A RETROSPECTIVE ANALYSIS OF SOCIODEMOGRAFIC AND ETIOLOGICAL CAUSES OF MATERNAL DEATHS IN A TERTIARY TEACHING HOSPITAL (KING GEORGE HOSPITAL)– VISHAKAPATNAM

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ABSTRACT

BACKGROUND

Pregnancy and childbirth is a normal physiological process bringing a joyful experience to individuals and families. However, in many parts of the world, pregnancy and childbirth is a perilous journey, a risky and potentially fatal experience for millions of women especially in developing countries. Maternal mortality ratio is a very sensitive index that reflects the quality of reproductive care provided to the pregnant women.

The aim of the study is to assess the maternal mortality ratio and causes of maternal death over a period of one year at a tertiary care teaching hospital (King George Hospital, Visakhapatnam), Andhra Pradesh.

MATERIALS AND METHODS

A retrospective hospital-based study of 70 maternal deaths over a period of one year from January 2006 to December 2006. The information regarding demographic profile and reproductive parameters were collected and results are analysed using percentage and proportions.

RESULTS

Over the study period, there were 6800 deliveries giving MMR of 1029.4/1,00,000 livebirths. Severe preeclampsia leading to eclampsia was the direct leading cause, while sepsis was indirect leading cause. Most women died within 25-165 hrs. of admission. The age group of 19-24 yrs. were mainly affected and most of the cases are unbooked, which were referred from other centers.

CONCLUSION

Most maternal deaths are preventable by optimum utilisation of existing MCH facilities, identifying the bottlenecks in health delivery system, early identification of high-risk pregnancies and their timely referral to tertiary care centre.

KEYWORDS

Sociodemographic, MMR, MCH Facilities, Direct Causes, Indirect Causes.

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BACKGROUND

Maternal mortality is defined as the death of any woman while being pregnant or within 42 completed days of termination of pregnancy, irrespective of the duration or site of pregnancy from any cause related to or by pregnancy, but not from accidental or incidental causes.[1] Maternal mortality is defined internationally as maternal death rate per 1,00,000 livebirths. The fifth millennium developmental goal concerns improving Maternal Mortality Ratio (MMR) by 75%. Currently, it is estimated to be 174 per 1,00,000 livebirths, which is above the desired figure of 140 per 1,00,000 livebirths as the objectives of Millennium Development Goals (MDG). Hence, this present study was to improve maternal health and reduce maternal morbidity and mortality (MDG 5 goals) by analysing and finding out the factors that contributes in causation of maternal deaths.

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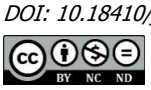

MATERIALS AND METHODS

This was a retrospective hospital-based study carried out in the Obstetrics and Gynaecology Department of King George Hospital- a tertiary level healthcare referral center in Visakhapatnam, Andhra Pradesh, India. Demographic and other data was collected from individual case records and maternal death review from January 2016 to December 2016 were included. As per definition of maternal death, death

due to suicide and homicide were excluded from the study. A total 70 maternal deaths were analysed with the special emphasis on sociodemographic profile of patient, parity, cause of death and time interval from admission to death. Results were analysed by using percentage and proportion.

RESULTS

Year	MMR
1939	2000
1959	1000
1979	840
1999	540
2016	174

Table 1. Changing Trend in Maternal Mortality Rates Since 1959 to 2016

One of the most important goals of MDG is to reduce the maternal mortality rate to one third of 1990, which is 140 (MMR goal).

