Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 VOL 10, ISSUE 02, 2019

ORIGINAL RESEARCH

A demographic study and analysis of maternal mortality in a tertiary care centre in Bihar: A five years retrospective study

Dr. Sanjeev Kumar[1], Dr. Amrita Pritam[2], Dr. Pratima[3], Dr Ravindra Prasad[4]

[1]Tutor, Department of Community Medicine, Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar.

[2]Senior Resident, Department of Obstetrics & Gynaecology, Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar.

[3]Assistant Professor, Department of Obstetrics & Gynaecology, Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar.

[4]Associate Professor, Department of Community Medicine, Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar.

Corresponding author: Dr Amrita Pritam

Senior Resident, Department of Obstetrics & Gynaecology, Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar, India

Email: dr.aproy@gmail.com

Received: 20 March, 2019 Accepted: 25 April, 2019

ABSTRACT

Background: A maternal death is defined as “the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy or its management, but not from accidental or incidental causes." The maternal mortality ratio in India was 174 maternal deaths per 100,000 live births in 2015. Most maternal deaths are due to haemorrhage, anaemia, and puerperal complications and the vast majority would be preventable with universal access to antenatal care and an effective system of referral.

Materials and Methods: A retrospective study was carried out to study the demographic factors and analyse maternal mortality in the Department of Obstetrics and Gynaecology at Sri Krishna Medical College, Muzaffarpur, Bihar. Data regarding maternal mortality from April 2013 to March 2018 were collected, analysed, and interpreted.

Results: In our study, total maternal deaths were 386. Total live births were 43,778. MMR turned out to be 386 maternal deaths per 100,000 live births. The maximum number of deaths occurred in the age group of 20–30 years. 81.85% of deaths occurred within 24 hours of the patient's admission. Haemorrhage was the most common cause of maternal deaths.

Conclusion: This study has shown a higher value of MMR due to being a tertiary care centre; most cases referred were in very critical situations and had terminal illness status. There should be proper antenatal care, screening, and postnatal care. Early detection of high-risk pregnancies can save a lot of maternal lives. The referral system should be sound and available round the clock at every level of the health care delivery system. Mother and child health is the promotion, prevention, curative and rehabilitative health care of mothers and children.

Keywords: Haemorrhage, Maternal mortality ratio, Mother-and-Child health, Referral system.

ISSN: 0975-3583, 0976-2833 VOL 10, ISSUE 02, 2019

Introduction

According to the WHO, a maternal death is defined as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy or its management, but not from accidental or incidental causes".[1] Late maternal death is defined as the death of a woman from direct or indirect causes, more than 42 days but less than one year after termination of pregnancy.[2] Pregnancy-related death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.[3]

The International Classification of Diseases (ICD) has recommended that maternal deaths may be disaggregated into two groups: (1) Direct obstetric deaths: those resulting from obstetric complications of the pregnant state (pregnancy, labour, and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. (2) Indirect obstetric deaths: those resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes but which were aggravated by the physiological effects of pregnancy.[4] Statistical measures of maternal mortality are the maternal mortality ratio, maternal mortality rate, adult lifetime risk of maternal death, and the proportion of maternal deaths among women of reproductive age.[2,5]

The maternal mortality rate, the direct obstetric rate, and the indirect obstetric rate are fine measures of the quality of maternity services.[4] An estimated 303,000 maternal deaths occurred globally in 2015, yielding an overall MMR (Maternal Mortality Ratio) of 216 (207–29) maternal deaths per 100,000 live births. For the purpose of categorization, MMR is considered to be high if it is 300–499, very high if it is 500–999, and extreme high if it is ≥ 1000 maternal deaths per 100,000 live births.[6]

The overall MMR in developing regions is 239 (229–275), which is roughly 20 times higher than that of developed regions, where it is just 12 (11–14). The maternal mortality ratio in India was 174 in 2015. The lifetime chances of maternal death in the world in 2015 as a whole are about 1 in 180.[7]

A woman is most vulnerable during the postpartum period. About 50–70 percent of maternal deaths occur in the postpartum period, of which 45 percent occur in the first 24 hours after delivery and more than two-thirds during the first week. Most maternal deaths are due to haemorrhage, anaemia, and puerperal complications and the vast majority would be preventable with universal access to antenatal care and an effective system of referral.[8]

80% of these deaths can be prevented through actions that are effective and affordable in developing country settings.[9] Enhancing women's access to family planning, adequate nutrition, improved water and sanitation facilities, and affordable basic health care, greater involvement of men in maternal and child care, and protection from abuse, violence, and discrimination would still lower mortality. For every woman who dies from causes related to pregnancy or childbirth, it is estimated that there are 20 others who suffer from a pregnancy-related illness or experience other severe consequences. [7]

There are enormous variations in the maternal mortality rate according to a country's level of socio-economic status. There is a need for comprehensive mother and child health care and family services as a compact family welfare service.

