Print ISSN: 2321-6379
Online ISSN: 2321-595X
DOI: 10.17354/ijss/2016/536

Original Article

Causes of Maternal Mortality and Changing Trends: A Retrospective Analysis

Monica Soni[1], Priyanka Soni Gupta[2], Ankur Gupta[3]

[1]Assistant Professor, Department of Obstetrics and Gynaecology, S.P. Medical College and P.B.M. Hospital, Bikaner, Rajasthan, India, [2]Assistant Professor, Department of Microbiology, Jawahar Lal Nehru Medical College and Associated group of Hospitals, Ajmer, Rajasthan, India, [3]Senior Medical Officer, Department of Respiratory Medicine, Jawahar Lal Nehru Medical College and Associated group of Hospitals, Ajmer, Rajasthan, India

Abstract

Background: Reduction in maternal mortality is a key international development goal. Data for causes of maternal mortality can help formulate policies to improve maternal health. We undertook this study to review the causes of maternal deaths at our center with an aim to reduce maternal deaths.

Materials and Method: A retrospective analysis of 294 maternal deaths over a period of 6 years was done in the Department of Obstetrics and Gynaecology, S.P. medical college, Bikaner, Rajasthan, in two phases, i.e., Phase I from 1st April 2008 to 31st March 2011 and Phase II from 1st April 2012 to 31st March 2015. Causes of death were analyzed along with the study of preventable causes and changing trends.

Result: The triad of hemorrhage, hypertensive disorders and sepsis was responsible for most of the maternal deaths in the study. Hemorrhage was the most important cause in both phases (24.73% and 37.96%). There was a decline in the percentage of deaths due to sepsis from 22.58% in Phase I to 10.19% in Phase II and a slight increase in hypertensive cases from 11.29% to 15.74%. Anemia was the most important indirect cause leading to 6.99% maternal deaths in Phase I and 7.41% in Phase II. Poor, illiterate, unbooked women from rural areas were at higher risk.

Conclusion: There has been an improvement in statistics, but it is still a long way to go. Strengthening the health-care system along with an attack on cultural and sociodemographic factors which cause underutilization of available services is required.

Key words: Changing trends, Maternal deaths, Maternal mortality

INTRODUCTION

Maternal mortality is unacceptably high worldwide.[1-5] There are about 880 maternal deaths every day.[1] Most of these occur in low-resource settings and can be prevented.[1-5] Seeing this, countries have united to reduce the global maternal mortality ratio to <70/100,000 live births between 2016 and 2030 as a part of the Sustainable Development Agenda.[1] No country should have a maternal mortality rate more than twice the global average.[1] The high maternal mortality rate is an indicator of inadequate health services as well as the low standard of living and low socioeconomic status of the community.[2] Low status of the women in the society coupled with low literacy rates also leads to underutilization of available health services.[1,2] A good number of maternal deaths can be averted by skilled care before, during, and after childbirth.[1-4] This study was conducted at the Department of Obstetrics and Gynaecology, P.B.M. Hospital, Bikaner, Rajasthan, with an aim to analyze the causes and risk factors associated with maternal mortality with a motive to guide measures to reduce maternal deaths and improve maternal and fetal outcomes. 186 cases of maternal deaths were studied in Phase I (1st April 2008 to 31st March 2011) and 108 cases were studied in Phase II (1st April 2012 to 31st March 2015). The cases were systemically analyzed and changing trends were also studied.

Access this article online

www.ijss-sn.com

Month of Submission : 08-2016
Month of Peer Review : 08-2016
Month of Acceptance : 09-2016
Month of Publishing : 10-2016

MATERIALS AND METHODS

This was a retrospective study of 294 cases of maternal deaths over a period of 6 years. The study period was

Corresponding Author: Dr. Priyanka Soni Gupta, 45-A, Chandranagar, Beawar Road, Ajmer - 305 001, Rajasthan, India. Phone: +91-9462946250. E-mail: Priyankasn51@gmail.com

divided into two phases of 3 years each. 186 cases were studied in Phase I from 1st April 2008-31st March 2011 and 108 cases in Phase II from 1st April 2012-31st March 2015. Each case was studied with respect to age, parity, residence, literacy, socioeconomic status, antenatal booking, mode of delivery, admission to mortality interval, etc. Causes of death were analyzed and other contributory factors were studied. Changing trends from Phase I to Phase II were observed.

