MATERNAL MORTALITY IN HOSPITAL PRACTICE

by

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Impressed by the fact that maternal deaths in the obstetric wards of a large general hospital do not represent the total maternal mortality in the hospital, all deaths in women during reproductory life (taken arbitrarily between 18 and 42 years) were analysed over a period of 7 years from 1962 to 1969 at the Safdarjang Hospital, New Delhi.

Of 2,104 deaths analysed, 549 (26.1%) had occurred during pregnancy, labour or within three months of delivery. One hundred and fifty-one had delivered prior to admission. Two hundred and fifty-three (46%) died in the obstetric ward and 296 (54%) in other wards. Over the same 7 years period there were 41,215 deliveries in the hospital. The maternal mortality rates calculated on the basis of these figures were:

Including all maternal deaths—13.3/1000 births.

Excluding deliveries outside hospital—9.65/1000 births.

Deaths in obstetrics wards only—6.16/1000 births.

Such high maternal mortality rates reflect the poverty, ignorance and prejudices of the population and the inadequacy of medical facilities outside hospitals. These factors make any attempt to define avoidable and unavoidable factors and to assign responsibility for death a futile exercise. According to the definition of primary avoidable factor as "the departure from accepted standards of satisfactory care from which ensured the *train of* events resulting in death" (Stalworthy, 1966), almost every death may be considered as avoidable, under the existing circumstances.

This study has therefore been limited to defining the major hazards to the pregnant women, with the hope that by directing greater attention to these hazards, the best use can be made of the existing medical facilities.

The causes of maternal deaths have been classified according to the Guide for Maternal Death Studies of the American Medical Association (1957) as follows:

1. *Direct Obstetric Causes*: A death resulting from complication of pregnancy itself, from intervention elected or required by the pregnancy or resulting from the chain of events initiated by the complication or the intervention e.g. haemorrhage, toxaemia, infection, vascular accidents (air or amniotic embolism) anaesthesia, transfusion reaction, etc.

2. *Indirect Obstetric Causes*: A death resulting from disease before or developing during pregnancy (not a direct effect

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Received for publication on 4-9-72.

of pregnancy) which was obviously aggravated by the physiologic effects of pregnancy e.g. anaemia, cardiac, renal, hepatic and metabolic diseases, etc.

3. *Non-obstetric Causes*: A death not related to pregnancy nor to its complications and management e.g. malignancy, suicide, accidents, etc.

In following this classification difficulties were encountered when several conditions occurred in the same patient each of which may have contributed to death. It was then placed in the most appropriate category after reviewing the history and pathological diagnosis where available.

Infectious diseases like typhoid, tuberculosis, and infective hepatitis which are usually included among non-obstetric causes, have been included in indirect obstetric causes, since a review of the cases showed that the nutritional demands of the foetus when added to chronic malnutrition, further reduce the resistance to infection and thus indirectly influence the course of the disease adversely in our patients.

Observations

Table I shows that 316 (57.6%) were due to direct obstetric causes—123 (22.2%) due to abortions and 193 (35.4%) due to other complications of pregnancy, labour and puerperium; 220 (40%) were due to indirect obstetric causes and 13 (2.4%) to non-obstetric causes.

Age and Parity: Fig. 1 shows the age and parity distribution of obstetrics deaths other than abortions (left hand column) and abortion deaths (right hand column) compared with all cases delivered in hospital (central column). The shaded areas represent the age and parity groups at high risk.

This confirms the general observation that pregnancy and delivery carry a higher risk for women over 35 years, primiparae and grand multiparae of para 7 and over. However, younger women (30 years and over) of lower parity (para 4 and over) are at higher risk from abortions. The proportion of deaths due to abortion 22% is comparable with 18% in England and 20% in the United States (Stalworthy 1966, Revenscroft 1962).

Causes of Deaths: Table II shows the distribution of the causes of death.

Direct Obstetric Deaths

Genital infection in 241 cases (137 puerperal and 104 post abortal) was responsible for 43.8% of all maternal deaths, being the most important single cause of death.

