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Original Research Article

Towards safe motherhood to - are we moving in the right direction?: experience from an urban health facility in South India

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ABSTRACT

Background: This study was designed to evaluate the institutional Maternal Mortality Ratio (iMMR) in our institution, a tertiary private medical college hospital and to suggest recommendations and possible interventions to reduce it.

Methods: This retrospective descriptive study was conducted by reviewing the hospital records over a period of ten years from January 2009-December 2018. The case records were reviewed for maternal demographic characteristics and complications.

Results: The total number of deaths during the study period was 21, giving an iMMR of 85.268 per 100000 live births. Most of the maternal deaths (>80%) occurred postpartum. Obstetric causes contributed to 57% of the deaths with hypertension and hemorrhage topping the list. Other causes were sepsis and non obstetric causes including one case of maternal suicide. 52.38% of the women died more than 48 hours after admission to the hospital, while 28.57% succumbed in less than six hours. Secondary complications noted were ICU admission, extended intubation, massive transfusion, operative intervention and multi organ dysfunction.

Conclusions: The classical triad of Hypertension, Hemorrhage and Sepsis continues to be the major determinant of maternal mortality and are potentially preventable by promoting universal access to quality health care, strengthening of health services and ensuring accountability.

Keywords: Hemorrhage, Hypertension, Maternal mortality, MMR, Multi organ dysfunction, Suicide

INTRODUCTION

In the year 2000, the United Nations adopted the Millennium Development Goals (MDG) out of which MDG 5 was targeted on reducing the Maternal Mortality Ratio (MMR) by three fourths between 1999-2015.¹ By the year 2015, Sustainable Development Goals (SDG) were introduced and SDG 3 aimed at Good Health and Well-Being.² Under this, the aim is to bring down the global maternal mortality to below 70 per 100000 by the year 2030.

At an MMR of 130 per 100,000 live births in 2016, India is ranked 128 in the world.^{3,4} WHO commended India for its groundbreaking progress in reducing maternal mortality by 77% to the present rate.³ Strategies responsible for this achievement include (i) Increased coverage of maternal health services and promoting institutional deliveries (ii) Incentives and financial support for women delivering in the public health system (iii) Improving literacy among women and increasing the average age at marriage (iv) promotion of public-private partnerships in the care of pregnant women.³

To put the country on track to achieve the SDG targets, Government of India established the NITI (National Institution for Transforming India) in the year 2015 to monitor, coordinate and ensure implementation of the SDGs.²

This study was designed to evaluate the MMR in our institution, a tertiary private medical college hospital and to suggest recommendations and possible interventions to reduce the institutional Maternal mortality ratio (iMMR). Continued and focussed efforts to end preventable deaths due to pregnancy and childbirth will help our country reach the SDG.

METHODS

This retrospective descriptive study was undertaken in the Department of Obstetrics and Gynecology at the PSG Institute of Medical Sciences and Research, Coimbatore, India during the period from January 2009- December 2018. The approval of the Institutional Human Ethics Committee was obtained. Informed consent was not required since it was a retrospective study and there was no direct patient contact. The case records of all the women who died during pregnancy or within 42 days of delivery due to complications of pregnancy or other causes were reviewed for the following factors: age, obstetric history, antenatal complications and co morbidities, gestational age at onset of symptoms (if any), ICU admission, the need for ventilator support, blood transfusion, multidisciplinary management, cause of death and admission death interval. The number of live births during the study period was obtained from the parturition register. MMR was calculated as number of maternal deaths per 100000 live births.

RESULTS

There were a total of 24628 live births in our institution during the study period. Data regarding the socioeconomic status, urban/rural divide were difficult to ascertain from the case records.

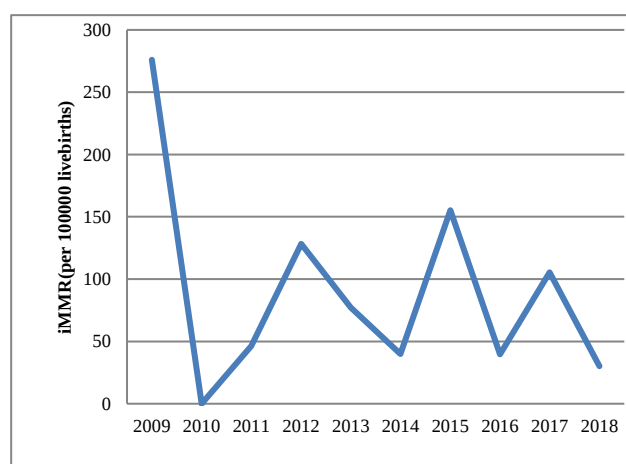


Figure 1: Trends in maternal mortality.