ISSN: 0975-3583, 0976-2833 VOL 10, ISSUE 02, 2019

Aims and objectives

This study was conducted to calculate the maternal mortality ratio, study the associated demographic factors, and assess the common causes of maternal mortality at our hospital.

Material and methods

A retrospective study was carried out for a period of five years, from April 2013 to March 2018, in the Department of Obstetrics and Gynaecology at Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar. All women who died at our hospital while remaining in the state of pregnancy or within 42 days of termination of pregnancy, irrespective of the duration or site of pregnancy or its management, but not from accidental or incidental causes, were included in the study as study subjects. All maternal deaths occurring during the study period were analysed in terms of age, residence, parity, status of ANC, mode of management given, pregnancy status at the time of death, duration from time of admission to death, and cause of death. The Institutional Ethics Committee gave the study its approval.

Demographic and other data was collected from individual case records, and maternal death review forms from April 2013 to March 2018 were included.

A detailed history regarding demographic characters, previous antenatal care, and type of delay is noted.

Statistical analysis

The data was entered using Microsoft Windows Excel, and the statistical analysis was done using the Statistical Package for Social Sciences (SPSS). All the relevant data were collected from hospital records and registers. The collected data were computed and analysed statistically.

Result

Table-1:

Year	Maternal Deaths	Total Live Birth	MMR
April 2013 - March 2014	87	9180	947
April 2014 - March 2015	77	8845	870
April 2015 - March 2016	62	8572	723
April 2016 - March 2017	92	8704	1056
April 2017 - March 2018	68	8477	802
April 2013 - March 2018	386	43778	881

The total number of deliveries during the study period of five years, from April 2013 to March 2018, was 45,891. Total maternal deaths were 386. Total live births during the same time period of five years, from April 2013 to March 2018, were 43,778. The maternal mortality ratio (MMR) was 881 maternal deaths per 100,000 live births. The highest MMR was 1056 during April 2016 to March 2017, and the lowest was 723 during April 2015 to March 2016 [Table 1].

ISSN: 0975-3583, 0976-2833 VOL 10, ISSUE 02, 2019

Table 2: Socio-demographic characters of the participant's

Demographic profile	No of subjects	Percentage
Age in years		
<20 years	20	5.18%
20 – 30 years	289	74.87%
>30 years	77	19.94%
Residence		
Rural	254	65.8%
Urban	132	34.2%
Gravida/Parity		
Primigravida	96	24.87%
Multigravida	231	59.84%
Grand multigravida	59	15%
Period of Gestation at the Time of Death		
Antenatal	23	5.95%
Before 20 weeks	77	19.94%
After 20 weeks	11	2.85%
Intrapartum	275	71.24%
Postpartum/Postnatal		
Antenatal Care		
Booked	23	5.95%
Unbooked	363	94%
Condition of patient at the time of admission	38	9.84%
Stable	212	54.92%
Semiconscious	136	35.23%
Unconscious		
Duration from admission to death		
<6 hours	162	41.96%
6-24 hours	154	39.89%
24-72 hours	58	15.05%
>72 hours	12	3%

289 maternal deaths (74.87%) were among the age group of 20–30 years. 65.8% were residents of rural areas. The maximum number of deaths was of multiparas, i.e., 231 (59.84%). Most of the maternal deaths occurred in the postpartum or postnatal period, approaching 275 (71.24%). Maximum maternal deaths were in unbooked cases, i.e., 363 (94%), compared to 23 (5.95%) in unbooked cases. 212 cases were brought in a semiconscious state to the hospital, and almost 136 cases were unconscious at the time of admission. Maximum mortality occurred within 6 hours of admission to the hospital. 81.85% of deaths occurred during the initial 24 hours from the time of admission [Table 2].

