International Journal of Community Medicine and Public Health
Sharma A et al. Int J Community Med Public Health. 2022 May;9(5):2080-2084
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20221014

Original Research Article

A community-based study on maternal mortality in Bongaigaon district, Assam

Anand Sharma[1,2]*, M. S. Lakshmi Priya[3]

[1]District Surveillance Unit, Integrated Disease Surveillance Programme, Bongaigaon, Assam, India
[2]Department of Anthropology, Dibrugarh University, Dibrugarh, Assam, India
[3]District Administration, Bongaigaon, Assam, India

Received: 22 March 2022
Revised: 06 April 2022
Accepted: 07 April 2022

***Correspondence:**
Dr. Anand Sharma,
E-mail: anandsharmaicmr@gmail.com

ABSTRACT

Background: Maternal mortality is an important indicator for measuring the health care provided to the women by any society. India has a high maternal mortality ratio and within India the state of Assam has the highest MMR in the country.
Methods: A community based cross-sectional study was conducted during January 2021 till December 2021 in Bongaigaon district. The study included 10 maternal deaths occurred in Bongaigaon District in a year. The information regarding socio demographic, clinical information and reproductive parameters was collected from the verbal autopsy and the results were analyzed by using percentage.
Results: Out of 13,124 total deliveries, maternal mortality was found to be 76 per 1,00,000 live births. The leading cause for maternal death is eclampsia (30.0%) followed by haemorrhage (20.0%), PIH (20.0%), heart failure (10.0%), anemia (10.0%), placental abruption with haemorrhage (10.0%).
Conclusions: Teenage pregnancy is one the major concern in maternal and child health. There is a wide scope for improvement as a large proportion of the observed deaths were preventable.

Keywords: Maternal death, Teenage pregnancy, Bongaigaon

INTRODUCTION

The global community adopted a set of 17 Sustainable development goals (SDGs) on 25 September 2015, to provide benchmark targets for global development between 2015 and 2030.[1] These goals are intended to build on the momentum and enthusiasm generated by the Millennium development goals (MDGs),[2] but also to reframe them within the context of a myriad of environmental and societal challenges inherent in achieving sustainable global development.[3,4]

The Global strategy for women's, children's, and adolescents' health 2016-2030 further aims to position the global discussion of maternal mortality within a continuum of programmed aimed at improving the health of women and children globally.[5]

In 2014, India was recognized to have contributed one-fifth of the global burden of absolute maternal deaths, while experiencing an estimated 4.7% decline in its Maternal mortality ratio (MMR) which stood at 174 per 100,000 live births in India.[6]

As per Sample registration system (SRS), 2011-13 reports published by Registrar General of India, MMR was 167 per 1,00,000 live births in the country under the Millennium development goal (MDG).[7,8] Every year, many women in reproductive age-span die due to

complications during and following pregnancy and childbirth or abortion.

The WHO defines a maternal death as 'the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause to or aggravated by the pregnancy or its management but not from accidental or incidental causes'.[9]

The Sustainable development goals 3 (SDG 3) plan to reduce the global MMR to fewer than 70 per 100,000 live births by 2030 and have suggested no country should have an MMR greater than 140 per 100,000 live births, a number twice the global target. According to the Sample Registration System, a household survey conducted by the Indian government, the MMR dropped from over 400 per 100 000 in the early 1990s, to 230 in 2008 and to 130 per 100000 between 2014 and 2016.[10]

The government of India launched the National Rural Health Mission (NRHM) in 2005, to improve access to good quality healthcare services for socioeconomically disadvantaged population concentrating its efforts on nine Empowered action group (EAG) states.[11,12] These are Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand. The EAG states and Assam together account for about 50% of the total population, 61% of the total births, 71% of the infant deaths and 72% of the under- 5 deaths in India.[13]

Assam has the highest MMR in the country. The immediate cause of a maternal death is always a biomedical event, but contributory causes are many. This includes socioeconomic determinants such as education, income, occupation, women empowerment in society, and access to and utilization of the health system. Some studies have noted the relationship between maternal mortality and socioeconomic factors such as per capita income, gross domestic product, educational level, and availability and functionality of health services.[14-16]

