International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2021; 5(4): 103-107
Received: 25-05-2021
Accepted: 27-06-2021

Dr. Najma Malik
Assistant Professor, Department of Obstetrics and Gynecology, BRD Medical College, Gorakhpur, Uttar Pradesh, India

Dr. Ruma Sarkar
Associate Professor, Department of Obstetrics and Gynecology BRD Medical College, Gorakhpur, Uttar Pradesh, India

Dr. Ankita Kumari
Assistant Professor, Department of Obstetrics and Gynecology, BRD Medical College, Gorakhpur, Uttar Pradesh, India

Dr. Vani Adtiya
Professor and Head of Department of Obstetrics and Gynaecology BRD Medical College, Gorakhpur, Uttar Pradesh, India

Dr. Babita Vaswani Agarwal
Assistant Professor, Department of Obstetrics and Gynecology, BRD Medical College, Gorakhpur, Uttar Pradesh, India

Corresponding Author:
Dr. Najma Malik
Assistant Professor, Department of Obstetrics and Gynecology, BRD Medical College, Gorakhpur, Uttar Pradesh, India

Analysis of risk factors influencing maternal mortality: A study at tertiary care hospital in Uttar Pradesh

Dr. Najma Malik, Dr. Ruma Sarkar, Dr. Ankita Kumari, Dr. Vani Adtiya and Dr. Babita Vaswani Agarwal

DOI: https://doi.org/10.33545/gynae.2021.v5.i4b.972

Abstract
Aim: Maternal mortality has been defined as priority issue in health policy and research in India. So, the aim of our study was to provide information that is important for identification of risk factors that contribute maternal death at a tertiary care referral hospital in Uttar Pradesh.
Material & Methods: The retrospective study was conducted in BRD medical college, Gorakhpur from June 2017 to 2019. Data was collected from the individual case sheet and facility based maternal death review forms.
Result: Most of the deceased belongs to lower class (81%), uneducated (58%). 35.51% died during pregnancy while 53% died in postnatal period. Antenatal visits were taken by only 44% and most of the cases were referred (83%). 71% mothers having hemoglobin < 10 gm%. Combined type 1 and type 2 delays most common contributing factors 43.92%.
Conclusion: There is need to focus on integrated care throughout the pregnancy by improving women knowledge and empowering them to take an active role in their own health as well as giving access to skilled care at birth and during pregnancy.

Keywords: maternal mortality, MMR, tertiary hospital, social causes, delays

Introduction

by LSCS these patient could not be saved, one important reason for that may be delay in shifting ICU due to limited beds available. 32 (29.9%) women admitted due to hemorrhage, most of them having hypovolemic shock. Such patients can be saved by timely referral and immediate availability of blood and blood products at their first point of care like CHC & PHC.

Even at our tertiary health center blood would only be provided on behalf of donors there is limited capacity of donor free blood in our blood bank. Most of the time attendants denied or not willing to donate blood. So there is need to upgrade and strengthen the existing infrastructure at each level from primary to tertiary care centers.

71.97% mothers were having anemia of mild to very severe variety. In spite of free distribution of iron and folic acid supplements under government programmes this high incidence can be due to failure of reaching these supplements to all pregnant women and not all women who received these supplements actually consumed it. WHO has recognized anemia as a global problem with serious consequences for mother and their babies [14].

29.9% mothers died due to complications of medical diseases. Globally direct obstetric causes and indirect causes of maternal death have been implicated in 73% & 27.5%, Lale S, Doris C, Alison G *et al* [15].

After exploring delays, we observed combined type 1 and type 2 delays and combination of all three delays were due to delay in deciding seeking care, unawareness of danger signs and not reaching to appropriate health facility (tertiary center) in time and limited availability of ICU beds, blood and blood products were most common contributing risk factors for mortality, although there was- no single delay was contributing exclusively. Ghumare JP *et al*. [16] showed 19% of mortality due to mix of all types of delays either any two or all three. Leval 1 delay in 27% of cases whereas 21% cases had level 3 delay.

Maternal mortality remains one of the most daunting public health problem in India. Even today 20% global maternal deaths occur in India [1].

Maternal mortality is defined as the death of any woman while being pregnant or within 42 completed days of termination of pregnancy, irrespective of duration and site of pregnancy, from any causes related to or aggravated by pregnancy, but not from accidental or incidental causes [2].