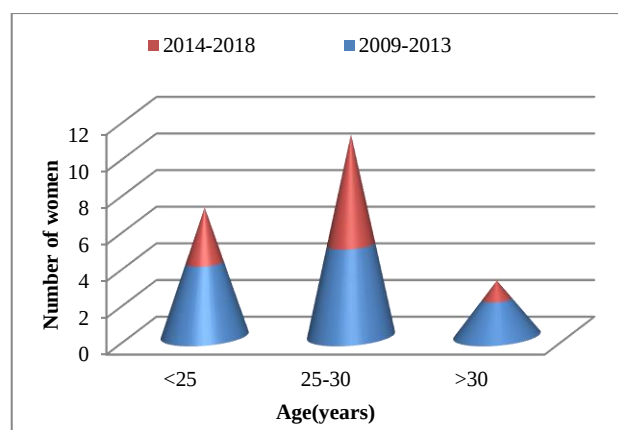


Figure 2: Age distribution.

The total number of deaths during the study period was 21, giving an iMMR of 85.268 per 100000 live births. The annual trend in iMMR has been pictorially represented in Figure 1. The age of the women ranged from 20-32 years (mean-25.9±3.6 years). The age distribution of the women is graphically represented in Figure 2.

Table 1: Main causes of maternal mortality.

Causes	2009-2013	2014-2018	%
Hypertensive disorders	3	2	23.8
Haemorrhage	3	2	23.8
Sepsis	1	1	9.52
Anaemia	1	1	9.52
Viral infection	2	0	9.52
Peripartum Cardiomyopathy	0	2	9.52
Pulmonary embolism	0	1	4.76
Jaundice	1	0	4.76
Suicide	0	1	4.76

Table 2: Complications in patients.

Complications	2009-2013	2014-2018	%
ICU admission	8	7	71.42
Extended intubation>12 hours	4	5	42.87
Multiorgan dysfunction	4	5	42.87
Blood transfusion>5 units	6	3	42.87
Operative intervention	1	2	14.28

Majority of the women died postpartum, except for three. Two of the women who died antenatally were referred to our facility in a moribund state and died within two to three hours of admission despite intensive resuscitative measures. Ten of the women were multiparous and eleven of them were primiparous. Referrals from outside facilities were predominant in the first five years. Obstetric causes dominated the scenario in the first five years (6/11), whereas deaths during the next five years were mainly due to medical disorders (Table 1).

52.38% of the women died more than 48 hours after admission to the hospital, while 28.57% succumbed in less than six hours of admission (Figure 3).

Secondary complications noted were ICU admission, extended intubation, massive transfusion, operative intervention and multi organ dysfunction. Commonest among the above was ICU admission (71%) and the least common was operative intervention (14.28 %) (Table 2).

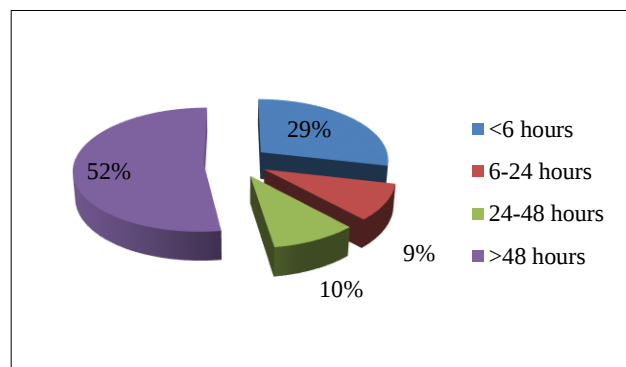


Figure 3: Admission death interval.

DISCUSSION

Maternal mortality is considered an index of the quality of healthcare services in a society. MMR of Tamil Nadu (a state in South India) at 66 per 100,000 live births is low as compared to most of the states in India.⁴

The lower rates are due to a higher proportion of institutional deliveries, effective healthcare delivery system and high quality emergency obstetric care provided by CEmONC (Comprehensive Emergency Obstetric and Newborn Care) centres.

In the present study, the highest mortality rates were in the age group 25-30 years, which is comparable to those of similar studies from South India.^{5,6} This may be explained by the fact that the highest proportion of the pregnant population belongs to this age group. 71.43% of the women were primiparous as against other studies where multiparous women formed the majority.⁷ Both vaginal deliveries and cesarean sections were encountered equally in our series.

A fluctuating trend in iMMR was observed during the study period with peaks during the years 2009, 2012 and 2015. This was a chance observation since the women were referred from maternity units from the surrounding areas and there was a modest but steady increase in the number of deliveries over the years.