Sociodemographic Characteristics	No. of Maternal Deaths	%
Age		
<19	7	10
19-24	31	44.28
25-29	28	40
30-34	4	5.7
>35 and above	0	0
Area of Residence		
Urban	10	14.52
Rural	60	85.8
Socioeconomic Status		
Upper	0	0
Upper middle	5	7.1
Lower middle	5	7.1
Upper lower	22	31.42
Lower	38	54.28
Occupation		
Landless labour	28	40
Cultivators	24	34.28
Household work	10	14.2
Service	8	11.42
Education		
Illiterate	41	58.57
Primary education	20	28.57
Secondary education	9	12.85
Higher secondary education	0	0

Table 1. Distribution of Maternal Deaths According to Sociodemographic Characteristics (n=70)

Observed from table 1 that out of 70 deaths, 31 (44.28%) were in the age group of 19-24 years followed by 28 (40%) deaths and remaining in other age groups. According to B.G. Prasad's classification,[2] majority of maternal deaths (54.28) belonged to lower class, followed by (31.42%) from upper lower class. By occupation (40%) maternal deaths were seen in landless labourers followed by (34.28%) in household work. Majority (58.57%) were illiterate and (28.57%) studied upto primary level.

Variables	No. of Maternal Deaths	%
Antenatal registration	(n=70)	
Booked	2	2.85
Unbooked	68	97.14
Delivery status	(n=70)	
Delivered	45	64.28
Undelivered	25	28.57
Abortion	5	7.14
Place of delivery	(n=50)	
Tertiary care center	25	35.71
Private nursing home	13	18.57
Home	2	2.85
PHC/RHC	8	11.42
Govt. hospital	1	2.85
Stage of pregnancy at the time of death	(n=70)	
1st trimester	5	7.14
2nd trimester	10	14.28
3rd trimester	22	31.42
Postpartum	33	47.14
Time interval from admission to death	(n=70)	
0-1 hrs.	0	0
2-12 hrs.	13	18.57
13-24 hrs.	12	17.14
25-165 hrs.	25	35.71
>=7 days	20	28.57
Parity	(n=70)	
Primigravidas	33	47.14
Multigravidas (2-4)	34	48.57
Grand multi >5	3	4.28

Table 2. Distribution of Maternal Deaths by Delivery Related Characteristics

As seen from table 2, out of 70 deaths, 13 (18.57) women died within 2 to 12 hrs. of admission; 12 (17.24) women died within 13-24 hrs. of admission; 25 (35.71) women died within 25-165 hrs. of admission and 20 (28.57) after 7 days of admission. Maximum deaths has occurred who have delivered at tertiary care center. Majority of deaths have occurred in the postpartum period, followed by 22 (31.42) in the 3rd trimester 10 (14.28) in the 2nd trimester and remaining in 1st trimester. As of 70 deaths, 68 (97.14%) had unbooked status. By parity, 34 (48.57%) are multipara and 33 (47.14%) are primiparous.

Causes of Death	No. of Maternal Deaths	%
Direct cause	(n=41)	58%
Eclampsia	14	20
Haemorrhage	11	14.7
Obstructed labour	5	7.14
Septic abortion	5	7.14
Abruption	3	4.28
Embolism	3	4.28
Indirect causes	(n=29)	42%
Sepsis	13	18.8
DIC and MODS	7	10

Heart disease	3	4.28
Anaemia	3	4.28
HIV	0	2.85
Sickle cell crisis	1	1.42
	70	**100**

Table 3. Distribution of Maternal Deaths According to Causes

As evident from Table 3, direct causes contributes to 58% and indirect causes contribute to 42% of maternal death. Amongst direct causes, 17 (24.28%) is due to severe preeclampsia leading to eclampsia and embolism. Haemorrhage was responsible for 11 (14.7%) deaths obstructed labour and septic abortion was responsible for 10 (14.28%) deaths. Abruption accounts for 3 (4.28%) of deaths. Among indirect causes, 13 (18.8%) are due to sepsis, 7 (10%) are due to DIC and MODS, 6 (8.56%) are due to heart disease and anaemia, 2 (2.85%) are due to HIV and 1 (1.40%) is due to sickle cell acute chest syndrome.

Three delay model proposes the pregnancy-related mortality is overwhelmingly due to delays in- (1) Deciding to seek appropriate medical help for an obstetric emergency; (2) reaching an appropriate obstetric facility; and (3) receiving adequate care when a facility is reached.

