ORIGINAL ARTICLE

THE THREE DELAYS OF MATERNAL MORTALITY IN A TEACHING HOSPITAL

Madiha Iqbal[1], Zia Muhammad[2], Zubaida Akhtar[1], Talat Naz[1]

[1]Department of Obs & Gynecology, Khyber Teaching Hospital, Peshawar - Pakistan
[2]Department of Paediatrics, Khyber Teaching Hospital, Peshawar - Pakistan

ABSTRACT

Objective: To determine the causes of maternal mortality, the three delays contributing to maternal mortality and the perinatal outcome in a tertiary care hospital.

Material and Methods: This descriptive study was carried out in Gynae 'A' ward of Khyber Teaching Hospital (KTH), Peshawar, Pakistan from January, 2011 to December, 2015. All the maternal deaths were analysed. The information and relevant data was obtained from the patients record and mortality register. Fortuitous deaths and deaths due to gynecological causes were excluded from the study.

Results: The maternal mortality ratio for the five year period was 278/100,000 live births (53 maternal deaths /19052 live births). Fifty (96.2%) of them had direct causes and only two (3.7%) had indirect cause. The most common causes being post partum hemorrhage (PPH) in eighteen cases (33.9%), eclampsia in fifteen cases (28.4%) and suspected pulmonary embolism in eight cases (15.0%). The indirect deaths were due to rupture of aortic aneurysm (1.8%) and severe cellulitis of the submandibular region, obstruction the airway (1.8%). Majority of the patients encountered multiple delays. First delay was the major contributor (64.7%) i.e. delay in deciding to seek appropriate care. 32% of the patients encountered second delay i.e. delay in reaching the appropriate facility.

Conclusion: The leading causes of maternal deaths were PPH, eclampsia and septicemia, all preventable , if the first delay is addressed timely and promptly. A majority of them suffered first and second delays in their management.

Key Words: Maternal mortality, eclampsia, post partum haemorrhage, puerperal sepsis.

This article may be cited as: Iqbal M, Muhammad Z, Akhtar Z, Naz T. The three delays of maternal mortality in a teaching hospital. J Med Sci 2017; 25: (2) 231-235.

INTRODUCTION

Maternal mortality ratio (MMR), the number of maternal deaths per 100,000 live births, is a sensitive indicator of maternal health. It shows the effectiveness of health system and quality and accessibility of maternal health services available to women[1]. WHO and UNICEF revised estimates (2010) reported that approximately 358000 women die worldwide from maternal causes[2]. About 99% of these deaths occur in the developing countries[3].

The millennium developmental Goal 5 called for a 75% reduction in maternal mortality between 1990 and 2015 world-wide. In this modern world of medical advancement, maternal mortality remains high in Pakistan; every year an estimated 25000 women die due to pregnancy related causes[4].

The main causes of maternal deaths in Pakistan are PPH, eclampsia and sepsis. However, these causes do not usually result in maternal deaths in the developed world. Therefore, other factors, like delay in receiving timely and proper care in case of a pregnancy complication, play a pivotal role in the continuation of this tragedy in the modern era[5].

According to Thaddeus and Maine, delay can occur at three levels:

1. Delay in decision to seek care.
2. Delay in reaching the appropriate facility.
3. Delay in receiving adequate care in the facility[6].

The reasons for the first delay may be late recognition of the problem, fear of the hospital or the costs

Dr. Madiha Iqbal (Corresponding Author)
Department of Gynecology,
Khyber Teaching Hospital, Peshawar - Pakistan
Cell: +92-333-9225922
Email: drziamuhammad@gmail.com
Date Received: February 25, 2017
Date Revised: April 4, 2017
Date Accepted: June 10, 2017

which is the most common cause in our setup. The second delay is usually caused by difficulty in access to transport (especially for the patients from far flung areas) and the third delay is due to difficulty in getting blood and blood related products. The objectives of this study were to determine the causes of maternal death, and to identify its causes with focus on the role of three delays of maternal mortality and to assess the perinatal outcome.

MATERIAL AND METHODS

This study was conducted in Gyne 'A' ward of Khyber Teaching Hospital, Peshawar. All the maternal deaths from January 2011 to December 2015 were included and analyzed. This is one of the leading tertiary care hospitals of the province. The nature of admissions is mostly emergency and referred from the periphery in critical conditions.

The WHO definition of maternal deaths; "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by pregnancy or its management but not by accident or incident''[8],was used as operative definition of maternal deaths. Fortuitous deaths and deaths due to Gynaecological causes were excluded from the study.

Delay was defined as by Thaddeus and Maine6. Three types of delays have been identified: i)Firstdelay is the delay to seek appropriate care which may be due to lack of awareness, lack of finances or non-availability of male members. ii) Second delay refers to the delay in reaching the concerned facility either due to long distance or late referral. iii) Third delay is the delay in getting the appropriate facility e.g. delay in getting blood or blood products or delay in surgical intervention due to different reasons.

