

# Maternal Death Audit: Experience from a Periurban Hospital

S TASNIM<sup>a</sup>, N KABIR<sup>b</sup>, A RAHMAN<sup>c</sup>, A AHMED<sup>d</sup>, S CHOWDHURY<sup>e</sup>

### Summary:

*Maternal death audit is becoming a routine process in the practice of obstetric care in both developed and developing countries. Review of case records of maternal deaths between September 1999 and December 2004 was done to find out the profile of the patients and factors associated with the deaths in a periurban hospital in Dhaka. A total 40 maternal deaths occurred among 14,137 live births amounting MMR 282 per 100,000 live births.*

*Mean age of deceased mothers was 24.85± 5.6 years, 25% were primipara and vaginal delivery occurred in*

*42.46% cases. Thirty percent deaths occurred within six hours of admission to hospital and 73% deaths occurred during post-partum period. The primary obstetric cause of deaths were severe pre-eclampsia and eclampsia (42.5%), haemorrhage (17.5%), obstructed labour (12.5%) and sepsis (7.5%) respectively.*

*Facility based audit into maternal deaths provide an opportunity to understand the inciting factors and is recommended to be implemented for improvement of professional practice and management.*

*(J Bangladesh Coll Phys Surg 2006; 24: 5-9)*

### Introduction:

Audit in medical practice is defined as the systematic and critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources and the resulting outcome and quality of life for the patients<sup>1</sup>.

Audit can measure the structure that is the resources and personnel available, process that happens in the practice/hospital and outcome that indicated the results of care. This is well appreciated that audit is not fault finding, but it

encourages thoughtful planning which leads to valid information collection and subsequently to informed decision making<sup>2</sup>.

Maternal mortality is a key indicator of the quality of health services and usually provides an insight to health care practices that are most effective in averting maternal deaths<sup>3</sup>. Even in developed countries where MMR is much lower, maternal death audit have attributed substandard care to 40-66 percent of maternal deaths<sup>4</sup>. Maternal death audit is in practice in the United Kingdom, South Africa and Malaysia since 1952, 1998 and in early 80's respectively<sup>5</sup>.

In recent years, audit has become an acquired concept in the context of obstetric and other health care in both industrialized and developing countries. Maternal death audit is important because it gives an understanding to what happened and why. This helps to go beyond rates and ratios to determine the inciting factors and to take measure how they could have been avoided<sup>6</sup>.

This study was designed to review maternal deaths in a periurban comprehensive health facility to find out patients' profile and selected factors associated with maternal deaths.

### Materials and methods:

Individual case review, one of the methods of maternal death audit, was used. Data was retrieved

- a. Dr. S Tasnim, FCPS, MMed, Diploma in Community Epidemiology. Associate Professor, Department of Obstetrics & Gynaecology, Institute of Child and Mother Health, Matuail, Dhaka.
- b. Dr. N Kabir, FCPS, DRH. Associate Professor, Department of Obstetrics & Gynaecology, Institute of Child and Mother Health, Matuail, Dhaka.
- c. Dr. A Rahman, DCM, MMed. Assistant Professor, Department of Epidemiology & Biostatistics, Institute of Child and Mother Health, Matuail, Dhaka.
- d. Dr. A Ahmed, MBBS. Assistant Registrar, Department of Obstetrics & Gynaecology, Institute of Child and Mother Health, Matuail, Dhaka.
3. Prof. S Chowdhury, FCPS, Dip RH. Professor and Head of the Department of Obstetrics & Gynaecology, Institute of Child and Mother Health, Matuail, Dhaka.

**Address of correspondence:** Dr. Saria Tasnim, Apartment 9/D Nakshi Tower, 6/D Topkhana Road. Dhaka-1000., Telephone: 9556922, 0189221096.

from hospital case records (admission register, case file, delivery register, death certificate) using structured questionnaire by assistant registrars trained for the purpose. The questionnaire was designed to explore profile of the patient, time of admission, diagnosis at the time of admission, mode of delivery, treatment received, time of death and cause of death. A total of 40 maternal deaths those occurred in the facility (Institute of Child and Mother Health, Dhaka, Bangladesh) between September 1999 and December 2004 were analyzed. However, the cases which were brought dead were excluded from the study.

