try and improve upon the causes at tertiary health care level.

MATERIALS AND METHOD:

Present study was a retrospective study of 42 cases carried out in the Department of Pathology, GMC Akola from January 2018 to December 2019. Data was obtained from autopsy records. Clinical autopsy was performed in mortuary by Senior Pathologist, Obstetrician and forensic expert in every case. On autopsy table every autopsy protocol was followed. External examination and in situ dissection was done in detail. All major organs were evaluated like brain for intracranial hemorrhage, meninges for meningitis, heart for frothy air bubbles in right atrium (Air embolism) or rheumatic heart disease (RHD), lungs for pneumonia/ effusion/ pulmonary embolism, liver for fatty change, uterus for perforation/ rupture/ placental adhesions, peritoneum for tubercles or effusion, ovaries for ectopic pregnancy, spleen for splenomegaly as seen in malaria/ thalassemia or splenic infarcts for sickle cell disease.

Organs were fixed in 10% formalin. Multiple sections from every organ were studied in detail with Hematoxylin and Eosin and special stains like PAS, Reticulin and Masson's Trichrome. Blood culture was sent in suspected cases of septicemia. CSF was examined in cases of puerperal sepsis. Antemortem details were studied from case sheets and correlated with gross and microscopic Pathological findings.

RESULTS:

Total 42 cases of maternal mortality were studied. Maximum age range was 18-25 years. Mean age was 22.5 years. Least age was of a maternal death due to puerperal sepsis and maximum age was multigravida of 35 years from uterine rupture. 100% cases were referred to our

Institution from surrounding Rural Hospitals and PHC with impending complications.70% deaths occurred within 24 hours of admission and 30% occurred within first week. Maternal death was seen in 71% of multigravida and 29% of primigravida. Hospital delivery was seen in 90% cases and home delivery in 10%. 88% (n=37) showed direct cause of death like antepartum(APH) and postpartum hemorrhage (PPH), puerperal sepsis, ruptured uterus and pregnancy induced hypertension as shown in table 1.

Table 1: Showing Direct Causes Of Maternal Mortality (n=37):

Sr.no.	Directcauses	Casenumber	%
1	Pre-eclampsia/eclampsia (APH&PPH)	11	29.7%
2	Puerperalsepsis	10	27%
3	Rupturedeuterus(PPH)	5	13.5%
4	Atonicuterus(PPH)	3	5.4%
5	Rupturedectopicpregnancy(PPH)	2	5.4%
6	Placentaaccrete(APH)	2	5.4%
7	Placentaprevia(APH)	1	2.7%
8	Abruptioplacentae(APH)	1	2.7%
9	IntracranialhemorrhageandDIC	1	2.7%
10	CMLwithDIC	1	2.7%

12% (n=5) showed indirect cause like nutritional anemia, sickle cell anemia, bronchopneumonia due to H1N1 infection, Hepatitis E infection. (Table 2). Death due to sickle cell anemia was seen in one, as this hemolytic anemia is common in this part of Western Vidarbha (table 2).

Table 2: Showing Indirect Causes Of Maternal Mortality (n=5):

Sr.no.	Indirectcauses	Casenumber	%
1	NutritionalAnemia	2	5.4%
2	SicklecellDisease	1	2.7%
3	Broncho-pneumonia(H1N1)	1	2.7%
4	AcuteHepatitis(HepatitisE)	1	2.7%
5	FattyliverDisease(HELLP)	1	2.7%

Table 3: Associated Factors affecting maternal mortality (n=42):

Sr.no.	Factors	Parameter	No.of cases	Parameter	No.of cases
1	**Age**	18-25years	26	>25years	16
2	**Gravida**	Multigravida	30	Primigravida	12
3	**Hospital stay**	Less than 1day	28	Morethan1day	14
4	**Place of delivery**	Hospital	40	Home	2
5	**Mode of delivery**	LSCS	30	Vaginal	12
6	**Associate danemia**	Hb-6to8gm%	30	Hb-8to10gm%	12

Figures: Microscopic Pictures Of Various Organs In Cases Of Maternal Mortality:

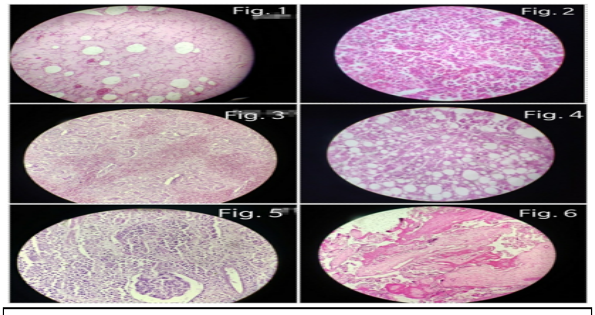

Fig 1: Pulmonary edema (H & E, 40X), **Fig 2:** Lobar pneumonia (H & E, 40X), **Fig 3:** Hepatic necrosis (H & E, 40X), **Fig 4:** Fatty change (H & E, 40X), **Fig 5:** Acute tubular necrosis (H & E, 40X), **Fig 6**: Placenta accrete

DISCUSSION:

MMR is recognized as a social indicator and is dependent upon socioeconomic status, literacy, nutrition and level of maternal health care in the community. Main two indicators of maternal health are **1) ANC checkups** and **2) Institutional Delivery**. Most maternal deaths can be prevented if pregnant women have access to good quality antenatal, natal and postnatal care. In developed countries like UK and USA indirect causes of death are common, however in developing countries like India direct causes are commoner. 80% of the times it is either antepartum or postpartum hemorrhage. Anemia is not only a leading cause but also an aggravating factor in hemorrhage, sepsis and toxemia[1] as shown in table 3.

The observations in the present study were compared with other studies in the literature.

1) Majority of maternal deaths were seen in 18- 25 years of age compared with all other studies. 2) Multiparty was seen in 71% cases same as study made by Suvarnekar et al,[3] whereas Bardale et al[4] found it was common in primigravida. 3) 66% deaths occurred in first 24 hours same as study made by Suvernakar et al.[3]4) PIH with eclampsia and PPH was a leading cause of death in the present study same as study made by Paul B et al,[5] Varsha Patil et al[6] and Suvernakar et al.[3] 5) Panchabhai TS[7] stated that infectious diseases and cardiovascular diseases are common cause of maternal deaths which doesn't correlate with the present study.6) Amongst indirect causes anemia was the leading cause of death in the present study which correlates with Varsha Patil et al[6] and Dileep Mavalankar et al[8], Jashnani et al[9], Panchbhai et al[7] and Bardale et al[4]. 7) Jashani K D et asel[9] had maximum cases of acute viral hepatitis whereas present study showed just one case of Hepatitis E.

CONCLUSION:

Maternal mortality is a major public health issue all around the world specialy in developing countries of Sub-Saharan Africa and South East Asia which alone account for 87% of global maternal deaths. More than 70% of maternal deaths in India are due to PPH, PIH with eclampsia, puerperal sepsis. Major causes are low socioeconomic status, poverty, illiteracy, poor access to medical services, poor diet with lack of essential nutrients like iron and folic acid, too early and too many pregnancies and excess physical work by female in India.

According to National and International Human Rights Commission **"Safe Motherhood Is Considered As A Human Right".** World Health Organization (WHO) recommends a minimum of 4 ANC checkups and Government of India recommends a minimum of 3. MMR can be significantly reduced 1) if 100% institutional deliveries are promoted 2) high risk pregnancies are identified 3) iron – folic acid therapy and tetanus immunization is implemented 4) three cleans(hands, perineal and umbilical area) are maintained 5) pregnancy is properly planned 6) multiparity is reduced 7) anemia is timely corrected. Indian Government has taken commendable efforts to reduce MMR under National Rural Health Mission (NRHM) programme, Janani Shishu Suraksha Karyakram(JSSK) and Accrediated Social Health Activists (ASHA).

Clinical/ pathological autopsies should be promoted in all maternal deaths to know the exact cause and sequence of maternal mortality. Such studies and NRHM guidelines will certainly improve maternal care, reduce MMR, would be of immense help to Obstetricians in management protocols of ANC patients.

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