Medical records of all maternal deaths were scrutinized and information obtained, which included age, parity, admission status, education, socio economic status, referral history, level of antenatal care , distance from the hospital, duration of hospital stay, associated medical condition and obstetric complication along with perinatal outcome. Information regarding the First and Second delays was obtained from interviews with the patients' attendants' while regarding Third delay was obtained from case files. The collected data was analyzed by computer software SPSS version 14 and results presented as frequencies and percentages.

RESULTS

A total of 19052 live births occurred during the study period. Total No. of maternal deaths was fifty three MMR calculated for the five year period was 278/100,000 live births. Out of fifty three maternal deaths, fifty one (96.2%) patients had direct causes and only two (3.7%) had indirect cause as shown in Table 1.

The most common cause of maternal death was PPH in eighteen (33.9%) cases. The second leading cause was eclampsia in fifteen patients (28.4%). PPH due to uterine atony was observed in ten cases. Four patients had genital tract trauma. Two had uterine rupture while two patients presented with severe abruption. Suspected pulmonary embolism was seen as the 3rd common cause in eight (15.0%) cases. Four (7.5%) patients died of septicemia, three (5.6%) of anesthesia complications while the same number from suspected pulmonary embolism in our study. The criteria for diagnosis of pulmonary embolism and amniotic fluid embolism was purely clinical in collaboration with mul-

Table 1: Causes of Maternal Deaths

Causes	Total no. of maternal mortality and %age
A: DIRECT	51 (96.2)
Haemrrohage	18(33.9)
Eclampsia	15(28.4)
Suspected Pulmonary embolism	8(15)
Septicaemia	4(7.5)
Anesthesia complication	3(5.6)
Suspected Amniotic fluid embolism	3(5.6)
Total Direct	51(96.2)
B: INDIRECT	2(3.92)
Rupture of aortic aneurysm	1(1.8)
Severe Submandibular Cellulitis	1(1.8)
Total Indirect	2(3.92)

Table 2: Age & Parity Distribution in Maternal Death

Age in year	Total No. & %age
<20	8 (15)
20-29	22 (41.5)
30-39	18 (33.9)
40 and above	5 (9.4)
Parity	
Primigravida	16 (30)
Multigravida(G2-5)	18 (33.9)
Gtand Multigravida (G6 and above)	19 (35.8)

Table 3: Neonatal outcome Total babies born in the hospital – 35

Out come	Total No. & %age
i. Alive babies	31(88.5%)
a. Apgar score 6 & above	10(32.2%)
1. Eclampsia (>36wks)	5 (16.1%)
2. Anesthetic complication	3 (9.6%)
3. Indirect causes	2 (6.4%)
b. Apgar score 6 & below	21(67.7%)
1. Eclampsia (<36wks)	10 (47.6%)
2. Pulmonary embolism	8 (25.8%)
3. Septicemia	4 (19%)
4. Amniotic fluid embolism	3 (14.2%)
ii. Dead babies	4 (11.4%)
1. Abruption	2 (50%)
2. Uterine rupture	2 (50%)

tidisciplinary approach. Two patients expired of indirect causes, one due to rupture of aortic aneurysm and the other one due to severe submandibular cellulitis obstructing her airways.

Out of fifty three patients none of them had any sort of antenatal visits. Thirty eight (71.6%) were mishandled at home by dais and thirteen (24.5%) were referred from periphery. All of them were from poor socioeconomic class and none of them were educated. Parity distribution is shown in Table 2.

The age ranges from 18-42 years. Most of the maternal deaths occurred between 20-39 yrs. Overall, maximum number of deaths occurred in postpartum period (42) followed by antepartum (6) and intrapartum periods (5). The distance from the hospital was observed and it was found that twenty eight patients were living within 10 km from the hospital, 20 patients; within 10-50km and only five patients were from far flung areas. In this study, 98% of the deceased mothers had multiple delays with first delay the major contributor (64.7%) i-e delay in deciding to seek appropriate care. 32% had second delay i-e delay in reaching the appropriate facility.(Table III)

Thirty one babies were delivered alive. Only ten (32.2%) delivered with good APGAR score, survived and were handed over to the attendants, sadly after their mothers' demise (18 patients presented as PPH and were already delivered out of the hospital hence, those babies could not be traced for outcome). Twenty one babies (67.5%) delivered with poor APGAR and died within 24 hours -48 hours of birth. Out of these twenty one babies, majority were born to mothers with eclampsia mostly preterm i.e. their POG was <36wks as shown in Table 3.

DISCUSSION

The maternal mortality ratio of 278/ 100,000 live births calculated in this study is comparable to the studies of other tertiary care hospitals of Pakistan where the MMR ranges from 204 to 1650/100,000 live births[7]. Fahim F observed that the trend remains the same over the 9 year period (2000-2009)8. The MMR given by the Pakistan demographic and health survey (2007) is 276/100,000 live births whereas the MDG target for 2015 was 140/100,000 live births9. Hence Pakistan is still far behind the MDG target, which was to be achieved in 2015.