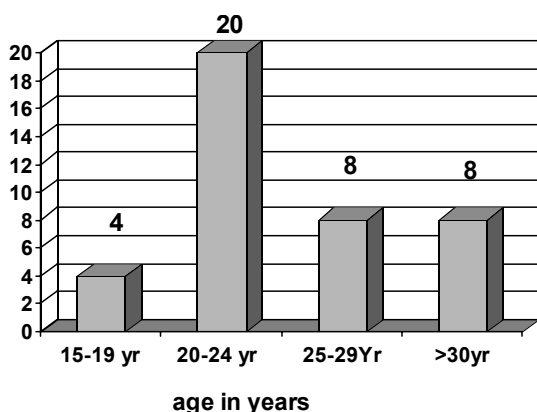
### Results:

Among 15,532 obstetric patients 14,137 cases had livebirth and 40 mothers died during the study period

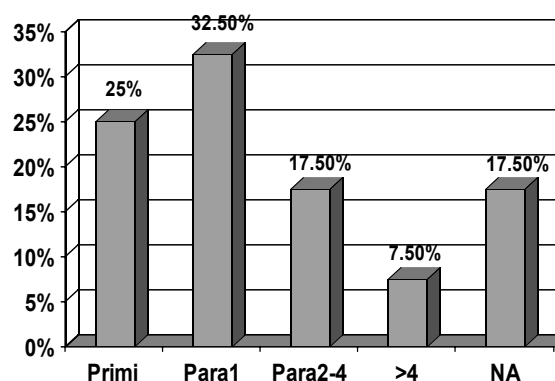
1999-2004 (Table-1). The mean age of the deceased mothers was  $24.85 \pm 5.65$  years and 50% belongs to 20-24 years age group. One quarter of the mothers were primipara and about one third were in their second pregnancy (Figure-1 and 2). Vaginal delivery occurred in 42.46% cases (Table-II). Regarding delivery status, about 73% deaths occurred in the post-partum period and 17.54% in the ante-partum period (Figure 3). The interval between admission to hospital and death was less than six hours in 30% deaths. The primary obstetric causes of death were severe pre-eclampsia and eclampsia (42.50%), haemorrhage (17.50%), obstructed labour (12.50%) and sepsis (7.50%) respectively (Figure-5).

**Table-I**

<i>Year wise Distribution of Obstetric patient</i>						
Year	Total Obs in patients	NVD	C/S	Live birth	Instrumental delivery	Death
1999 (Sep-Dec)	383	200	160	253	4	4
2000	2541	1229	1144	2351	6	4
2001	2299	1144	1123	2223	5	8
2002	2912	1101	1357	2352	3	6
2003	3635	1874	1731	3449	2	8
2004	3762	1779	1954	3509	4	10



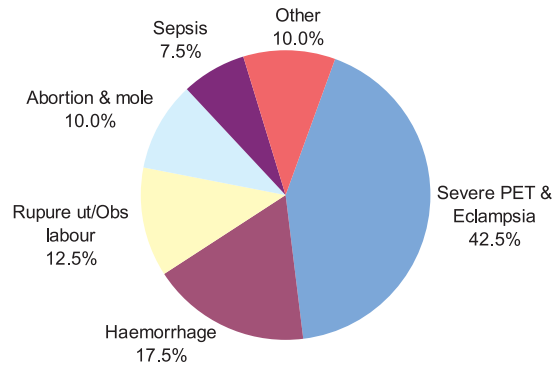
**Fig.-1:** Age distribution.



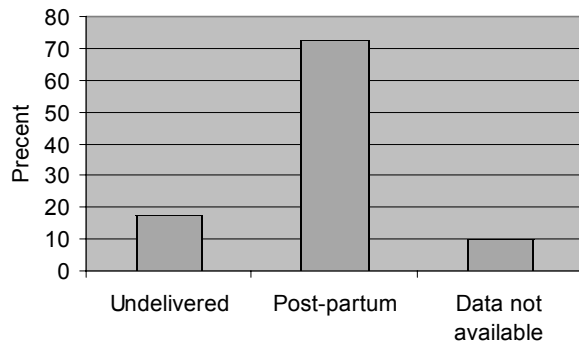
**Fig.-2:** Distribution of parity

**Table-II**

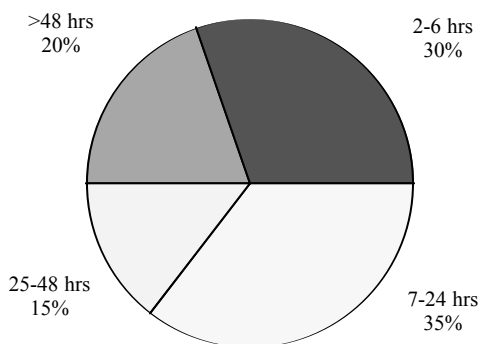
<i>Status of delivery at the time of death</i>		
Mode of delivery	Number	Percentage
Vaginal delivery	17	42.46
Caesarean section	60	15.00
Undelivered	70	17.50
Abortion	40	10.00
Craniotomy	20	50.00
Data not available	40	10.00