Major proportion of the deaths occurred in the postpartum period (80.95%).^{6,8} One perimortem caesarean section was done on a patient with peripartum cardiomyopathy (PPCM) who had a cardiac arrest on table.

Two thirds of the women who died were referred from other hospitals.⁵ Increased mortality was seen in patients who were referred from other hospitals, due to the bad general condition in which they were received and the time delay. The type of delay could not be assessed in the referral cases as the primary care was given elsewhere.

Obstetric causes of maternal mortality include those resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium). Non obstetric causes result from pre existing diseases or those that develop during pregnancy and which is not due to direct obstetric cause, but was aggravated by the physiological effects of pregnancy.⁹

Interestingly, 57% of the deaths were due to direct obstetric causes in contrast to those by Sowjanya kumari et al (85%), B. Paul et al (76.7) %, Murthy et al (72.5%) and similar to Khandale SN et al (61%).^{6,10-12}

The leading causes of death were hypertensive disorders (23.8%) and haemorrhage (23.8%) comparable to the study by Paily et al. The major cause of death in women with hypertension in our series was hepatic dysfunction (60%).¹³

Severe preeclampsia is associated with high rates of maternal mortality and morbidity. The major contributors to maternal mortality in preeclampsia are eclampsia, HELLP, cerebral haemorrhage, renal dysfunction and coagulopathy. The two pronged approach to management of preeclampsia, i.e., control of hypertension with Labetalol and seizure prophylaxis with Magnesium sulphate has to be adopted to minimise complications.¹⁴ Standard protocols have to be in place for early detection, referral, appropriate treatment and timely delivery.¹⁵

80% of the women who succumbed to obstetric haemorrhage were referred from other hospitals in a critical condition and died within few hours of admission despite intensive resuscitative measures including obstetric hysterectomy. Atonic postpartum haemorrhage (PPH) was the cause of death in four cases while one patient died due to rupture uterus. Rupture uterus followed a second trimester termination in a woman with two previous cesarean sections with an inappropriate dose of misoprostol.

Active management of third stage of labour (AMTSL) and oxytocin as the first line uterotonic has been advocated as the gold standard in preventing complications due to PPH.¹⁶ In health care settings without facilities like access to blood and blood products and specialist care, early referral will play a pivotal role in preventing mortality. Women at high risk for PPH could be appropriately managed antenatally and delivered in a tertiary centre so that complications arising henceforth could be anticipated and prevented. Staff in the tertiary centres have to be trained in protocols for management of PPH with frequent mock drills.

Since our institution is an urban centre, the prevalence of cases of severe anaemia was less.¹³ This could be attributed to early identification of women with anaemia and institution of appropriate treatment. Still anaemia was a contributory factor in five women in our series. Blood transfusion for moderate anaemia close to delivery was the trigger for deterioration of the maternal condition in three instances. Two of the three women were diagnosed with transfusion reaction which led to acute renal failure requiring dialysis.^{6,8} The importance of early detection of anaemia, its correction and the need for raising the threshold for transfusion is reiterated by these cases.

Two women in our study had a diagnosis of PPCM (9.52%) as compared to Creanga et al (10-15%).¹⁷ One of them was diagnosed antenatally at 29 weeks and the other followed a normal vaginal delivery.

Four women had hepatic dysfunction and jaundice, out of which three were due to preeclampsia and one was due to viral hepatitis. All patients with hepatic dysfunction were referred from other hospitals due to availability of good intensive care facilities and were directly referred to the gastroenterology unit. The incidence of pulmonary embolism, hepatitis and sepsis in our series were similar to that of Singh et al.⁸

One death in our study was due to suicide. According to the ICD-MM guidelines published by the WHO all antepartum and post partum suicide deaths should be included as direct obstetric deaths even if it is not possible to establish the diagnosis of depression or puerperal psychosis.¹⁸ This is a major deviation in maternal mortality reporting and has the potential to increase the MMR since hitherto unreported deaths will be accounted for henceforth.^{13,19}

The commonest complications encountered by these women were prolonged ICU stay and ventilator support. Multidisciplinary care was required in more than 50% of our cases, commonest being the involvement of nephrologist, gastroenterologist and cardiologist. 29% of the women died within six hours of admission, whereas 52% succumbed to complications after 48 hours, the longest being 33 days.^{5,7,8,12}

The only operative intervention performed was obstetric hysterectomy which was required in three women-two following failed medical management of atonic PPH and one following rupture uterus. 50% of our patients required multiple transfusions since obstetric haemorrhage was a leading cause of mortality, and coagulopathy due to hepatic dysfunction was also seen in a few cases.