Maternal mortality ratio (MMR) is defined internationally as the number of women die out of 100,000 live births in a given year. MMR of India was 130 per 100,000 live births and in utter Pradesh 201 by sample registration survey (SRS) 2014-2016 [3].

By the year 2030, as part of the sustainable development goals the target is to reduce the global maternal mortality ratio to less than 70 per 100,000 live births [4].

Disparity in maternal deaths are not only in between countries but it can be observed with in the country also. According to special bulletin on maternal mortality in India 2016 -2018,

released by the office of the Registrar General's Sample Registration System (SRS) the southern States of India registered a lower MMR like Andhra Pradesh, Telangana, Karnataka, Tamil Nadu and Kerala. Situation is still worrisome in handful of states like Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh and Assam. About 65 – 75% of total estimated maternal deaths in India occurred in these state[5]. Though govt. of India is running a lots of maternal health programmes including Janani Suraksha Yojana all over the country to reduce Maternal mortality but still there is need to identify the specific social and cultural factors that might be leading to maternal deaths in these states.

Apart from direct and indirect causes many social causes have been associated with high maternal mortality, these include low socio- economic status of women, illiteracy, early age of marriage, teenage pregnancy, delay in seeking care, poor access of quality antenatal services, inadequacy of skilled birth attendant at the time of delivery, delay in obtaining transport/ lack of assured referral, failure to receive appropriate emergency care on time, and poor access to family planning & safe abortion services.

A respectable number of maternal deaths can be averted by rectifying above mentioned social causes.

Keeping all this in view this study was done to understand the missed opportunities to save maternal lives and identification of risk factors that contribute to maternal mortality in a tertiary care referred hospital.

Material and Methods

This study was a retrospective analysis of all risk factors which are directaly or indirectaly contributing to maternal deaths occurring at a tertiary care government hospital in Uttar Pradesh over a period of 2 year from June 2017 to June 2019. The data was collected from individual case sheets and facility based maternal death review forms (FBMDSR). MDSR forms were filled by treating unit senior residents /junior residents and counter checked by senior faculty of that unit within 24 hour of any death. These forms and case sheets were further reviewed in monthly meetings of maternal death committee of our institution. Study also focused on three delays in receiving care for a mother. FBMDSR forms and types of delays taken in our study are according to National Health Mission guidelines for maternal death surveillance and response.

There was no intervention with the patient or their management so consent was not required for the purpose of study. Information regarding socio- demographic profile, obstetric and medical profile, factors for which she came/referred for admission, her clinical condition at that time and types of delay which contribute to maternal mortality were extracted from individual case sheets and facility based maternal death review forms.

Permission was taken from institutional maternal death review committee. Results were analyzed using percentage and proportion.

Result

Maternal mortality ratio was 1178 during study period from June 2017 to June 2019 (there were total 107 maternal deaths out of 9080 live births).

Most of the maternal deaths occurred in age group of 15-25 years i.e. 41% and most of them (57.9%) were uneducated, very few, 6.5% educated up to 12 class. 100% of women were unemployed (housewives) and married, spouses of most of them also uneducated (39.2%) & unemployed (48.5%). 81% of mothers who died belongs to low socio-economic status. (Table 1)

Maternal deaths were common among multigravida (63%). 30.84% mothers had no antenatal visits, 74% had only 1 to 3 visits at any point of their antenatal period. about 50.46% women take antenatal care at Primary health center(PHC), 18.69% at community health center (CHC) and 30.84% had their care at home. 31 (32.63%) women delivered vaginally, out of which 26.31% delivered at PHCs &CHCs and most of these (61.29%) deliveries conducted by nurse/ midwife, 19.35% deliveries were conducted by untrained birth attendants or their relatives. 26 (27.36%) mother delivered by LSCS and 38 (40%) remain undelivered. 35.51% mother died in antenatal period, 4.67% during delivery, 53.27% within six week after delivery & 6.54% after abortion/ectopic pregnancy. Underlying medical condition like RHD, CVD, Diabetes, jaundice, infection (HIV, tuberculosis) ARDS contributed to maternal death in 29.9% cases.(Table 2).

