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Original Article

Determinants of maternal mortality: A prospective study from single centre of Bhopal

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Abstract
Background: *Globally, more than 830 maternal deaths happen daily, and nearly, all of these occur in developing countries. Maternal mortality ratio (MMR) of Madhya Pradesh is 173 per 100000 live births.*
Aims and Objectives: *To study various maternal factors associated with maternal death.*
Materials and Methods: *Sixty three women who died during pregnancy were studied at Department of Obstretics and Gynecology, Sultania Zanana Hospital, Gandhi Medical College, Bhopal from April 2008 to March 2009. Age, parity, area of residence, booking status, education status, referral state, gestational status, period of gestation, outcome of gestation, mode of delivery, types of delivery and place of delivery were recorded.*
Results: *MMR was 763 per 100000 live births. Mortality was more common among the women who were from urban area (51%), were illiterate (50.79%), belong to Class V socio-economic status (59%) and had unbooked antenatal care (97%). Mortality was more common among the women who were referred from outside Bhopal (64%), were in the 3rd trimester (82.55%), gave birth to baby (62%) and had vaginal delivery (66.67%).*
Conclusion: *Women belong to urban slum area who had limited education and with financial constraint, not receiving ANC and were delivered in Institution had higher risk of death.*
Keywords: *Maternal mortality, antenatal care, Maternal mortality ratio, socio-economic status.*

Introduction

Pregnant women are exposed to a greater risk of death.[1] Millennium development goals (MDGs) tabled during 1990 for reducing the maternal mortality has resulted in a sharp decrease in mortality by 43%.[2]

However, the decline in maternal mortality ratio (MMR) in Asian countries was only 2.3% per year between 1990 and 2015.[2] Efforts have been made to achieve MDGs by Asian countries but that was not sufficient because of insufficient evidence on the factors responsible for maternal mortality other than the medical causes between 2000 to 2010.

Medical causes of maternal mortality are well reported in previous literature.[3] These studies have contributed enough in reducing the mortality rates that occurs due to complications during and following pregnancy and childbirth (such as post-partum haemorrhage, sepsis, obstructed labour).[4]

According to the Registrar General of India (RGI) MMR of Madhya Pradesh was 173 per 100000

live births.[5] Hence in present study we tried to investigate the causes other than the medical one that determines the mortality among the pregnant women of Bhopal area.

Materials and Methods

A hospital based prospective study was performed at Department of Obstrectics and Gynecology, Sultania Zanana Hospital, Gandhi Medical College, Bhopal from April 2008 to March 2009.

Women dying during pregnancy, child birth or within 42 days of termination of pregnancy, irrespective of site and duration of pregnancy, died due to from any cause which was related or aggravated by pregnancy or its management were included in the present study.

Women dying due to accidental cases and those dying beyond 42 days of postpartum period were excluded from the present study.

For each maternal death information was collected regarding the age, parity, area of residence, booking status, education status, referral status, gestational status, period of gestation, outcome of gestation, mode of delivery, types of delivery and place of delivery were recorded in pre- approved proforma.

Every woman was enquired for antenatal care, number of visits and person providing antenatal care. Any complication during pregnancy, labour and puerperium was noted.

The cause of death was carefully analyzed in each case. Any doubtful or incomplete information provided in the file was cross checked by interviewing close relatives of deceased i.e. verbal autopsy. Verbal autopsy is a method of understanding medical and social causes of maternal death based on report of relatives and neighbors who have no medical training. Hospital death review committee discussed various parameters of all maternal death in details. Maternal mortality ratio was calculated as total number of female death due to complication of pregnancy, childbirth or within 42 days of delivery from "puerperal causes" in an area during a given year divided by total number of live birth in same area of year multiplied by 1000.

All the data was expressed either in numbers or percentage. Frequency distribution of SPSS ver. 20 was used to prepare tables. No statistical test was performed.

Results

Total number of maternal death during the study period was 63 and total number of live birth during the same period was 8256. Maternal mortality ratio was 763 per 100000 live births.

Maximum maternal death occurred in the age group of 21-30 years (74.3%) which is the most fertile period. Maximum [20 (46%)] maternal death occurred in primi patients. The most common cause of maternal death in the present study was hypertensive disorders of pregnancy, which is more common in primi patients.