Type of Delay	Percentage
Delay in seeking care	30%
Delay in arrival at a health facility	65%
Delay in provision of adequate care	5%

Table 4.Maternal Deaths According to 3D's

DISCUSSION

Maternal mortality is an index of reproductive health of the society. High incidence of maternal deaths reflects poor quality of maternal services, late referrals and low socioeconomic status of the country. Various studies in India in the last 15 years have shown wide variations in MMR ranging from 47/1,00,000 to 625/1,00,000 births. This study has comparatively high MMR, which could be due to the fact that our hospital is a tertiary care center and receives a lot of complicated referrals from rural areas and remote tribal areas at a very late stages.

In the present study, there were 70 maternal deaths among 6800 deliveries giving MMR of 1029 per 1,00,000 livebirths, which is much higher than national averages. King George Hospital, Visakhapatnam, being a teaching institution and tertiary care center for 3 districts, get complicated cases from rural areas mainly from remote tribal areas. Admissions of moribund cases referred from periphery have inflated this mortality ratio like other teaching institutes of India. Other similar studies from tertiary care institution reported MMR ranged between 213 to 879 per 1,00,000 livebirths.[3,4,5,6,7,8,9,10,11]

With prevailing custom of early marriage in rural area, majority of present with their pregnancy in the age group of 19-24 years. In the present study, maximum deaths (44.28%) were in the age group of 19-24 years, followed by 40% deaths in the age group of 25-29 years, 10% deaths are <19 years similar to that reported by the other studies. Kaur et al[12] revealed that 51.8% of deaths in 20-30 years, 19.6% in teenage pregnancies and 23.3% in >30 years; Taneja P[13] showed that 78% of deaths in 20-30 years; Sengupta et al[10] observed that 61% deaths in 20-29 years; 28.62% of deaths in >30 years and only 9.94% of deaths in <19 years; Agarawal et al[14] noticed that 50% deaths in 20-25 years, 27% 26-30 years, 12% in <19 years; Sikdar et al[15] reported that 23.5% deaths in less than 20 years; 54.5% in 21-30 years, 18.5% in >30 years, Dogra et al[16] revealed that 48% deaths in 20-25 years while 10.3% in >30 years; reduction in number of deaths in women <19 years is partly due to liberalisation of abortion law (MTP ACT), as a result of which many young women seek help from specialist doctors for legal abortions, thus reducing number of criminal abortions subsequently the deaths associated with its complications.

Studies	<19 yrs.	19-24	25-29	30-34	>35
Amulya et al	10%	44.28%	40%	5.7%	0%
Kaur et al[12]	19.6%	26.4%	26.4%	23.3%	0%
Taneja et al[13]	10%	39%	39%	10%	2%
Sengupta et al[10]	9.94%	35%	26%	28.34%	0%
Agarwal et al[14]	12%	50%	27%	10%	0%
Sikdar et al[15]	23.5%	34.5%	20%	18.5%	3.5%
Dogar et al[16]	6%	48%	34%	10%	0%

Table 5. Comparison of Maternal Deaths in the Present Study with Others According to Age

In the present study, out of 70 deaths, 34 (48.57%) deaths are among multigravidas and 33 (47.4%) are among primigravidas similar to that reported by other studies; too many and too close pregnancies together adversely affects the mothers health have its roots in social status of the women.

Study	Primigravida	Multigravida
Amulya et al	47.4%	48.57%
Agarwal et al[14]	25%	43%
Purandara et al[17]	30%	70%
Sikdar et al[16]	25.5%	74.5%
Thomas et al[18]	29.2%	59.8%

Table 6. Comparison of Maternal Deaths in the Present Study with Others According to Parity

In the present study, 13 (18.57%) died within 2-12 hours admission, 12 (17.14%) died within 13-24 hours of admission, 25 (35.71%) died within 25-165 hours of admission and 20 (28.57%) after 7 days of admission. Similar reports have been reported by other studies.

Study	0-1 hrs.	2-12 hrs.	13-24 hrs.	26-165	>7 Days
Amulya et al	00	18.57%	17.14%	35.71%	28.57%
Sikdar et al[16]	00	19.7%	12.5%	23.8%	16%
Agarwal et al[15]	5%	22%	44%	25%	4%
Purandar et al[17]	10%	49%	20%	20%	1%

Table 7. Comparison of Maternal Deaths in the Present Study with Others According to Time Interval

In the present study, maximum (47.14%) deaths occurred in the postpartum period; followed (31.42%) deaths in 3rd trimester and (21.42%) in 1st and 2nd trimester. Similar reports have been reported by other studies.