83.17% mothers referred to BRD medical college for admission having single or multiple obstetric/non-obstetric high risk factors. Most important causes for referral were high blood pressure (31%), haemorrhage(29%) including APH and PPH, sepsis (5.6%), dystocia (7.47%) and 60.74% mother had multiple risk factors at the time of admission. Among all these admitted women 71% were having low haemoglobin level (<10 g/dl) (Table 3)

Most common contributing factors for mortalities was combined type 1 and type 2 delay 47(43.92%) followed by combination all three delays 30, (28.03%). Exclusively type 1 delay seen in 18 (16.82%) cases, type 2 delay in 8 (7.47%) and type 3 in 4 (3.73%) cases.(Table 4)

Single mother	0	0
Widow/divorced/separated/never married	0	0
3. Mother Education		

Table 1: Risk Factors For Mortality Related To Socio-Demographic Profile Of Mother

	Risk Factors	CASE (N=107)	%
1	**AGE**		
	15-24 YEARS	44	41
	25-34 YEARS	25	23.3
	35-45 YEARS	38	35.5
2	**Marital Status**		
	Married	107	100
	Single Mother	0	0
	Widow/Divorced/Separated/Never Married	0	0
3	**Mother Education**		
	Uneducated	62	57.9
	Class 1-8th	38	35.5
	Class 9th – 12th	7	6.5
	>Class 12th	0	0
4	**Spouse Education**		
	Uneducated	42	39.2
	Class 1-8th	30	28
	Class 9th – 12th	20	18.6
	>Class 12th	15	14
5	**Occupation Of Mother**		
	Housewife	107	100
	Unskilled Worker	0	0
	Skilled Worker	0	0
6	**Occupation Of Spouse**		
	Unemployed	52	48.5
	Unskilled Worker	40	37.3
	Skilled Worker	15	14
7	**Socioeconomic Status**		
	Lower Class	87	81.3
	Middle Class	20	18.6
	Upper Class	0	0

Table 2: Characteristics Related To Obstetrics And Medical Profile Influencing Maternal Mortality

Characterstics	Case (N=107)	%
1. Gravida		
Primigravida	39	36.44
2nd Gravida	16	14.95
3rd Gravida	17	15.88
4th Gravida	13	12.14
>4th Gravida	22	20.56
2. Antenatal Visit		
None	33	30.84
1-3	74	69.15
>4	0	0
3. Place OF Antenatal Care		
Govt. Hospital- PHC	54	50.46
CHC	20	18.69
Tertiary Care	0	0
Private Hospital	0	0
Home	33	30.84
4. Mode And Place of Delievery	**N=95**	
Health Facility - Vaginal Delivery At PHC	13	13.68
Vaginal Delivery At CHC	12	12.63
Vaginal Delivery At Tertiary Care	5	5.26
Vaginal Delivery At Private Hospital	1	1.05
Caesarean (Tertiary Care + Private Hospital)	26	27.36
Not Delivered	38	40
5. Birth Attendant At Vaginal Delivery	**N=31**	
Nurse/Midwife	19	61.29
Doctor	6	19.35
Relative/ Untrained BA	6	19.34
6. Pregnancy Stage		
Antepartum	38	35.51
Intrapartum	5	4.67
Within 6 Weeks Of Delivery	57	53.27

Within 6 Weeks Of Abortion	7	6.54
7. Underlying Medical Condition (HIV, RHD, CVD, Diabetes, Jaundice, Anemia, ARDS, Others)		
Yes	32	29.9
No	75	70.09

Table 3: Clinical Parameters of Mother At The Time Of Admission Contributing To Maternal Death

Admission Factors	CASES (N=107)	%
1.Referred Cases		
Yes	89	83.17
No	18	16.82
2. General Condition		
Stable	27	25.23
Unstable/Low GC	80	74
3. Blood Pressure		
High	25	23.36
Low	54	50.46
Normal	28	26.16
4. High BP	**N=25**	
Eclampsia	16	64
Preeclampsia	9	36
5. Hemmorhage	**N=32**	
Antepartum	13	40.62
Postpartum	19	59.37
6. Hemoglobin		
< 10 G/Dl	76	71.02
> = 10 G/Dl	31	29
7. SEPSIS		
Yes	6	5.6
No	101	94.39
8. DYSTOCIA (Prolonged Labor, Obstructed Labor, Ruptured Uterus)		
Yes	8	7.87
No	99	92.52
9. Mothers Having Multiple Risk Factors		
Yes	65	60.74
No	42	39.25