Table 1: Maternal causes of death

Characteristic		No of women	Percentage
Residence	Rural	30	49
	Urban	33	51
Education status	Illiterate	32	50.79
	Primary education (up to 5th class)	18	28.57
	Secondary education (up to 10th class)	11	17.47
	Higher secondary education (12th class) and above	2	3.17
SES	Class 1 (≥1900 Rs. Per capita)	0	0
	Class II (950-1899)	0	0
	Class III (575-949)	11	11
	Class IV (275-574)	19	30
	Class V (<275)	33	59
Antenatal Booking	Booked	2	3
	Un-booked	61	97

SES; socio economic status,

Table 2: Causes of death from other maternal factors

Parameters		No of women	Percentage
Referral Status	Inside Bhopal	17	36
	Outside Bhopal	30	64
Period of Gestation	1st trimester	3	4.76
	2nd trimester	8	12.69
	3rd trimester	52	82.55
Outcome of pregnancy	Delivered	39	62
	Undelivered	20	38
Place of delivery	Home	4	10.25
	PHC/CHC	3	7.7
	District Hospital	3	7.7
	Institution	28	71.79
	Other Hospital	1	2.56
Mode of delivery	Vaginal	26	66.67
	Abdominal	13	33.53
Antenatal Care provider	None	18	27.85
	ANM	30	47.74
	Doctor (GP/MO)	12	19
	Doctor (specialist)	3	4.70
Intranatal Care provider	ANM	5	12.81
	Doctor (GP/MO)	5	12.82
	Doctor (specialist)	29	74.37

Discussion

Previous reports on determinant of mortality among the pregnant women have focused on the medical causes. However, a great attention is required on the causes related to maternal care during pregnancy, natal and postnatal period, causes related to available recourses such as manpower, available infrastructure and financial constraints. In present study we tried to find out such causes mainly other than the medical causes which may be responsible for the increase in mortality among the pregnant women.

During the study period, number of maternal death was 63 and total live births were 8256. Thus the MMR was 763 per 100000 live births. According to the Registrar General of India (RGI), MMR of Madhya Pradesh was 173 per 100000 live births, in present study MMR was 763 per 100000 live births. High MMR reveled in present study may be due to the fact that in our study place was a tertiary care centre and referral centre so un-booked obstetric cases were referred here in emergency for management. A similar study conducted by Shankar Sarbajana at Iron and Steel Company hospital, Burhanpur, MMR observed was only 119.6 per 100000 live births. It may be because in that region women were urban, booked, educated and received proper antenatal care.[6]

Majority of the earlier studies have reported age of pregnancy, multipara pregnanciesas the important risk factor for mortality among pregnant women.[7, 8] However we found that mortality was more common among the women of fertile period and those having primi pregnancy.

Mothers who did not attend ANC clinic were 5 times more likely to die compared to those who attended ANC clinic. Present study highlight the importance of ANC as majority of the women who died were un-booked. Present study findings is in line with the previous studies from Kenyan tertiary Hospital[9], Mizan-Tepi University[10] and Bongs general hospital and public hospitals in Mekelle town[11] which have reported higher mortality among the women who did not attend ANC. A similar study from Jharkhand highlighting the importance of ANC reported that merely 28% women received any antenatal care.12 A recent study from Chandigarh also highlighted the importance of ANC in reducing the maternal mortality among Indians.[6] plays very important role in screening the preexisting diseases, providing iron supplementation for prevention of anemia and TT vaccination for prevention of tetanus. ANC is a kind of protective factor for the would be mother and not attending it puts the mother of greater health risk.

In present study majority of the women who died were referred from outside Bhopal means they belong to periphery of the Bhopal which is usually urban slum area. We have also found that a great number of patients were from the rural setup. A study from PGIMER Chandigarh by Kaur et al also reported that majority of the mother who died belong to slums and rural areas of Chandigarh.[6] National Family Health Survey of 2016 reported that maternal deaths occurred more, among the women who were living in slums and rural areas than from urban area.[13]

In spite of adequate primary, secondary and tertiary hospitals in Bhopal city majority of the women died in the Institution and only 11% died who delivered at home. The reason for higher mortality in Institution may be because a very late referral from the periphery and higher percentage of emergency cases. However previous studies have reported higher death percentage among the women who delivered at home because of the accessibility issue of existing maternal health services. A study from Asian country like Bangladesh have reported less support of family, lack of transportation, traditions and religious values to be the culprit for more home deliveries.[14]

In present study we also found mother education and financial constrain of the family as the important determinant of mortality. Majority of the women were either illiterate or had education till 5th class and majority of them had Rs. <275 per capita. An African study by Adgoy et alrevealed that financial inequity and education were the key determinants of maternal health faced by the African women in African countries.[15] Similar results were depicted by the previous studies by Simkhada et al[16] and Adjiwanou et al[17] where they reported that husband/spouse education and financial stand of the household plays a very important role in determining the health status of the mother.

The present study had few limitations; one was the small sample size and second was the cross sectional nature of the study. There is a need of a large randomized clinical trial to strengthen the present study findings.

Conclusion

Based on the results we found that multiple risk factors other than the medical are involved in determining the death among the pregnant women. Important ones are residence of urban slum area, limited education, financial constraint, no ante natal care. The MMR reveled in present study is high.

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