ISSN: 0975-3583, 0976-2833 VOL 10, ISSUE 02, 2019

Figure 1: Percentage wise distribution of participents

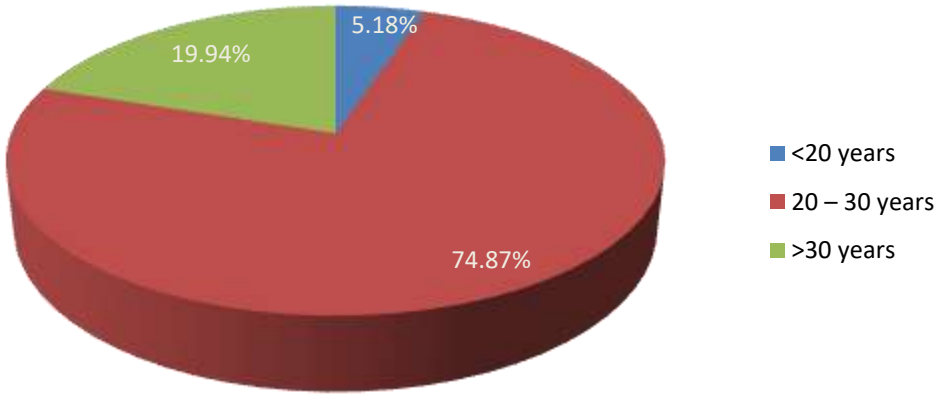

Table 3: Different Causes of maternal death

Cause of maternal death	Number	Percentage
Direct cause	316	81.86%
Hemorrhage	150	38.86%
Hypertension	75	19.43%
Rupture uterus/Obstructed	24	6.21%
labour	20	5.18%
Sepsis	16	4.14%
Unsafe abortion	12	3.10%
Pulmonary embolism	7	1.81%
Ectopic pregnancy	7	1.81%
Amniotic fluid embolism	5	1.29%
Inversion of uterus		
Indirect cause	70	18.13%
Anemia	40	10.36%
Hepatitis	10	2,59%
Heart disease	10	2.59%
Malaria	3	0.77%
Tuberculosis	2	0.52%
Acute renal failure	1	0.26%
Dengue	1	0.26%
Diabetes	1	0.26%
COPD	1	0.26%
Epilepsy	1	0.26%

In our study, 316 deaths were due to direct causes of maternal deaths, which accounts for 81.86%. Haemorrhage was the most common direct cause resulting in deaths (38.86%),

ISSN: 0975-3583, 0976-2833 VOL 10, ISSUE 02, 2019

followed by hypertension (19.43%), ruptured uterus/obstructed labour (6.21%), sepsis (5.18%), unsafe abortion (4.14%), pulmonary bolism (3.1%), and others. Indirect causes resulted in 70 maternal deaths (18.13%). Anaemia was the commonest indirect cause of maternal deaths (10.36%) [Table 3].

Discussion

Studies have shown that mortality risks for mothers are particularly elevated within the first two days after birth. Maternal deaths mostly occur between the third trimester and the first week after birth, except for deaths due to complications of abortion. About 80% of maternal deaths are due to direct causes, i.e., obstetric complications of pregnancy, labour, and pregnancy due to intervention or incorrect treatment. Puerperal infections, often the consequences of poor hygiene during delivery or untreated reproductive tract infections, account for about 15% of maternal mortality. Hypertensive disorders of pregnancy, particularly eclampsia, result in about 13% of all maternal deaths. Around 20% of maternal deaths are due to indirect causes, that is, the result of pre-existing diseases or diseases that developed during pregnancy, which are not due to direct obstetric causes but are aggravated by the physiological effects of pregnancy. Anaemia is one of the significant auses. Maternal anaemia affects half of all pregnant women. Pregnant adolescents are more prone to anaemia than older women, and they often receive less care. Various indirect causes include infectious diseases such as malaria and intestinal parasites, hepatitis, cardiovascular disease, diseases of the endocrine and metabolic systems, and other infections like tuberculosis and HIV/AIDS. MMR was found to be high in our study, as most of the women were referred late, mostly in terminal and irreversible conditions, from referral centres to our center. In our study, the MMR was 881 maternal deaths per 100,000 live births. In the study done by Kauret al.[10], the MMR was 1470, which is close to comparing with our result.

In the study by Vidyaet al.[11] it was 302, and Singh et al.[12] found MMR as 3906 in their study.

In our study, 81.86% of maternal deaths were due to direct causes, which is similar to the study by Bhaskaret al.[13]

Vidyaet al.[11] found it at 50% in their study. Khareet al.[14] reported direct causes of maternal death as 83% similar to our findings.