Table 4: Assessment Of Delays Influencing To Maternal Death

Type Of Delay	Cases(N=107)	Percentage
1. Type 1*	18	16.82%
2. Type 2**	8	7.47%
3. Type 3***	4	3.73%
4. Combined Type 1 + Type 2 Delay	47	43.92%
5. Combined Type 1 + Type 2+ Type 3 Delay	30	28.03%

Note-

*Type 1 Delay – Delay In Deciding To Seek Care, Unawareness Of Danger Signs, Using Traditional Home Care Or Informal Service Providers.

**Type 2 Delay - Lack Of Transport, Poor Roads, Delay In Organizing Funds, Not Reaching Appropriate Facility In Time.

***Type 3 Delay – Delay In Receiving Adequate And Appropriate Treatment Due To Lack Of Blood/Blood Products/Medicines/Consumables, Skilled Manpower Etc.

Discussion

Maternal mortality is a global health problem. Between 2000 to 2017, the maternal mortality ratio dropped by about 38% worldwide. 94% of all maternal deaths occur in low and lower middle income countries, and most could have been prevented[6]. MMR in our study during given period was 1178 which is very high as compared to national average of 130/100,000 live births. Here it is prudent to mention that it is a single tertiary care hospital in this region and is main referral center for 6 to 7 adjoining districts of Uttar Pradesh, Bihar and neighboring country Nepal also. Hence most of the high risk women with life threatening complications were referred to this center.

In this study majority of maternal deaths (41%) was observed in women of age group 15-24 year which may be due to custom of early marriage in India especially in rural areas. Similarly Usha Doddamani *et al.* [7] and Nair *et al.* [8] observed that 49.2% and 43.40% maternal deaths were in the age group of 20 -24 yr respectively.

Illiteracy was also a high risk factor for maternal mortality. We observed that 57.9% mothers were uneducated. Only 6.5% mothers completed their secondary education (9th to 12th class). 39.2% spouses were illiterate and this finding is important since it emphasizes the role of education for both the mother and her spouse in obtaining and understanding the benefits of good health and being able to make appropriate decisions during pregnancy.It is important to note that despite the women weaker role in decision making in Indian settings, education has a strong influence on mortality. Vidyadhar *et al.* [9] observed that majority (57.90%) of mothers were illiterate and only 21.05% had studied up to primary and secondary level.

In our study 36.44% were primigravida and 63.55% were multigravida, it shows poor awareness and acceptance of family

planning methods and contraceptive use which leads to unplanned pregnancy. Similar results were found by Mittal *et al* [10] i.e. 56.59% and 13.73% mortality in multipara and grandmultipara respectively. Comparable results were also found by Nair *et al* [8].

Antenatal care is important for screening of preexisting diseases and anemia. During antenatal visits, we had chance to pick up such mothers at an early stages of pregnancy because complications arises due to anemia and other diseases could impact adversely during pregnancy and during childbirth. In our study, 55.15% mothers received no antenatal visits in index pregnancy. None of the mother get minimum required antenatal visits recommended by WHO (i.e. 4 visits). National Family Health Survey 2015-2016 (NFHS-4) data shows only 16.7% women in rural India and 31.1% in urban areas received full antenatal care. 72% deceased mother did not receive any antenatal care during pregnancy in study by Khan N and Pradhan MR [11].

There are major differences worldwide and among developing countries in the proportion of deliveries with skilled attendance, the quality of that attendance, the proportion of deliveries that take place in health facilities and the quality of services in these facilities

According to WHO estimates, more than half of all women give birth without the assistance and supervision of a skilled birth attendant. (World Health Organization; 1997) [12]. We observed in our study that only 19.35% vaginal deliveries were attended by doctors rest were conducted by nurse/midwife or untrained birth attendants.

Majority of deaths occurred within six week after birth i.e. postpartum (53.27%) followed by antenatal period and intrapartum period, 6.54% women died within six weeks after abortion/ectopic pregnancy. Arpita N *et al*. [13] and Khan N *et al*. [11] showed 72.16% and 45.4% deaths in postnatal, 21.6% and 27.5% in antepartum and 6.1% and 25.6% in intrapartum period respectively.