More than 50% of deaths in our study were due to obstetric causes, which are largely preventable. This could be achieved by intensive monitoring with incorporation of early obstetric warning tools.²⁰ Early warning tools include monitoring of maternal vital

parameters such as blood pressure, heart rate, temperature, oxygen saturation, respiratory rate and altered sensorium; and notification to the physician in case of any abnormality.

As with all retrospective studies, our study also has limitations. Our institution being a private medical college in a city with many other well equipped hospitals, we reported a lesser number of maternal deaths. Fewer numbers preclude adequate statistical analysis and hence reduce the power of the study. Higher proportions of cases were referred from far-off areas and hence details regarding the initial management could not be accessed. In addition, autopsy was not performed routinely and therefore, the exact cause of death could not be verified in many of the cases.

CONCLUSION

Though the iMMR has shown a fluctuating trend, it has remained at acceptable levels in comparison to the state and national averages. The classical triad of Hypertension, Haemorrhage and Sepsis remains the major determinant of maternal mortality in our institution and most of them are preventable. By promoting universal health coverage, access to quality health care, strengthening of health services and ensuring accountability, we can strive to reduce deaths due to pregnancy and childbirth.

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

REFERENCES

1. World Health Organisation. Millennium Development Goals, 2000. Available at: https://www.who.int/topics/millennium_development_goals/about/en/. Accessed 10 April 2019.
2. United Nations. Sustainable Development Goals, 2016. Available at: <https://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/>. Accessed 10 April 2019.
3. WHO Regional Office for South East Asia. June 2018. Available at: <http://www.searo.who.int/mediacentre/features/2018/india-groundbreaking-success-reducing-maternal-mortality-rate/en/>. Accessed 20 March, 2019.
4. National Institution for Transforming India. Available at: <https://niti.gov.in/content/maternal-mortality-ratio-mmr-100000-live-births>. Accessed on 16 January, 2019.
5. Rajeswari, Shobha. Maternal mortality in an urban tertiary care hospital of South India. *Indian J Obstet Gynaecol Res.* 2016;3(1):32-7.
6. Kumari JS, Revathi V, Reddy KS. A study of maternal mortality in Government Maternity

- Hospital, Sri Venkateswara Medical College, Tirupati. *Indian J Obstet Gynaecol Res.* 2018;5(4):525-9.
7. Pipal VR, Chouhan B, Pipal DK, Chouhan M, Yaduvanshi N, Mahavar N. Study of maternal mortality at Umaid Hospital, Jodhpur: a review of five years. *Indian J Obstet Gynaecol.* 2018;6:6.
 8. Singh S, Singh N, Nagar JK, Jain S. Maternal mortality at a tertiary health care: a retrospective study. *Int J Reprod Contracept Obstet Gynecol.* 2018;7(5):1773-7.
 9. Park K, Park's textbook of Preventive and Social Medicine, 24th edition. Page 593. India. Banarsidas Bhanot Publications. 2017.
 10. 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(3):213-6.
 11. Murthy BK, Murthy MB. Maternal mortality in tertiary care hospital: A 10 years review. *Int J Prevent Med.* 2013;4(1):105-9.
 12. Khandale SN, Kedar K. Analysis of maternal mortality: a retrospective study at tertiary care centre. *Int J Reprod Contracept Obstet Gynecol.* 2017;6:1610-3.
 13. Paily VP, Ambujam K, Rajasekharan Nair V, Thomas B. Confidential review of maternal deaths in Kerala: a country case study. *BJOG.* 2014;121:(Suppl. 4):61-6.
 14. Lo JO, Mission JF, Caughey AB. Hypertensive disease of pregnancy and maternal mortality. *Curr Opin Obstet Gynecol.* 2013;25:124-32.
 15. Ghulmiyyah L, Sibai B. Maternal mortality from preeclampsia/eclampsia. *Semin Perinatol.* 2012;36:56-9.
 16. WHO. Available at: www.who.int/reproductive-health/publications/maternal_perinatal_health/9789241548502/en/WHO_recommendations_for_the_prevention_and_treatment_of_postpartum_haemorrhage-2018_update. Accessed 16 January 2019.
 17. Creanga AA, Berg CJ, Jean Y. Maternal mortality and morbidity in the United States: Where are we now? *J Women's Health.* 2014;23:3-9.
 18. WHO. The WHO Application of ICD-10 to deaths during pregnancy, childbirth and the puerperium: ICD-MM. Geneva: World Health Organization, 2012. Accessed on 20 March, 2019.
 19. Fuhr DC, Calvert C, Ronsmans C. Contribution of suicide and injuries to pregnancy-related mortality in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Psychiatry.* 2014;1:213-25.
 20. Shields LE, Wiesner S, Klein C. Use of maternal early warning trigger tool reduces maternal morbidity. *Am J Obstet Gynecol.* 2016;214:527.e1-6.

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