Study	1st Trimester	2nd Trimester	3rd Trimester	Postpartum
Amulya et al	10%	11.42%	31.42%	47.14%
Purandara et al[17]	5.66%	11%	10%	73.33%
Thomas et al[18]	3.5%	9.7%	31.9%	54.9%
Dongra et al[16]	5%	5%	86.20%	3.9%

Table 8.Comparison of Maternal Deaths in the Present Study with Others According to Trimester

In the present study, direct causes contribute to 58% and indirect causes contribute to 42% of maternal deaths, common direct causes were eclampsia and pulmonary embolus (24.28%) (severe preeclampsia leading to antepartum, intrapartum and postpartum eclampsia), haemorrhage (18.9%) (postpartum haemorrhage, antepartum haemorrhage, abortion-related haemorrhages) and septic abortion (7.14%). Indirect causes of sepsis (18.8%) (puerperal sepsis, antepartum and intrapartum sepsis), DIC and MODS (10%) (severe preeclampsia leading to HELP, sepsis, abruption, septic abortion), anaemia and heart failure (8.56%), HIV-related complications (2.85%), sickle cell and acute chest syndrome (1.42%); similar was reported by other studies. Bera et al revealed that among direct causes, haemorrhage contributed in 23.8% and sepsis for 16.4% deaths, among indirect causes jaundice related 19.9%, followed by anaemia and heart disease with 5.9% and 3.4% deaths, respectively.

Measures to Reduce MMR- Govt. Initiatives in Our Hospital are-

Janani Suraksh Yojana

It is a centrally-sponsored scheme with benefit of cash assistance with institutional care. Eligibility criteria for cash assistance are-

-LPS- All women delivered in Govt. Health Centre.

-HPS- BPL women aged 19 yrs. and above, SC and ST women.

Due to this programme, there is increased institutional delivery and has enabled poor women to access public health facilities.

Janani Sishu Suraksha Karyakram

It was launched in 1st June 2011. Main aim is to provide completely free and cashless services to pregnant women (normal deliveries and caesarean operations)-

-Care of sick newborn up to 30 days after birth.

-Free diagnostics and drugs and consumables.

-Free diet during stay in the hospital.

-Free provision of blood.

-Exemption from user charges.

-Free transport from home to health institutions and transport between facilities in case of referrals.

-Free drop back from institution to home after 48 hrs.

Mother and Child Tracking System

A web-based portal was launched by Govt. of India in December 2009. This architectural connection between health and family welfare service delivery system was meant to include-

-Health status of women and children.

-It aims at facilitating reduction in maternal, infant and child mortality.

Online uploading of name-based data for pregnant women and children under MCTS portal was basically to track pregnant women for universalising obstetric care comprising of antenatal, delivery and postnatal care and to track child towards achievement of full immunisation goals in the country.

Government Programmes Only in State of Andhra Pradesh

108 Services- Free ambulance services catering to the needs of suburban, rural, tribal and interior villages, which are not accessible to regular transport services.

Talli Bidda Express- Unique state Government of Andhra Pradesh initiative to drop the mother and infant safely to their doorsteps.

Maternal and foetal lifeline- In this maternal deaths from all the centres in the state are uploaded and sent to the referral centre where the audit was conducted and reviews and suggestions regarding the case will be sent to the concerned institute.

CONCLUSION

In today's modern era of medicine, most maternal deaths are seen in women from rural areas, less educated, unbooked and patients from low socioeconomic status, who had to travel a lot to reach a tertiary care center. Also, there is no awareness of warning signs of pregnancy.

Complication occurring in pregnancy can be avoided by identification of high-risk cases, early referral, easy transport, continued skill-based training, upgradation of hospitals and monitoring of health services can reduce maternal mortality.

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