

# TRENDS IN MATERNAL MORTALITY IN TERTIARY CARE HOSPITAL IN PESHAWAR - PAKISTAN

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## ABSTRACT

**Objective:** To report a 9 year review of maternal mortality ratio in the largest tertiary care hospital in Peshawar, Pakistan.

**Methodology:** Medical records of 371 maternal deaths were retrospectively reviewed to determine the trends & likely cause of each death over the study period.

**Results:** There were a total of 371 maternal deaths, while 36,460 deliveries were conducted over the 9 year period. The maternal mortality ratio (MMR) was 1017/100,000 live births. The highest MMR of 2015 / 100,000 was observed in 2001 and lowest was 759 / 100,000 in 2009. Hemorrhage consistently remained the leading cause accounting for 38.89% of maternal deaths followed by Eclampsia, Suspected cases of pulmonary embolism & sepsis, each contributing 27%, 9.7% & 7% respectively. 45% of deaths were noted in older women (30y). Multiparas accounted for more deaths. Lack of seeking antenatal care was observed to be major determinant of maternal mortality.

**Conclusion:** The fall in MMR has been very slow. It still remains very high with hemorrhage being the main contributing cause. Improvement in the quality of skilled maternity care, community education on the need to avail antenatal care, provision of family planning services, among other factors, can drastically curtail the preventable causes of maternal deaths & reduce MMR.

**Key Words:** Maternal mortality, Maternal mortality ratio (MMR), Trends, Causes of maternal mortality.

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## INTRODUCTION

Maternal Mortality – the death of women while pregnant or within 42 days of termination of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes<sup>1</sup>, represents a catastrophic event and is used as an indicator of the developmental condition of a country. The performance of any health system can be evaluated by studying their maternal mortality statistics<sup>2</sup>. It

represents the quality of prenatal & obstetric care, as well as the health status of the women in the reproductive age. The reduction in maternal mortality is a high priority for the international community, especially in view of the increased attention on Millennium Development Goals<sup>3,4</sup>. The Millennium Declaration was the first time that maternal mortality was featured so prominently in the high ranks of the global pronouncement<sup>4</sup>. This provided an opportunity to ensure that the risk of maternal deaths is minimized for all women. MDG 5, the 5<sup>th</sup> goal, is the reduction of maternal mortality by 75% by the end of 2015<sup>5,6</sup>. Although some degree of reduction in maternal mortality has been achieved in the developed countries, not much progress has been recorded in Africa & Asia.

World Health Organization and United Nations Children's Fund (UNICEF) revised the estimates of maternal mortality statistics in 2010 & reported that approximately 358,000 women die worldwide from maternal causes: 87% in Africa and Asia<sup>1,7</sup>. The life time risk of maternal death is one in 16 in sub-Saharan Africa and one in 43 in South Asia. This data come into perspective when extremes are compared. The lowest estimate of lifetime risk is nearly one in 30,000 for Sweden

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and highest is one in 6 for Afghanistan and Sierra Leone<sup>4</sup>. This comparison between the burden of maternal mortality in developed and developing countries has long been called as the “Largest discrepancies of all public health statistics” and is substantially greater than that for child or neonatal mortality<sup>4</sup>.

The situation in Pakistan is no different than other south Asian countries. Available data shows that maternal mortality ratios in Pakistan remain high. It is estimated that about 500 maternal deaths occur per 100,000 live births each year<sup>8,9</sup>. However it is a well known fact that all health statistics coming out of the developing countries are statistical estimates. The maternal mortality ratio for Pakistan as well as for Khyber Pakhtunkhwa was projected as 533 / 100,000 live births for the year 1990 – 91, produced by National Institute of Population studies, Pakistan<sup>8</sup>. The Pakistan demographic and health survey was conducted in 2006 – 07. The survey describes the current situation of health and population of Pakistan. The maternal mortality ratio given by Pakistan Demographic and health survey is 276 / 100,000 live births. Whereas the MDG target for 2015 is 140 / 100,000 live births. However most of the studies done at tertiary level hospital have shown a very high MMR<sup>9-13</sup>. Our study was undertaken to review the trends in the maternal mortality in our institution with a view to determine the major causes of death and to ascertain if there are any significant deviations from other reports.

## METHODOLOGY

A retrospective analysis of maternal deaths was carried out from 1<sup>st</sup> January 2000 through 31<sup>st</sup> December 2009. The data of year 2002 was not complete so was not included in the analysis. It

was a nine years review done at Lady Reading Hospital Peshawar, Pakistan. The medical records of maternal deaths were studied. Information on all the cases were extracted from the patient's case notes, Labour Unit registers and maternal mortality records. The total deliveries and live births for the period were noted from the delivery registers, including the demographic details pertaining to age parity and antenatal care. These women were either registered for delivery at the hospital; or were referred from another hospital or from home in case of an emergency.