**Fig.-5:** Causes of maternal death at Institute of Child and Mother Health



**Fig.-3:** Status of pregnancy at the time of death



**Fig.-4:** Interval between admission to hospital and death

**Discussion:**

The study revealed that maternal death was more after vaginal delivery and in the second pregnancy that is expected to be relatively uneventful that indicates limited value of screening for risk factors. This is consistent with the theme that every pregnancy is potentially at risk and needs attention. Death occurred more during puerperium and that has also been found in national mortality survey<sup>7</sup>.

There was no antenatal care in all cases except one. This is a very important issue to be considered indicating need of adequate antenatal care for prevention of maternal mortality. More deaths happened within six hours of admission indicating delay in coming to hospital. All patients came from the catchment areas, not very far from the facility (Matuail, Demra, Adamjee, Narayangonj) with quite good access to transport indicating lack of awareness of “danger signs” and delay in making decisions by the patients or the family for coming to hospital. Experience of different interventions for safe motherhood reveals that the medical decisions by the community are often based on non medical reasons. Cultural appropriateness and alternative healing systems are strong competitors for seeking proper medical care<sup>8</sup>. Delay in seeking treatment contributed to 32% and 28% of rural and urban deaths among mothers in some studies<sup>9</sup>. Majority of the admission was during routine office hours indicating that there is a tendency of avoiding movement at odd hours.

Pre-eclampsia and eclampsia were found to be the commonest causes of death. Hypertensive disorders

of pregnancy constitutes a greater proportion of deaths in hospitals of both developing as well as developed countries<sup>10</sup>. In a study from Indonesia, hypertensive disease accounted for 64% of hospital maternal deaths<sup>11,12</sup>. In Panama, 41.7 percent deaths were due to pre-eclampsia/eclampsia<sup>13</sup>. At a tertiary hospital in Bangladesh, causes of maternal death reported were eclampsia (32%), haemorrhage (25%), HELLP syndrome (6%) and septic shock (9%)<sup>14</sup>. Another early study revealed, most common obstetric causes of death were eclampsia (47%), haemorrhage (25%), infection (17%)<sup>15</sup>.

The age structure of deceased mothers indicated that 50% belong to 20-24 years. Other hospital based studies had shown that 49% deaths occurred in the age group of 20 - 29 years<sup>15</sup>. This reflects the prevailing social norm of early age at marriage and childbearing<sup>16</sup>. However, in European countries, more than half of maternal deaths are among woman between 25 and 34 years<sup>3</sup>. Majority of deaths occurred in this study during puerperium and that is consistent with national survey<sup>7,17</sup>. Study from other countries showed that 8.3% of deaths occurred in undelivered women and 66.7% occurred within 30 days of postpartum<sup>13</sup>.

Although audit has become an integral part of medical care in industrialized countries, the experience in developing countries are yet very scanty<sup>5</sup>. Possible constraints for such audits are the magnitude of resource constraints or insufficiency in resource allocation that fail to support the implementation or sustainability of audit activities. In addition, the strong hiererchial structure of the medical profession may hamper the process of peer review, and inadequate access to scientific evidence will lead to over reliance on clinical judgement on the basis of current practice rather than best practice<sup>5</sup>. However, a number of developing countries like Jamaica, Egypt, South Africa and Malaysia have established confidential inquiries of maternal deaths<sup>18,19</sup>. In Indonesia, district level audits are in practice<sup>12</sup>. There are documented reports on facility based audits involving case reviews, compilation of risk factors and avoidable factors<sup>20,21</sup>. Government of Bangladesh has taken initiatives to establish regular

perinatal death audits in different hospitals since 2004<sup>22</sup>. Auditing of cases of severe obstetric morbidity may be an useful alternative or complement to auditing maternal deaths as it may reveal positive elements of care and provide an opportunity to congratulate staffs for saving lives<sup>23</sup>.