Social factors are important determinants of maternal mortality. Early age at marriage, early first pregnancy, decrease spacing and large family, poor educational level, poverty, marginalized population, and geographical isolation are some known social determinants.[17-19] As per SRS, 2016-2018 reported by Registrar general of India, MMR for Assam is at 215. Highest prevalence was in Upper Assam division comprising districts of Tinsukia, Dibrugarh, Sibsagar, Jorhat and Golaghat.[20]

Objectives

The objective of this study were (a) to assess the MMR in Bongaigaon district; (b) to assess the different causes of maternal mortality; and (c) to compare with different studies in India.

METHODS

A community based cross-sectional study on maternal deaths occurred in Bongaigaon district was included in the study.

The study was conducted during January 2021 till December 2021.

The study included all 10 maternal deaths occurred in Bongaigaon District during January 2021 till December 2021.

The data was collected from the institutions as well as through community-based verbal autopsy in the field.

Statistical analysis

The data was collected through verbal autopsy and analyzed by using Microsoft Excel.

Results were analyzed by using percentage.

Inclusion criteria

All maternal death occurred in Bongaigaon district were included in the study.

MMR for the study period was calculated by using the formula,

$$MMR = \frac{\text{Total number of maternal deaths}}{\text{Total number of live births}} \times 100000$$

RESULTS

Out of 13,124 total deliveries, institutional maternal mortality was found to be 76 per 1,00,000 live births. It is observed from Table 1 that out of total 10 deaths, 4 (40%) were in the age group of 21-25 years followed by 3 (30%) deaths in 16-20 years and 2 (20%) in the age group 26-30 years.

According to the classification for the area of residence, majority of maternal deaths 9 (90%) were from rural areas, followed by 1 (10%) from the urban areas. By occupation, 60% maternal deaths were among the agricultural workers followed by 40% were housewife. Educational status states that 60% were upto 8th standard followed by 30% were illiterate respectively. Figure 1 shows the causes contributed to the maternal deaths in Bongaigaon district.

Amongst the leading causes for maternal death is eclampsia (30.0%) followed by haemorrhage (20.0%), PIH (20.0%), heart failure (10.0%), anemia (10.0%), placental abruption with haemorrhage (10.0%).

Table 1: Socio-demographic profile of the maternal deaths in Bongaigaon district.

Socio-demographic profiles	N	%
Age (in years)		
16-20	3	30
21-25	4	40
26-30	2	20
31-35	1	10
Area of residence		
Rural	9	90
Urban	1	10
Occupation		
Housewife	4	40
Agricultural workers	6	60
Education		
Illiterate	3	30
Up to 8th std	6	60
Graduate	1	10

Table 2: Comparison of MMR of different research studies in India.

Study group	Study period	MMR (per 100000 live births)	Causes of maternal death		
			Anaemia	Eclampsia	Septicemia
Amitava et al[6]	1999-2004	623.46	4.18	50.5/7.3	18.17
Kaur et al[17]	2001-2005	1470	44.3	7.5	21.7
Purandare et al[8]	2000-2005	113.44	53.3	n/a	3.3
Murthy et al[14]	2001-2010	302.23	10	26.66	18.33
Fernandes et al[7]	2005-2014	144.86	n/a	21.43	14.3
Yadav et al[9]	2006-2010	555.5	14.94	n/a	12.67
Bangal et al[11]	2006-2010	302.9	2.63	10.52	7.89
Taye et al[3]	2012-2015	824.64	24.73	n/a	8.24
Hazarika et al[30]	2015-2016	490	29.1	23	17
Zaman et al[31]	2012-2013	709.35	23.28	28.76	9.58
Doddamani et al[32]	2016-2017	364	-	38.4	-
Bhadra et al[33]	2009-2014	233	-	27.6	-
Present study	2021	76.2	10.0	30.0	-