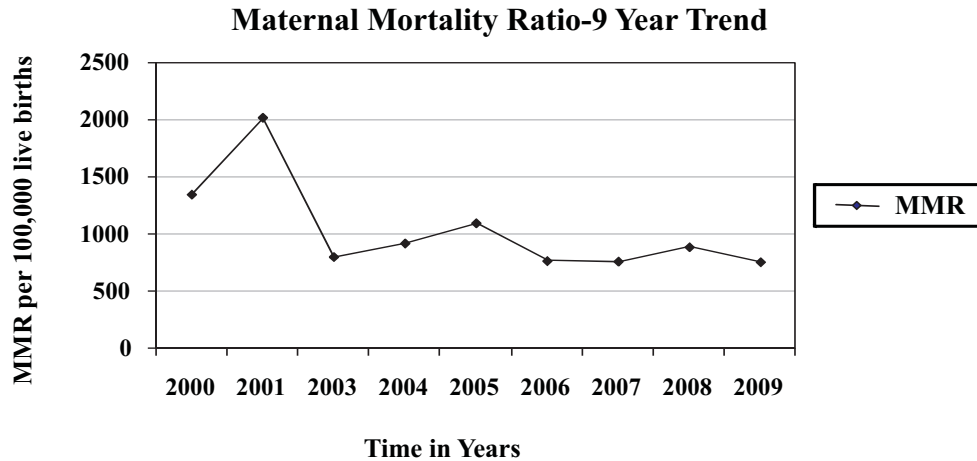
The data was analyzed on SPSS 14. Chi square test was applied on age, parity and antenatal care status to find the significant association with maternal mortality.

## RESULTS

A total of 371 maternal deaths were recorded during the 9 years study period. 36,460 live births were conducted in the same period, giving a cumulative maternal mortality ratio of 1017 / 100,000 deliveries. The worst yearly MMR was seen in year 2001, which were 2015 / 100,000 live births. The MMR decreased insignificant from 1347 in year 2000 to 759 in year 2009. An increasing trend in the number of deliveries in the tertiary care hospital was also observed in the same period (Figure 1 and Table 1). Hemorrhage remained the leading cause of maternal mortality over the 9 year period, accounting for 38.89 % deaths, followed by Eclampsia and suspected cases of pulmonary embolism, accounting respectively for 27 % and 9.7 % deaths. Sepsis lead to 7 % maternal deaths and majority of the cases were due to septic abortion. 12.6 % of women died of indirect causes which included cases of hepatic encephalopathy, rheumatic heart disease, anemia, chronic Myeloid Leukaemia and cerebral malaria (Table 2). Socio demographic characteristics of

**Table 1: Yearly trends of Maternal Mortality Ratio**

Year	Total Deaths	Total Live Births	MMR/100,000 Live Births
2009	33	4346	759
2008	38	4270	890
2007	35	4571	765
2006	32	4020	769
2005	44	4004	1098
2004	40	4335	922
2003	31	3855	804
2001	69	3423	2015
2000	49	3636	1347
Total	371	36460	1017.50

**Table 2: Causes of Maternal Mortality**

Year	Hemorrhage	Eclampsia	Thrombo Embolism	Sepsis	Abortions	Anesthetic complications	Indirect Causes
2009	14(42.4%)	10(30.3%)	02(6%)	01(1.28%)	00(0%)	02(6.06%)	04(12.12%)
2008	12(31.5%)	13(32.5%)	05(4.15%)	03(7.89%)	00	02(5.26%)	03(7.89%)
2007	11(31.4%)	13(37.14%)	03(8.57%)	03(8.57%)	00	00	05(14.2%)
2006	13(40.6%)	07(21.8%)	02(6.25%)	04(12.5%)	01(3.12%)	01(3.12%)	04(12.5%)
2005	18(40.9%)	10(22.7%)	07(15.9%)	01(2.27%)	02(4.5%)	03(6.8%)	03(6.8%)
2004	19(47.5%)	11(27.5%)	02(5%)	01(2.5%)	00(0%)	01(2.5%)	06(15%)
2003	09(29%)	06(19.3%)	06(19.3%)	02(6.45%)	01(3.2%)	00(0%)	07(22.5%)
2001	29(42%)	15(21.7%)	04(5.8%)	10(14.5%)	04(5.8%)	03(4.34%)	04(5.8%)
2000	19(38.7%)	10(20.4%)	05(10.2%)	01(2%)	01(2%)	02(4%)	11(22.4%)
Total	141 (38.89%)	95 (27%)	36 (9.7%)	26 (7%)	9 (2.4%)	14 (3.7%)	47 (12.6%)