Observations

The observations of our study are shown in Tables 1-3.

DISCUSSION

About 66.87% of maternal deaths in Phase I and 72.22% in Phase II were attributed to direct causes. The triad of hemorrhage, sepsis, and hypertensive disorders including eclampsia was the major cause in both phases, similar to various other studies.[3-6] A significant number of maternal deaths resulting from this triad are preventable with early and appropriate intervention. Obstetric hemorrhage, mostly postpartum, was the single most important cause leading to a maximum number of maternal deaths in both phases, similar to other studies.[6] PPH also needs a special mention because of the shortest episode-to-death interval in the absence of proper life-saving care. Number of maternal deaths attributable to PPH vary considerably between developed and developing countries, suggesting that deaths from PPH are preventable.[7] Africa and Asia have the highest prevalence. Supervision of delivery by a skilled health-care provider and promotion of active management of the third stage of labor need to be emphasized. The high prevalence of anemia in women of developing countries further complicates PPH and needs to be targeted.[7] Hypertensive disorders of pregnancy, particularly eclampsia, were responsible for 11.29% of maternal deaths in Phase I and 15.74% in Phase II. Good antenatal, intranatal, and postnatal care, early diagnosis of preeclampsia and impending eclampsia, early referral, quick and well-equipped transport facilities with immediate management at referral centers can reduce maternal and fetal morbidity and mortality.[8] 10.19% of cases in Phase II were due to sepsis as compared to 22.58% in Phase I. The reduction may be related to promotion of clean deliveries, antibiotic coverage, and early surgical intervention.[9] 3 cases of obstructed labor were reported in Phase I but none in Phase II. Improving nutrition in childhood for healthy bone and pelvic development, early diagnosis and referral of labor dystocia and operative intervention can help reduce maternal mortality and morbidity. Deaths due to unsafe abortions can be prevented by increasing access to family planning and contraceptive measures and safe abortion services.

Table 1: Distribution of cases according to demographic variables

Demographic variables	*n* (%)		
	Phase I	Phase II	Total
Age (in years)			
<21	40 (21.56)	24 (22.22)	64 (21.77)
21-25	79 (42.47)	48 (44.44)	127 (43.20)
26-30	43 (23.12)	22 (20.37)	65 (22.11)
31-35	14 (07.53)	10 (09.26)	24 (08.16)
36-40	4 (02.15)	2 (1.85)	6 (2.04)
>40	6 (03.23)	2 (1.85)	8 (2.72)
Residence			
Rural	119 (63.98)	76 (70.37)	195 (66.33)
Urban	67 (36.02)	32 (29.63)	99 (33.67)
Socioeconomic status			
Lower	143 (76.88)	68 (62.96)	211 (71.77)
Middle/upper	43 (23.12)	40 (37.04)	83 (28.23)
Education			
Literate	63 (33.87)	29 (26.85)	92 (31.29)
Illiterate	123 (66.13)	79 (73.15)	202 (68.71)

Table 2: Distribution of cases according to obstetric variables

Obstetric factors	*n* (%)		
	Phase I	Phase II	Total
Parity			
Primigravida	79 (42.47)	38 (35.19)	117 (39.80)
Multigravida	96 (51.61)	59 (54.63)	155 (52.72)
Grand multigravida	11 (05.91)	11 (10.19)	22 (07.48)
Antenatal booking			
Booked	166 (89.25)	98 (90.74)	264 (89.80)
Unbooked	20 (10.75)	10 (09.26)	30 (10.20)
Delivery			
Undelivered	56 (30.11)	30 (26.85)	86 (29.25)
Home delivery	74 (39.79)	09 (08.33)	83 (28.23)
Other hospitals	10 (05.38)	16 (13.89)	26 (08.84)
Our hospital	46 (24.73)	51 (49.07)	97 (32.99)
Abortion	00 (00)	02 (01.85)	02 (0.68)
Admission to mortality interval			
<1 h	28 (15.05)	06 (05.56)	34 (11.56)
1-6 h	44 (23.66)	20 (18.52)	64 (21.77)
6-12 h	36 (19.35)	22 (20.37)	58 (19.73)
12-18 h	10 (05.38)	16 (14.81)	26 (08.84)
18-24 h	13 (06.99)	06 (05.56)	19 (06.46)
1-7 days	43 (23.12)	33 (30.56)	76 (25.85)
>7 days	12 (06.45)	05 (04.63)	17 (05.78)