Haemorrhage in 45 cases accounted for 8.2% and toxaemia in 15 cases for only 2.8% of total maternal deaths.

TABLE I

Causes

Type	No. of cases		Percentage
Direct obstetric causes		316	57.6%
Abortions	123		22.2%
Other than abortions	193		35.4%
Indirect obstetric causes		220	40.0%
Non obstetric causes		13	2.4%
Total		549	100.0%

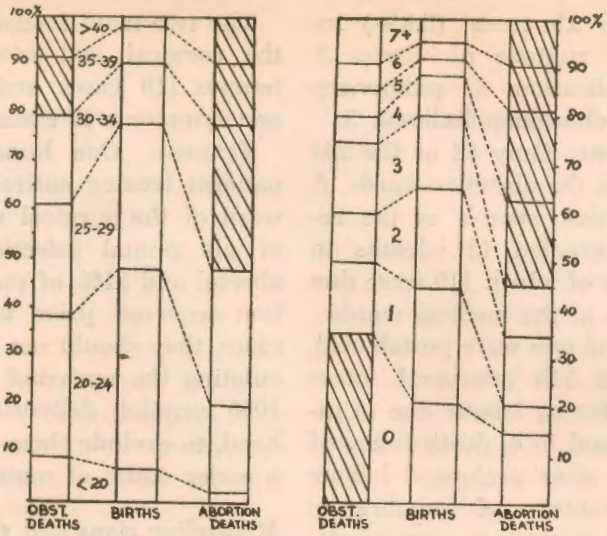

FIG. 1: AGE AND PARITY DISTRIBUTION OF OBSTETRIC AND ABORTION DEATHS COMPARED WITH DEATHS IN THE HOSPITAL.

TABLE II
Distribution of Causes of Death

Causes		No. of cases	Percentage
I. *Direct obstetric*			
Genital infections		241	43.8%
Haemorrhage		45	8.2%
Toxaemia		15	2.8%
Others		15	2.8%
Traumatic rupture of uterus	3		
Anaesthetic	4		
Pulmonary embolism	5		
Chorionepithelioma	3		
II. *Indirect obstetric*			
Extragenital infections		90	16.38%
Viral hepatitis	32		
Tuberculosis	25		
Others	33		
Anaemia		70	12.6%
Heart disease		30	5.4%
Cerebrovascular accidents		16	2.8%
Others		14	2.5%
III. *Non-obstetrics*		13	2.4%
Burns	7		
Malignancy	6		

Other causes in 15 cases (2.8%) included traumatic rupture of uterus 3, anaesthetic complication 4, pulmonary embolism 5, and chorionepithelioma 3.

Genital Infections: Only 82 of the 241 deaths occurred in the obstetric wards. A careful retrospective search of the records, however, revealed 121 deaths in the surgical wards of which 119 were due to tetanus and 38 in the medical wards.

One hundred and two were postabortal, 4 intrauterine and 135 puerperal infections. Four died during labour due to intrauterine sepsis and in 4, death followed caesarean section after prolonged labour and premature rupture of membranes. One hundred and thirty-two were admitted after delivery (2 after caesarean sections performed outside) and 6 had already been in prolonged labour prior to admission. In 2 cases intrauterine sepsis occurred during labour in hospital. These 2 deaths could have been avoided by accelerating labour with adequate oxytocin infusion and earlier resort to caesarean section.

The precipitating causes of death were cerebral and meningeal involvement 54 (22.4%), renal failure 25 (10.4%), coagulation failure 11 (4.5%), peritonitis and ileus 12 (5.0%), septic shock 9 (3.7%) and embolism 8 (3.3%). Anaemia was a contributory factor in 40 (16.6%).

The two main reasons for admission to the surgical and medical wards were tetanus 119 cases and misleading signs and symptoms 40 cases.

Tetanus: One hundred and nineteen patients treated entirely in the tetanus ward of the surgical unit formed 49.4% of all genital infections, 49% of post abortal and 51% of puerperal. As infection occurred prior to admission in all cases, they should not be included in calculating the maternal mortality rate per 1000 hospital deliveries. On the other hand, to exclude them would be to ignore a major cause of maternal deaths.