**Table 3: Sociodemographic Characteristics**

		Total Deaths (%)	Survivors (%)	Total Live Births (%)	p-value
<b>AGE</b>	<20	5 (1.35%)	541 (1.50%)	546 (1.50%)	0.9964
	20-24	73(19.68%)	7077(19.60%)	7150(19.60%)	
	25-29	126(33.96%)	12,241(33.90%)	12367(33.90%)	
	30+	167(45.01%)	16,249(45.00%)	16416(45.00%)	
<b>Parity</b>	P1	95 (25.61%)	9,244 (25.52%)	9,339 (25.60%)	0.9912
	P2-4	151 (40.70%)	14,805 (40.88%)	14,956 (41.00%)	
	P5+	125 (33.69%)	12,059 (33.30%)	12,184 (33.40%)	
<b>Antenatal care</b>	yes	15 (4.04%)	1,444(4.00%)	1,459 (4.00%)	0.9657
	no	356 (95.96%)	34,664 (96.00%)	35,020 (96.00%)	
		371 (100 %)	36108(100%)	36,479 (100%)	

maternal deaths are presented in Table 3. An increased risk was observed among women aged 30 years accounting for 45 % of deaths. However it was not statistically significant (P-value 0.99). Teenage pregnancies resulted in 1.34 % deaths (Table 3). Elderly women accounted for major proportion. Majority of the women were multipara (40.7 %). Primiparas accounted for 25.6 % of deaths. There was no statistical difference as for as parity was evaluated (P. Value 0.99). Lack of antenatal care was found to be a major determinant of maternal mortality. 96 % of the patients were unbooked, so P.value was not significant.

## DISCUSSION

The maternal mortality ratio of 1017 / 100,000 observed over the study period were comparable to other parts of the country. Most of studies from Punjab and Sindh have analyzed the data over similar period of time in tertiary care hospital and have found MMRs in the range of 228 – 2736 / 100,000 live births<sup>9-13</sup>. The lower values were seen in private teaching hospitals. However the trends remain the same in government institutes. When we analyze the various studies on maternal mortality in the developing countries, they are nowhere near achieving the MDG-5<sup>14-18</sup>. In countries like Malaysia, Sri Lanka, Thailand, Jamaica and Tunisia, there has been a significant decline in the maternal mortality<sup>4,6,19-21</sup>. The access to skilled birth attendants, emergency obstetric care and family planning services have made major contribution in decreasing the maternal mortality in these countries<sup>4, 6</sup>. However in Pakistan, in spite of many programmes much has not been achieved.

As the yearly trends in MMRs are followed in the study period, no significant fall in maternal deaths was seen. The trends more or less remained the same except a drop was seen from year 2001 to year 2003. However no significant cause was found for this positive change. A comprehensive overview of data from various articles was done by SN Jafarey in 2002<sup>9</sup> and observed similar findings. A study from Northern Nigeria published in 2009 showed a dramatic drop in their yearly trends of maternal mortality<sup>5</sup>, from as high as 6234 / 100,000 deliveries in 2003 to 1665 / 100,000 deliveries in 2006. They attributed these observations to the substantial increase in the number of women who resorted to hospital deliveries at that time. Nepal and Bangladesh both have shown declines in maternal mortalities despite low rates of deliveries with health professionals<sup>4,20,22</sup>. It was found that in addition to better abortion and emergency obstetric care, fertility reduction, better education and improving wealth also occurred in Bangladesh during the time of maternal mortality decline. So many social

changes can indirectly affect the trends in maternal mortality.

Hemorrhage was consistently observed to be the leading cause of maternal mortality throughout the study period. Overall it accounted for almost 40 % of deaths. It was interesting to note that hemorrhage is not only the largest contributing factor in developing countries<sup>23</sup>; it is also the leading cause in the most developed nations<sup>1,3,24,25</sup>. It was followed by hypertensive disorders which accounted for 27 % deaths. It is consistent with most of the data from Pakistan. Abortion related deaths, which were observed to constitute 13 % of the total mortality in some reports<sup>6</sup> were however the least in this study. It might be related to under reporting of induced abortion, due to the cultural religious implications. The overall cause of death profile was not dissimilar to findings from other developing countries. Nearly 45 % of deaths were observed in those above 30 years of age, which might be due to the increasing complications associated with increasing age and parity<sup>1</sup>. As observed in other studies<sup>5,11,13</sup>, non-utilization of antenatal care services were a major contribution to maternal mortality. The trends in maternal mortality and cause of death changed very little over the 9 years period.

Evidence based interventions for major causes of maternal mortality have been very effective in reducing the maternal mortality in many developing countries. For example Oxytocin and manual compression for postpartum hemorrhage, Magnesium sulphate for eclampsia, family planning and post abortion care to prevent unsafe abortions and antibiotics to prevent infections. These goals can be achieved through a combination of factors including: long term investment in midwifery training and referral hospitals, care at subsidized prices and a supportive system with regulation, control and supervision of the medical and midwifery profession; and information to confirm progress.

Reliable trend data are not available from most parts of the country. A uniform system of data collection needs to be implemented. The case studies of Thailand, Sri Lanka, Malaysia and Bangladesh tell an encouraging story and show that substantial falls in maternal mortality are feasible.

## CONCLUSION

The maternal mortality ratios remain unacceptably high. The fall in MMR has been very slow. Hemorrhage persistently contributed as the major causative factor. Advanced maternal age, multiparity and lack of prompt antenatal care

services were found to be significant contributors to maternal deaths in our study.

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#### **CONTRIBUTORS**

FF conceived the idea and planned the study. NN & NU did the data collection and analyzed the study. HH supervised the study. All the authors contributed significantly to the research that resulted in the submitted manuscript.