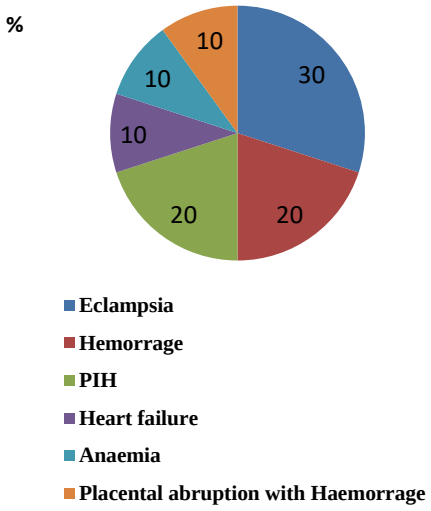

Figure 1: Cause of maternal deaths (N=10).

DISCUSSION

In the present study, there are 10 maternal deaths amongst 13124 total deliveries, giving a mortality rate of 76.2 per 1,00,000 live births. The district is catered to by 34 sectors within 4 medical blocks and one district hospital. MMR (per 100,000 live births)- SRS found that 301 (in 2001-2003); 254 (in 2004-2006); 178 (in 2010-2012); 130 (in 2014-2016); 122 (in 2015-2017).

India has made impressive achievement in reducing MMR substantially over the years. Since 2015, the MMR estimates from SRS are available annually through collating sample of three consecutive years at a time. According to the latest SRS estimates (2015-2017), the MMR of India was 122 per one lakh live birth and the country is working towards the vision of ending all preventable maternal mortality and a global MMR of 70 by the year 2030.[21] The recent status according to the SRS 2015-2017, among the major Indian states, Assam is the leading state as it represented a MMR of 229 per 1,00,000

live births followed by Rajasthan (186), Odisa (168), Punjab (122), Haryana (98), Karnataka (97), West Bengal (94), Gujarat (87), Andhra Pradesh (74), Tamil Nadu (63), Maharashtra (55), Kerala (42), etc.

In the present study, the leading cause for maternal death is eclampsia (30.0%) followed by haemorrhage (20.0%), PIH (20.0%), heart failure (10.0%), anemia (10.0%), placental abruption with haemorrhage (10.0%). The major obstetric complications accounted for more than three-fourths of maternal deaths with the well-known triad of toxemia (50.56%), sepsis (18.17%), and hemorrhage (9.72%) playing an important role.[22] Anemia (4.18%) and jaundice (1.84%) were two important indirect causes of maternal deaths. Anaemia was associated in 44.3% cases of maternal deaths, which can be prevented by iron, folic acid, protein supplement and blood transfusion.[23]

Haemorrhage in 70.83% of deaths; followed by septicaemia (3.3%) were among the direct causes and anaemia in 55.3% as indirect causes.[24] Eclampsia (26.66%), and sepsis (18.33%) were the major direct causes of maternal deaths whereas obstructed labour in 0.83%.[25] 2.4% deaths by infection and 7.1% deaths due to obstructed labour.[26,27]

Postpartum hemorrhage was the leading direct cause while infective hepatitis was indirect leading cause.[28] Hypertensive disorder of pregnancy (37.63%) was the leading direct cause followed by infections (14.69%) and hemorrhage (12.90%) and the anaemia (24.73%) was the commonest indirect cause of maternal death.[29] Anaemia (29.1%) was the leading cause of death; followed eclampsia (23.0%) and septicaemia (17.0%) while cardio respiratory failure was indirect leading cause for maternal deaths.[30] Eclampsia was the most common cause of maternal death.

Most common (43.83%) maternal death was seen in primigravidas.[31] Haemorrhage (38.4%), hypertensive disorders (29.2%) and sepsis (12%) were the major direct causes of maternal death. Anemia was the major indirect cause of death. Other indirect causes of maternal death were jaundice, heart disease, respiratory disease and epilepsy.[32] Hemorrhage (26.6%) and eclampsia (27.6%) were the major direct causes of maternal deaths.[33]

Limitation

This study was made on researcher's interest but it was not a funded project. Moreover, this study was conducted within one year during the time of data collection.