Misleading signs and symptoms

Table II shows the distribution of these in the 40 patients admitted to other wards as compared with the total infection deaths.

TABLE III

Misleading Clinical Manifestations due to Genital Infection in Cases Admitted to Other Wards as Compared with All Deaths due to Genital Infection

Manifestations	Other wards (40 cases)	All cases (241)
Neurological (coma, fits, hemiplegia)	27	54
Anuria	5	25
Coagulation failure	2	11
Pyrexia	2	2
Peritonitis	2	10
Gastroenteritis	2	2

Suspicion that these manifestations may be the sequelae of genital infection during a recent delivery or abortion might have averted the fatal outcome in some patients by—

(a) Identification and treatment of the causative organism by culture and sensitivity of high vaginal swabs and blood.

(b) Adequate and timely drainage of pelvic abcesses.

(c) More rigorous use of supportive measures like cortico-steroids and blood

and fluid infusions to maintain circulation.

Haemorrhage: In 45 patients accounted for 8.2% of 549 total maternal deaths and 18.8% of 253 maternal deaths in the obstetric wards. They included severe haemorrhage during abortion 15, postpartum haemorrhage 8, massive intraperitoneal haemorrhage due to rupture uterus 7, accidental haemorrhages 6, placenta praevia 4, ectopic gestation 3, and severe haemorrhage at time of caesarean section 2.

Thirty-three (76%) were admitted in an exsanguinated condition due to profuse bleeding prior to admission—4 were admitted with retained placenta, 4 had rupture uterus prior to admission, 3 with accidental haemorrhage were admitted in renal failure following outside delivery and in the other 3 placental abruption had occurred more than 12 hours before admission.

In 19 cases, severe anaemia was a contributory factor. Four developed coagulation failure and 3 renal failure.

Fourteen (60%) were over 30 years of age and para 5 or more.

Toxaemia in 15 patients accounted for 2.8% of all deaths and 5.9% of deaths in obstetric wards—12 of the 15 had eclampsia.

The precipitating causes of death were renal failure 5, cerebral haemorrhage 3, pulmonary oedema 4, and hyperpyrexia 1. Seven of the 15 were admitted after home delivery.

Four (26.6%) were grand multiparae over 35 years of age (one 10th gravida and one 15th gravida).

Indirect Obstetric Deaths: Occurred in 220 patients accounting for 40% of the total deaths. Only 97 of these (38.5%) were recorded in the obstetrics wards. This proportion of 40% is twice as high as the 20% reported from England and Canada (Stalworthy, 1966; Cannell, 1963). Diseases associated with pregnancy are obviously a special hazard in communities with low socio-economic standards. The two main hazards are infectious conditions (90 cases) and anaemia (70 cases).

Infectious conditions: These included infectious hepatitis 32 (36%), tuberculosis 25 (28%) and other infections e.g. gastroenteritis, encephalitis, pneumonia, pyelonephritis, etc. 33 cases (36%).

Forty-six died in the puerperium, 31 in pregnancy and 30 were associated with abortions. The age and parity distribution was as for all deliveries in the hospital.

Anaemia: In 70 patient (12.5%) severe anaemia was the primary cause of death and in another 90 (16%) it was a contributory cause. Only 5 of the 70 cases were associated with abortion (all midtrimester), 11 died undelivered in the 3rd trimester of pregnancy, 10 died during labour and 44 died in the puerperium.

Thirty-seven of the 44 puerperal deaths were admitted 1-45 days after delivery outside and 10 (23%) of these were associated with puerperal pyrexia.

Twenty-nine of the 70 patients (41%) had congestive heart failure on admission, 18 in pregnancy and labour and 11 in the puerperium.

Transfusion reactions precipitated death in 6 cases. The tachycardia associated with a febrile reaction when superimposed on the combined haemodynaemic load of severe anaemia, pregnancy and labour and in some cases puerperal pyrexia, causes a rapid and severe increase in the cardiac load with ultimate cardiac failure and death.

Twenty-eight (40%) of these women