

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20151629>

Research Article

A cross sectional study to assess the pattern of maternal mortality in a tertiary level government hospital of a city in north India

Akanksha Lamba^{1*}, Sakshi Agarwal², Apurba Kumar Dutta³

¹Department of Obstetrics & Gynaecology, Kasturba Hospital, New Delhi, India

²Department of Obstetrics & Gynaecology, S.P Medical College, Rajasthan, India

³Department of Obstetrics & Gynaecology, IQ City Medical College and Narayana Hospital, West Bengal, India

Received: 12 December 2015

Accepted: 26 December 2015

***Correspondence:**

Dr. Akanksha Lamba,

E-mail: dr.akanksha2709@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The index of the quality of health care delivery system of a country is reflected by its maternal mortality rate (MMR). Epidemiological data pertaining to maternal mortality is valuable in each set up to design interventional programs to favourably reduce the same. The objective of our study was to evaluate the maternal mortality rate in a tertiary care hospital, to assess the epidemiological aspects and causes of maternal mortality.

Methods: A retrospective study of hospital records and death summaries of all maternal deaths over the period from January 2010 to December 2012 was carried out. Maternal mortality rate, epidemiological factors and causes affecting maternal mortality were assessed.

Results: A total of 45 maternal deaths occurred per 7,266 live births out of which unbooked and late referrals accounted for 75.55 % of maternal deaths. Most maternal deaths occurred in the age group of 20–30 years, multiparous women (73.33%) and women from rural areas (71.11%). Direct obstetric causes accounted for 82.22% of maternal deaths where as 15.55% of maternal deaths were due to indirect causes. Maternal mortality rate (MMR) came out to be 627.79 per 100,000 live births. Hemorrhage was the commonest cause of death (37.33 %), followed by pregnancy-induced hypertension including eclampsia (15.55 %) and sepsis (11.11%).

Conclusions: Hemorrhage, sepsis, and pregnancy-induced hypertension including eclampsia were found to be the direct major causes of death. There is a wide scope for improvement as a large proportion of the observed deaths are preventable.

Keywords: Maternal mortality rate, Postpartum hemorrhage, Sepsis, Eclampsia, Anemia

INTRODUCTION

According to the World Health Organization (WHO), “A maternal death 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”. Each minute of every day, at least one woman in developing countries dies, as a result of complications arising during pregnancy and childbirth.¹ The current maternal mortality rate (MMR) in India is 212/100,000 live births.²

As stated by the WHO in its 2005 World Health Report “Make Every Mother and Child Count”, the major causes of maternal deaths are: Hemorrhage (25%), Infections (13%), Unsafe abortions (13%), Eclampsia (12%), obstructed labour (8%), other direct causes (8%), and indirect causes (20%). Indirect causes are malaria, anemia and cardiovascular disease, all of which may complicate pregnancy or be aggravated by it. A major reason for so many deaths due to hemorrhage is because, once bleeding starts, death can occur in around two hours as compared 10 hours for eclampsia and 72 hours for obstructed labour.³ The level of MMR in India has declined from

over 750 in the 1960s to about 400 in the 1990s and about 300 in 2003, though it is above 400 in some states.^{4,5}

Reducing the maternal mortality by three quarters between 1990 and 2015 is the first target of Goal 5 - Improving Maternal Health - of the eight Millennium Development Goals. United Nation (UN) report card on MDG - 5 concluded that little progress had been made in sub-Saharan Africa where half of all maternal deaths take place. The progress shown by the South Asian countries including India which accounts for 25% of all maternal deaths is also not impressive.⁶

Most of the evidence for maternal mortality is obtained through hospital data and community based reports, which are situated mostly in urban areas, whereas most of the maternal deaths are from rural areas. This study was done to assess maternal mortality in a tertiary medical college hospital situated in Haldwani, Uttarakhand where large numbers of patients are referred from rural and hilly areas of the state and northern UP. This study was done to calculate the maternal mortality rate in the hospital, to assess the epidemiological aspects and causes of maternal mortality and suggest remedial measures to reduce the same.

METHODS

The study was conducted by reviewing the records for maternal deaths over the period from Jan 2010 to Dec 2012 in the department of Obstetrics and Gynecology at Dr. Susheela Tiwari Government Hospital, Government Medical College, Haldwani (Nainital) irrespective of the place of delivery and correlated with various factors like age, parity, hospital antenatal supervision, delivery status, admission death interval, and causes of deaths. Autopsy could not be conducted on any of the bodies due to lack of consent.

The details of number of live births from Jan 2010 to Dec 2012 were collected from labor record register. Maternal mortality rate (MMR) for the study period was calculated by using the formula:

$$\text{MMR} = \frac{\text{Total no. of maternal deaths}}{\text{Total no. of live births}} \times 100000$$

Mean MMR for the study period was calculated by calculating the mean of yearly MMR of the entire study period.