CONCLUSION

The MMR in Bongaigaon district is 76.2 during the study period. There is a wide scope for improvement as a large proportion of the observed deaths were preventable. Teenage pregnancy is one the major concern in maternal and child health. Early detection, early referral, follow up help us to reduce maternal mortality. Decentralized model facilitate us to follow up each and every cases closely. Counseling by Sectoral medical officers and team help out to reduce maternal mortality. Support of Intrasectoral co-ordination also helps high risk pregnant women (resistant cases) to understand and shifted beneficiaries for institutional delivery.

ACKNOWLEDGEMENTS

This study was an outcome of a Project Saubhagya which is initiated by District administration and District Health Society, Bongaigaon. The authors would like to thanks all Sub Divisional Medical & Health Officer, Deputy Superintendent, Sectoral Medical Officer, District RBSK Co-ordinator and all health workers of Bongaigaon District for their support during the study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. United Nations. Transforming our world: the 2030 Agenda for Sustainable Development. Sustainable Development Knowledge Platform, 2016. Available at: https://sustainabledevelopment.un.orgsforming our world. Accessed on 12 March 2022.
2. Sachs JD. From millennium development goals to sustainable development goals. Lancet. 2012;379(9832):2206-11.
3. Griggs D, Smith M, Gaffney O, Rockström J, Ohman MC, Shyamsundar P, et al. Policy: Sustainable development goals for people and planet. Nature. 2013;495(7441):305-7.
4. Griggs D, Stafford SM, Rockström J. An integrated framework for sustainable development goals. Ecol Soc. 2014;19:49.
5. WHO. Global Strategy for Women's, Children's and Adolescents' Health, 2016-2030, 2016. Available at: http://www.who.int/lifecourse/partners/globalstrategy/global-strategy-2016-2030/e. Accessed on 12 March 2022.
6. Montgomery AL, Ram U, Kumar R, Jha P, Million Death Study Collaborators. Maternal mortality in India: causes and healthcare service use based on a nationally representative survey. PLoS One. 2014;9(1):e83331.
7. The Economic Times. India registers 26.9 per cent decline in Maternal Mortality Rate since 2013: SRS Bulletin, 2019. Available at: https://economictimes.indiatimes.com/industry/healthcare/biotech/healthcare/india-. Accessed on 12 March 2022.
8. PIB. Steps Taken to Reduce IMR and MMR, 2015. Available at: https://pib.gov.in/newsite/printrelease.as. Accessed on 12 March 2022.
9. WHO. ICD-11 (the 11th revision of the ICD) was adopted by the World Health Assembly in May 2019