Maternal deaths are common among young women in the most potential period of life and eclampsia, haemorrhage and obstructed labor are common causes of death. One limitation of this study was that the case records were maintained poorly with inadequate and incomplete information limiting understanding of all contributing factors. Regular audit of all adverse events will improve local management or professional practice.

It is recommended that antenatal selection of cases for hospital delivery, emphasis for community awareness for availing safe motherhood services, effective linkage from grass root level to higher level and implementation of maternal mortality or morbidity surveillance system should be a routine practice in health care system.

#### References:

1. Crombie I K, Davies HTO, Abraham SCS, Florey C du V (editors). The audit handbook. Improving health care through audit. 1997. New York: John Wiley & Sons.
2. Arnold CWB, Bain J, Brown RA. Moving to Audit. The Postgraduate office Ninewells Hospital and Medical School, Dundee. 1992.
3. Wildman K, Bouviercolle M H, the MOMS group. Maternal mortality as an indicator of obstetric care in Europe. *B J O G* 2004; 111: 164-69.
4. Benbow A, Maresh M. Reducing maternal mortality, reaudit of recommendation in reports of confidential enquiries into maternal deaths. *Br Med J* 1998; 317: 431-432.
5. Ronsmans CH. What is the evidence for the role of audits to improve the quality of Obstetric care. *Studies in HSO&P* 2001; 17: 207-227.
6. WHO. South Asian regional consultation on monitoring and evaluation of maternal and neonatal health. Guidelines for investigating maternal mortality. 8-11 July, 2002, Bangkok.
7. BMMS. Bangladesh Maternal Health Services and Maternal Mortality survey 2001. NIPORT; MEASURE/DHS+ ORC MACRO.
8. Kwast BE. Reduction of maternal and perinatal mortality in rural and peri-urban settings: what works? *Eur J Obstet Gynecol Reprod Biol* 1996; 69: 47-53.

9. Fawcus S, Mbizvo M, Lindmark G, Nystrom L . A community - based investigation of avoidable factors for maternal mortality in Zimbabwe. *Studies in Family Planning* 1996; 27: 319-327.
10. Duley L. Maternal mortality associated with hypertensive disorders of pregnancy in Africa, Asia, Latin America and the Caribbean. *Br J Obstet Gynecol* 1992; 99: 547-553
11. Supratikto G, Wirth ME , Achadi E , Cohen S, Ronsmans C . A district based audit of the causes and circumstances of maternal deaths in South Kalimantan, Indonesia. *Bull Wld Hlth Org* 2002; 80: 228-234.
12. Ronsmans C, Achadi E, Sutratikto G, Zazri A, McDermott J. Use of hospital data for safe motherhood programs in south Kalimantan, Indonesia. *Tropical medicine and International Health* 1999; 4: 514-21.
13. Gracia P Vigil-De. Maternal mortality in Panama city (CHMCSS), 1992-1996. *Int J Gynecol Obs* 1998; 61: 283-284.
14. Sayeba A . Presentation of workshop on facility based maternal death review at Dhaka Medical College Hospital. 2005, Dhaka.
15. Begum N. Maternal mortality in Mymensing Medical College Hospital: 1984-1988. *Bangladesh J Obs Gynaecol* 1991; 6: 14-21
16. BBS. Bangladesh data sheet. Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh, 1997.
17. Akhter H H, Chowdhury MEEK, Sen A. A cross-sectional study maternal morbidity in Bangladesh. *BIRPERHT* 1996, Dhaka.
18. Walker G J, Ashley D E, McGaw AM, Bernard GW. Maternal mortality in Jamaica. *Lancet* 1986; 1: 486-88.
19. Suleiman AB, Mathews A, Jegasothy R, Roslinah A, Kandiah N. A strategy for reducing maternal mortality. *Bull Wld Hlth Org* 1999; 77: 190-193.
20. Mantel GD, Buchmann E, Rees H and Pattinson RC . Severe acute maternal morbidity: a pilot study of a definition of a near miss. *Br J Obs & Gynaecol* 1998; 105: 985-990.
21. Zanconato G, Machungo F, Soler A, Bergstrom S. Audit of uterine rupture in Maputo: a tool for assessment of obstetric care. *Gynecol Obstet Invest* 1994; 38: 151-156.
22. DG Health/ MIS/Perinatal death/2004 dated 1.12.2004.
23. Ronsmans C, Fillipe V. Improving obstetric care through near miss audit. *Child Health Dialogue* 2000; 18: 9.