RESULTS

During the study period, there were a total of 7266 live births and 45 maternal deaths. The mean maternal mortality rate in the study period was 627.79 per 1, 00,000 live births.

Table 1: Year wise distribution of direct causes of maternal deaths.

Year	Maternal deaths	Live Births	MMR
2010	12	1740	689.65
2011	14	2354	594.73
2012	19	3172	598.99

The epidemiological characteristics of maternal deaths are shown in Table 2 and Table 3. Maximum maternal deaths (62.22%) were reported in the age group of 20 to 30 years. More deaths were reported in multiparous women (73.33%) as compared to Primigravidae (26.66%). More maternal deaths were reported in women from rural areas (71.11%) as compared to women from urban areas (28.88%). Maximum maternal deaths were reported in unbooked patients (75.55%) as compared to booked patients (24.44%).

Table 2: Age and parity wise distribution of maternal deaths.

Characteristics	Groups	Maternal deaths	Percentage
Age (years)	<20	05	11.11%
	20 - 30	28	62.22%
	31 - 40	10	22.22%
	>40	02	4.44%
Parity	Primi	12	26.66%
	Multi	33	73.33%

Table 3: Demographic profile of the study subjects.

Characteristics	Groups	Maternal deaths	Percentage
Gestational age (wks)	<20	06	13.33%
	20 - 37	07	15.55%
	>37	32	71.11%
Antenatal care	Booked	11	24.44%
	unbooked	34	75.55%
Locality	Urban	13	28.88%
	Rural	32	71.11%

77.7% percent of all maternal deaths were in the postnatal period and 16 (35.55%) of deaths were due to home delivery and delay in seeking transportation facilities. Antenatal women constituted 8.88% of all maternal deaths and early pregnancy deaths (due to septic and incomplete abortion and ectopic rupture) accounted for 13.33% of the total (Table 4).

As seen from Table 5, 27 maternal deaths (60%) had occurred within the first 24 h of admission possibly due to poor general condition of women on admission and late referrals from primary health care centres.

Table 4: Demographic profile of the study subjects.

Mode of delivery	Maternal deaths	Percentage
Early Pregnancy	06	13.33%
Antenatal (undelivered)	04	8.88%
Postnatal (vaginal del)	27	60%
Postnatal (LSCS)	08	17.77%

In the study period, 82.22% of maternal deaths were due to direct causes. The classical triad of hemorrhage (37.77%), eclampsia (15.55%), and sepsis (11.11%) was the major direct causes of maternal deaths, whereas only three maternal deaths (6.66%) were due to obstructed labor. Sepsis which is a direct consequence of poor hygiene during delivery accounts for 15% of maternal deaths globally. Sepsis cases included post abortion, puerperal sepsis and probable septicaemia. Amniotic fluid embolism was suspected in one (2.22%) and only one woman died because of acute uterine inversion.

Seven (15.55%) of all maternal deaths were due to indirect causes. Anemia, heart disease and jaundice accounted for 6.66%, 2.22%, and 4.44% of maternal deaths respectively.

Table 5: No. of maternal deaths showing time interval from admission to death.

Admission-death interval in hours	No. of maternal deaths	Percentage
<24	27	60%
24 – 48	09	20%
48 – 72	03	6.66%
>72	06	13.33%

DISCUSSION

Maternal mortality is an index of reproductive health of the society. High incidence of maternal deaths reflects poor quality of maternal services, late referral and low socioeconomic status of the community. The MMR in our present study is 627.79 per 100,000 live births, ranging from 689.65 in 2010 to 598.99 in 2012. Most women were from far-off places resulting in delayed intervention, and many were in poor general condition or comatose at the time of admission. Other studies from tertiary care institutions reported mortality rate of 727/100,000 live births due to large number of referred cases.⁷ Forty-five percent of postpartum deaths occur within 24 hours.⁸ In 2012 India has recorded more maternal deaths than any other country in the world (around 56,000 per year).⁹

In our study, 70% of maternal deaths were in the age group of 20 to 29 years, as highest numbers of births are reported in this age group. Similarly, 56.66% of maternal deaths were reported in multiparous patients. More

maternal deaths were reported in women from rural areas (69.16%), unbooked patients (83.33%), illiterate women (65%), and women belonging to low socioeconomic status. (83.33%) In our study, 72.5% of maternal deaths were due to direct causes. Hemorrhage (26.66%), eclampsia (26.66%), and sepsis (18.33%) were the major direct causes of maternal deaths. Our findings were consistent with other studies.^{10,11}

Table 6: Direct & indirect causes of maternal deaths (n = 45).