and comes into effect on 1 January 2022, 2022. Available at: www.who.int/classifications/icd/en/. Accessed on 12 March 2022.
10. Wikipedia. Sustainable Development Goal 3, 2015. Available at: www.sdgs.un.org. Accessed on 12 March 2022.
11. SRS Bulletin. Registrar General of India Sample registration system. Special Bulletin on maternal mortality in India 2014-16 sample registration system, 2018. Available at: https://censusindia.gov.in/vital_statistics/SRS_Bulletins/MMR%20Bulletin-2014-16.pdf. Accessed on 12 March 2022.
12. Chatterjee P. The health system in India: the underserved majority. Lancet. 2017;390(10111):2426-7.
13. Registrar Central. Annual health survey report a report on core and vital health indicators, 2021. Available at: https://www.censusindia.gov.in/vital_statistics/AHS/AHS_report_part1. Accessed on 12 March 2022.
14. Cham M, Sundby J, Vangen S. Maternal mortality in the rural Gambia, a qualitative study on access to emergency obstetric care. Reprod Health. 2005;2(1):3.
15. Goli S, Jaleel AC. What is the cause of the decline in maternal mortality in India? Evidence from time series and cross-sectional analyses. J Biosoc Sci. 2014;46(3):351-65.
16. Kuruvilla S, Schweitzer J, Bishai D, Chowdhury S, Caramani D, Frost L, et al. Success factors for reducing maternal and child mortality. Bull World Health Organ. 2014;92(7):533-44.
17. Bhatia JC. Levels and causes of maternal mortality in southern India. Stud Fam Plann. 1993;24(5):310-8.
18. González D, Portiño M, Ruiz MT. Knowledge gaps in scientific literature on maternal mortality: a systematic review. Bull World Health Organ. 2006;84(11):903-9.
19. Vora KS, Mavalankar DV, Ramani KV, Upadhyaya M, Sharma B, Iyengar S, et al. Maternal health situation in India: a case study. J Health Popul Nutr. 2009;27(2):184-201.
20. Ministry of Home Affairs. Report Annual Health Survey Factsheet Assam. New Delhi, Office of the Registrar General & Census Commissioner, India 2012-13, 2013. Available at: https://www.censusindia.gov.in/vital_statistics/AHSBulletins/AHS_Factsheets_2012_13.html. Accessed on 12 March 2022.
21. Ministry of Home Affairs. Sample Registration System (SRS) Bulletins, 2021. Available at: https://censusindia.gov.in/vital_statistics/SRS_Bulletins/Bulletins.html. Accessed on 12 March 2022.
22. Amitava P, Prasanta R, Samir H, Mondal TK. Review of changing trends in maternal mortality in a rural medical college in West Bengal. J Obstet Gynecol India. 2005;55:521-4.
23. Kaur D, Kaur V, Yuel VI. Alarmingly high maternal mortality in 21st century. JK Sci. 2007;9(3):123-6.
24. Purandare N, Chandock AS, Upadhya S, Sanjanwala SM, Saraogi RM. Maternal mortality at a referral centre: a five year study. J Obstet Gynecol India. 2007; 57(3):248-50.
25. Murthy BK, Murthy MB, Prabhu PM. Maternal Mortality in a Tertiary Care Hospital: A 10-year Review. Int J Prev Med. 2013;4(1):105-9.
26. Fernandes S, Prabhu P, Chunha PD. Maternal Mortality at a tertiary care teaching hospital in South India: 10 years Retrospective Study. Int J Med Health Sci. 2015;4(3):327-31.
27. Yadav K, Namdeo A, Bhargava M. A Retrospective and Prospective Study of Maternal Mortality in A Rural Tertiary Care Hospital Of Central India. Indian J Community Health. 2013;25(1):16-21.
28. Bangal VB, Giri PA, Garg R. Maternal Mortality at a Tertiary Care Teaching Hospital of Rural India: A Retrospective Study. Int J Biol Med Res. 2011;2(4):1043-6.
29. Taye MK, Alam A, Rakshita. Retrospective evaluation of causes and social correlates of maternal deaths at Assam Medical College and Hospital Dibrugarh, Assam, India. J Evolution Med Dent Sci. 2016;5(5):275-9.
30. Hazarika L, Phukan P, Sharma A, Das NK. Maternal mortality at a tertiary care teaching hospital in Dibrugarh district, Assam: a retrospective study. Int J Community Med Public Health. 2017;4(9):3342-6.
31. Zaman S, Begum AA. Maternal mortality at a rural medical college of Assam: a retrospective study. J Obstet Gynaecol Barpeta. 2014;1(1):46-51.
32. Doddamani U, Rampure N, Pooja K. Int J Reprod Contracept Obstet Gynecol. 2018;7(6):2446-8.
33. Bhadra B, Choudhury RR, Sarkar D, Sarkar S. An epidemiological study of mortality among mothers admitted in a rural tertiary hospital of West Bengal. J Family Med Prim Care. 2017; 6:270-3.

Cite this article as: Sharma A, Priya MSL. A community-based study on maternal mortality in Bongaigaon district, Assam. Int J Community Med Public Health 2022;9:2080-4.