About 33.33% of maternal deaths in Phase I and 27.78% in Phase II were caused by indirect causes. Anemia was the leading cause followed by heart disease. Liver and respiratory diseases were other important indirect causes. Current prevention efforts for anaemia focus on universal iron supplementation during pregnancy.[10] Additional factors which are often neglected include nutritional deficiencies of folic acid and vitamin B12, etc., infections such as HIV, parasitic infestations such as hookworm and schistosomiasis, and inherited anemias such as thalassemias.[10] Preconceptional counseling and appropriate management during pregnancy are of vital

Table 3: Distribution of cases according to cause of death

Causes of maternal death	*n* (%)		
	Phase I	Phase II	Total
Direct causes			
Total	124 (66.67)	78 (72.22)	202 (68.71)
Hemorrhage	46 (24.73)	41 (37.96)	87 (29.59)
Sepsis	42 (22.58)	11 (10.19)	53 (18.03)
Hypertension/eclampsia	21 (11.29)	17 (15.74)	38 (12.93)
Obstructed labor	03 (01.61)	00 (00)	03 (01.02)
Unsafe abortion	03 (01.61)	02 (01.85)	05 (01.70)
Others	09 (04.84)	07 (06.48)	16 (05.44)
Indirect causes			
Total	62 (33.33)	30 (27.78)	92 (31.29)
Anemia	13 (06.99)	08 (07.41)	21 (07.14)
Heart disease	08 (04.30)	06 (05.56)	14 (04.76)
Hepatitis/liver disorders	08 (04.30)	03 (02.78)	11 (03.74)
Swine flu	06 (03.23)	02 (01.85)	08 (02.72)
Other respiratory diseases	05 (03.76)	01 (00.93)	06 (02.04)
Malaria	07 (02.69)	01 (00.93)	08 (02.72)
Epilepsy	00 (03.76)	01 (00.93)	01 (00.34)
Others	08 (04.30)	08 (07.41)	16 (05.44)

importance in medical disorders related to cardiovascular, liver or respiratory system. The complexity of pregnancy and these diseases requires a multidisciplinary approach involving obstetrician, anesthetist, cardiologist, or concerned system expert and trained nursing and paramedical staff.

A number of sociodemographic factors also affect maternal mortality. It was observed that poor, illiterate, unbooked women coming from remote rural areas were more vulnerable to morbidity and mortality. High parity is contributory, especially in cases with short birth intervals. The WHO also states that maternal mortality is higher in women coming from rural areas, poor communities, and in low-resource settings.[1] Poverty, distance, lack of information, inadequate services, and cultural practices prevent women from receiving or seeking care during pregnancy and childbirth.[1] Barriers that limit access to quality health services need to be identified and addressed at all levels of the health system.

About 38.71% cases in Phase I and 24.08% in Phase II died within 6 h of admission. 70.43% and 64.81% died within 24 h. 15.05% of cases in Phase I succumbed within 1 h of admission as compared to 5.56% in Phase II. These figures could be related to improved transportation facilities after programs such as JSSY, leading to referred patients reaching the hospital before terminal stage, but many later succumbed to their complicated condition. There is still scope for betterment. Furthermore, there is also poor utilization of antenatal and intranatal facilities provided by the government at peripheral centers.

CONCLUSION

Hemorrhage is the leading direct cause of maternal deaths, followed by hypertensive disorders and sepsis. Anemia continues to be the most common indirect cause. Various sociodemographic factors are also related. Regional estimates vary and there is a slight improvement in statistics, but still, a large number of maternal deaths are preventable. Strengthening our health-care system as well as targeting sociodemographic factors that limit access to quality maternal health services is essential.

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How to cite this article: Soni M, Gupta PS, Gupta A. Causes of Maternal Mortality and Changing Trends: A Retrospective Analysis. Int J Sci Stud 2016;4(7):105-107.

Source of Support: Nil, **Conflict of Interest:** None declared.