Cause Of Death	No. of Deaths	Percentage
Direct Causes	37	82.22%
Hemorrhage	17	37.77%
Sepsis	05	11.11%
Obstructed Labour (Rupture Uterus)	03	6.66%
Abortion	01	2.22%
Eclampsia	07	15.55%
Acute Inversion of Uterus	01	2.22%
Amniotic Fluid Embolism	01	2.22%
Indirect Causes	07	15.55%
Anemia	03	6.66%
Cardiac Disease	01	2.22%
Hepatitis	02	4.44%
Acute renal Failure	01	2.22%

Hemorrhage was the commonest cause of death (52.5%), and this is comparable with most of the other studies. The availability of blood banks at all first referral units (FRUs) and their proper functioning are needed. The provision of timely blood transfusions can save many lives.¹² Only one woman had died because of inversion of uterus, and this is similar with the study reported by Jagdish and Govind.¹³ Even today large number of maternal deaths is due to the classical triad of hemorrhage, sepsis, and eclampsia. Hemorrhage especially during postpartum is sudden, unpredictable, and is more dangerous when woman has preexisting anemia. Most of these deaths are preventable if patients are given appropriate treatment at periphery and timely referred to higher centres. Unfortunately, in many cases, patients were referred very late, in critical condition, unaccompanied by health care worker. Depending on where these women are located, it may be too far for them to get to a hospital and seek the proper care that they need. Training of medical officers and staff nurses working in rural areas by programs like basic emergency obstetrics care and skilled attendant at birth training gives a ray of hope of reducing maternal mortality.

The present study highlights the importance of early antenatal registration of all pregnancies and regular follow-up of cases by trained staff. Poor nutritional status, lack of antenatal care, unawareness of warning signs of pregnancy, unsupervised/dai-handled deliveries, social bias toward blood donation, and late referrals are the major contributory factors leading to poor maternal prognosis. To improve maternal health, barriers that limit access to quality maternal health services must be identified and addressed at all levels of the health system.

CONCLUSIONS

Sustained reductions in maternal mortality will only be possible if modern high-quality obstetric care is made available to all women through a system of professional midwifery and referral hospital care in the context of political commitment and accountability of health providers. Even today most maternal deaths are seen in patients from rural areas, unbooked, illiterate patients and patients from low socioeconomic status. Hemorrhage, Eclampsia and sepsis are the major causes of maternal deaths. Improvement in primary health care in rural areas and proper implementation of NRHM programs and up gradation of hospitals in rural areas can definitely bring down the number of maternal death. A multicentric study is required to further assess the maternal mortality on a state or national level. Present study was contemplated with a financial as well as time constraint.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Maternal mortality. Website accessed by authors. <http://www.icm.tn.gov.in/intersession/Matnal.html>.
2. Special Bulletin on Maternal Mortality in India 2007-09: Sample registration system, Office of Registrar General, India, 2011.
3. AICOG Committee Opinion Number 283 May 2003. New US. Food and drug administration labeling on cytotec (misoprostol) use and pregnancy. *Obstet Gynecol.* 2003;101:1049-50.
4. Bhat PN, Navneetham K, Rajan SI. Maternal mortality in India: estimates from a regression model. *Stud Fam Plann.* 1995;26:217-32.
5. Registrar General of India. Maternal mortality in India: 1997–2003. Trends, causes and risk factors, Report 2006, Registrar General India: New Delhi.
6. United Nations. UN Millennium Development Goals web site. <http://www.un.org/millenniumgoals/>. Accessed 1 August 2009.
7. Paul B, Mohapatra B, Kar K. Maternal deaths in a tertiary health care centre of Odisha: An in-depth study supplemented by verbal autopsy. *Indian J Community Med.* 2011;36:213-6.
8. Nour NM. An Introduction to Maternal Mortality. *Reviews in Ob Gyn.* 2008;1:77-81.
9. India leads with Highest Maternal and First day Infant Deaths. Latest Current Affairs Questions. Retrieved 12 May 2013.
10. Puri A, Yadav I, Jain N. Maternal mortality in an urban Tertiary care hospital of north India. *J Obstet Gynaecol India.* 2011;61:280-5.
11. Onakewhor JU, Gharoro EP. Changing trends in maternal mortality in a developing country. *Niger J Clin Pract.* 2008;11:111-20.
12. Bates I, Chapotera G, McKew S. Maternal mortality in sub-Saharan Africa: the contribution of ineffective blood transfusion services. *BJOG.* 2008;115:1331-9.
13. Jagdish JA, Govind RP. Maternal mortality: changing trends. *J Obstet Gynecol.* 2007;57:398-400.

Cite this article as: Lamba A, Agarwal S, Apurba Dutta AK. A cross sectional study to assess the pattern of maternal mortality in a tertiary level government hospital of a city in North India. *Int J Reprod Contracept Obstet Gynecol* 2016;5:220-3.