In our study we also analyzed various maternal admission factors for which they came or were referred from other health facilities. Majority (83.17%) of deceased mothers were referred from another centers mostly from PHCs, CHCs and district hospitals without adequate life support measures and with life threatening complications, many of these could have been saved by timely and early access to higher health care facility. Cause of referral mainly due to lack of infrastructure, unavailability of obstetrician, anaesthetist, blood bank and pathology. We found that 25 (23.36%) women referred to our center for high blood pressure. Among these 16 (64%) women having eclampsia which is a deadly complication of high blood pressure in pregnancy. Although we had managed them with anticonvulsant and antihypertensive therapy along with early delivery either by vaginal or

Conclusion

Our study focused on assessing the factors causing poor outcome and deaths despite improved coverage of health care service, highlighting the need of integrated care throughout the pregnancy by improving women"s knowledge and empowering them to take an active role in their own health as well as gaining access to skilled care at birth and during pregnancy. Vigorous mass campaign for community based maternal education programme should be the top priority of maternal and child health programmes.

Root level health care workers like ASHA/ANM, health centers staff and hospital staff needs to be retrained using protocol about assessment, primary management of any health related problem in pregnancy and facilitating effective referral. The basic obstetric care for all, and early detection of complications and management of emergency services, upgradation of present infrastructure with availability of intensive care units& adequate blood and blood products need to be seriously looked in to urban health centers as well.

References

1. Yerpade PN, Keerti S Jogdand. A 5 year retrospective study of pattern of maternal mortality in a tertiary care hospital in South India. Int J Recent Trends Sci Technol 2014;11(3):310-2.
2. UNICEF. Maternal and perinatal death enquiry and response. Empowering communities to avert maternal deaths in India.[online]. Available at : http:// www.unicef.org/india/MAPEDIR Maternal_and_perinatal_Death_Inquiry_and_Response-India.pdf.(last accessed on Nov 12,2015).
3. Sample Registration System ;Registrar General, New Delhi, India 2014-16.
4. Mortality Factsheet Available at http://www.who.int/mediacentre/factsheet/fs348/en.
5. Global, regional and national levels and trends in maternal mortality between 1990 and 2015,with scenario-based projections to systematic analysis by the UN maternal mortality Estimation Inter-Agency group 2030:a
6. 6.Trends in maternal mortality:2000 to 2017: estimates by WHO, UNICEF, UNPA, World Bank Group and the United Nations population Division. Geneva. World Health Organization 2019.
7. Usha Dodamani, Nirmala Rampure, Kaveri Pooja. A study of maternal mortality in a tertiary care hospital, Int J Repro Contracept Obstet Gynecol 2018;7(6):2446-2448.
8. Nair *et al*: study of maternal mortality in a tertiary care hospital in a district of Maharastra, Int. Journal of medical science and public health. 2016;5(09).
9. Vidyadhar *et al*/Int Biol Med Res. 2011;2(4):1043-1046.
10. Pratima Mittal, Garima Kapoor, Nikita Kumari, Bindu Bajaj. Review of maternal mortality at a tertiary care hospital: what have we achieved? The Journal of Obstetrics and Gynaecology of India 2019;69(2):149-154.
11. Nizamuddin Khan, Manas Rajan Pradhan. J Health Popul Nutrition 2013;31(2):262-71.
12. World Health Organization (WHO) coverage of maternity care: A Listing of Available Information. 4 th edition. Geneva: WHO 1997.
13. Yadav K, Namdeo A, Bhargava M. A retrospective and prospective study of maternal mortality in a rural tertiary care hospital of central India. Indian Journal of Community Health 2013;25(1).
14. WHO recommendation on antenatal care for a positive pregnancy experience : WHO Geneva 2016
15. Lale S, Doris C, Alison G *et al*. Global causes of maternal death: a WHO systemic analysis. Lancet Glob Health 2014;2(6):e323-33.
16. Jitendra P Ghumare, Namrata Vasant Padvi. Assessment of maternal deaths using three delay model at a tertiary care center in rural Maharashtra, India. Int J Reprod Contracept Obstet Gynecol 2018;7(8):3043-3047.