Among the direct causes of maternal deaths, haemorrhage accounted for 38.86% of deaths in our study, followed by 19.43% due to hypertension, 6.21% due to obstructed labour, 4.14% due to unsafe abortion, and others. Haemorrhage was also the most common direct cause of maternal death in the study by Khareet al.[14] (66.7%), while eclampsia topped the list in the study by Singh et al.[12] (24%). Among the indirect causes of maternal death, anaemia was the most common cause in our study. In various studies, anaemia remained the commonest indirect cause of maternal deaths. In our study, it was followed by hepatitis (2.59%) and heart disease (2.59%). All patients with hepatitis came with deep jaundice and were in a state of hepatic encephalopathy.

Study limitations: Data is taken from a single tertiary care centre. The fact that the study sample was collected consecutively—as compared to at random—may have had an impact on the study's outcomes.

ISSN: 0975-3583, 0976-2833 VOL 10, ISSUE 02, 2019

Conclusion

There should be proper antenatal care, screening, and postnatal care. Early detection of high-risk pregnancies and their prompt management and referral will definitely save a lot of maternal lives. The referral system should be sound and available round the clock at every level of the health care delivery system. The referral card must have all the important and adequate information. Multiple referrals should be avoided. There must be a proper linkage between the health facilities available in any region. There should be an audit of work and an evaluation of the responsibilities of connecting health workers and staff. There should be a written protocol for emergency management in all obstetric emergencies that should be properly displayed in the emergency room. Basically, there is a need to strengthen the already existing health care delivery system with a few little modifications and regular, periodic audits and evaluations of the work of all health care provider staff at every level. These are not impossible or impractical actions, but there are already established, cost-effective provisions that women of reproductive age have a right to expect. Information is the basic part of education, and better health education increases awareness and motivation, which results in better utilisation of health resources. This needs attention to be paid regarding appropriate antenatal care, increased booking status, and increased institutional deliveries. 81.85% of deaths occurred in the initial 24 hours, which is directly linked to late and multiple referrals from the periphery.

Acknowledgement

I am immensely grateful to all faculties and co-workers of the Department of Obstetrics and Gynaecology, Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar, India, and Department of Preventive and Social Medicine (PSM), Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar, India, for their support and valuable suggestions.

References

1. WHO (2005). Improving Maternal, Newborn and Child Health in the South-East Asia Region, New Delhi.
2. WHO, UNICEF, World Bank (2010). Trends in Maternal Mortality, 1990-2008, Estimates Developed by WHO, UNICEF, UNFPA and The World Bank.
3. WHO (1976). Nutrition in Preventive Medicine, WHO Monograph Sr.No. 62 - P 567
4. Park K. Indicators of MCH Care: Preventive Medicine In Obstetrics, Paediatrics and Geriatrics.In: Park's Textbook of Preventive and Social Medicine.24th edn. Jabalpur: Banarsidas Bhanot 2017:p.593
5. WHO, UNICEF, World Bank (2012). Trends in Maternal Mortality; 1990-2010.
6. WHO etc. (2015). Trends in Maternal Mortality: 1990 to 2015, Estimates by WHO etc.
7. Park K. Maternal Mortality Ratio: Preventive Medicine In Obstetrics, Paediatrics and Geriatrics. In: Park's Textbook of Preventive and Social Medicine.24th edn. Jabalpur: Banarsidas Bhanot 2017:p.594
8. Ian Donalds Practical Obstetric Problems. 6th edn. New Delhi: BI Publication Limited 2010: p.3
9. Dutta DC. Maternal Mortality: Safe Motherhood, Epidemiology of Obstetrics. In:Textbook of Obstetrics.7th edn.Kolkata:New Central Book Agency(P) Ltd:p.603
10. Kaur D. Kaur V. Yuel VI. Alarming High Maternal Mortality in 21st Century.JK Science 2007;9(3):123-126

ISSN: 0975-3583, 0976-2833 VOL 10, ISSUE 02, 2019

11. Vidyadhar B. Bangal, Purushottam A. Giri, Ruchika Garg. Maternal Mortality At A Tertiary Care Teaching Hospital of Rural India; A Retrospective Study: Int J Biol Med Res. 2011; 2 (4): 1043-1046.
12. Singh R, Sinha N. Pattern of Maternal Mortality in a Tertiary Care Hospital of Patna, Bihar. Ind J Community Med 2009; 34(1): 73-74.
13. Murthy B.K., Murthy MB, Prabhu PM, Maternal Mortality in a Tertiary Care Hospital; A 10 years review. Int J Prev Med 2013; 4: 105-9
14. Khare S. Singh KN, Kulkar S. Maternal mortality in Jabalpur Medical College (A 15 years study). J ObstGynaecolInd 2002; 52(4): 51-54