Various studies on maternal mortality in developing countries like Nigeria[10], Nepal[11] and Bangladesh[12] have shown decline in maternal mortality. This is due to better access to skill birth attendant, emergency obstetric care and family planning services. However, in Pakistan the picture remains the same, inspite of all efforts to improve maternal health[13-17]. Majority of our patients died of direct causes (96.2%). This correlates with other hospital studies where over 80% of deaths were from direct causes[13-18]. However this is in contrast to developed nations where indirect and incidental causes are responsible for the majority of deaths[18-21].

Obstetric hemorrhage accounts for 25% of all maternal deaths world-wide with primary postpartum hemorrhage (PPH), the major contributing cause[22]. Tragic enough, this is a preventable cause of maternal deaths[22]. In our study, it was the leading cause of maternal mortality (33.9%) with uterine atony in ten cases, ruptured uterus seen in two cases and cervical tears in four cases. Two of the patients presented with severe antepartum hemorrhage that was due to abruption. These patients were usually brought in serious condition due to excessive bleeding. Unsafe obstetric practices like injudicious use of oxytocin, prolonged obstructed labour and late referral were identified in these cases as the contributing factors. Similar findings have been reported by a systematic review of WHO[22].

Hypertensive disorder is the most common medical problem in pregnancy and leads to a high proportion between 12 and 20% of maternal deaths world wide[21]. In our study, eclampsia is the second leading cause of MMR (15 cases – 28.4%). Two studies from Nigeria[23] and Kenya24 also showed the same results. All these patients were brought to hospital, in serious, moribund condition with no antenatal care. They developed DIC, renal failure, intracranial hemorrhage and pulmonary edema, leading to their tragic deaths.

A study from rural Sindh gives maternal mortality ratio of 297/100,000 live births. In this study, 27% of maternal mortality is due to eclampsia and it is second on the list after hemorrhage[25] which is comparable to our study. A study in Peshawar at Lady Reading Hospital gives maternal mortality ratio 311/100,000 lives births and 24.62% of deaths due to eclampsia which is second common cause of death in their study also[7]. Situation in Baluchistan is more alarming with maternal mortality ratio 560/100,000 lives births and eclampsia being the third important cause of maternal mortality after haemorrhage and sepsis[15]. In our setup, the main reason for high mortality in eclampsia was lack of proper antenatal care and late arrival or referral of the patients to the concerned medical facility.

Other direct causes of maternal mortality seen in our study were suspected pulmonary embolism (8), deaths due to anaesthesia (3 cases) and suspected amniotic fluid embolism (3). In the triennium report (2013-2015) of confidential enquiry into maternal death in UK, the most common cause of direct deaths was the thromboembolism, followed by hemorrhage, sepsis and anesthesia complication[21].

Among 53 maternal deaths, 04 (7.5%) patients died due to septic shock. 02 (3.7%) patients had history of septic induced miscarriage with the involvement of gut. 02 (3.7%) patients developed septicaemia secondary to chorio amnionitis due to obstructed labour and/or handling by dais. A study showed 5.6% mortality due to sepsis from Rural Sindh25, 23.91% from Lahore and 16.3% from Quetta[26]. The same is reported as a main cause of maternal mortality from one district hospital of Kenya[24].

In the indirect causes cardiac diseases was the cause of maternal mortality in one case. Some other studies also reported the same results[13-17]. Pregnant women with cardiac diseases should be admitted for stabilization under care of multidisciplinary team to ensure a best possible outcome. Our study showed that majority deaths (64%) occurred in postpartum period. This is comparable to other studies[13-17]. Appropriate care during this period especially to prevent and manage PPH is mandatory to prevent these deaths.

Ninety eight percent of the deceased mothers suffered multiple delays in getting the appropriate treatment. The first delay was found to be the most frequent (64.7%) followed by the second delay (32%). This is comparable to a study from Nigeria which reported multiple delays to be associated with 78% of maternal deaths, found the first delay to be the most frequent (57%) 27. The most common reason for the first delay was lack of awareness about the seriousness of the disease, followed by financial problems. The second delay was mostly due to long distance followed by late referral from the different health facilities. This delay in referral was responsible for some mothers being brought dead. The most common reason for the third delay was difficulty in getting blood, which is usually due to non-availability of the donors. This was followed by delay in surgical intervention, the usual reasons for which are delay in investigations, delay in anesthetist response and operating room being busy, comparable to two other studies[27,28].

The perinatal outcome in our study is in accordance to studies from Nigeria and other low income countries[23,24]. Out of the 35 antenatal patients, 31 (88.5%) of them delivered alive babies but only 10 (32.2%) could be saved and handed over to the attendants while 21 (67.7%) died within 24-48 hours of birth – mostly due to birth asphyxia and sepsis – the reasons being their mothers' compromised status. If we consider globally, there is a reduction in maternal mortality. World statistic shows maternal mortality ratio of 422/100,000 live births in 1980, to 320/100,000 live births in 1990, and 251/100,000 live births in 2008.[2]

Even in South Asia some of the countries have managed to reduce their maternal mortality, e.g., Sri Lanka, China and Bhutan. In Sri Lanka maternal mortality ratio has decreased to 30/100,000 live birth in 1999. More than 95% of all their births occur in hospital setups[24]. The governments in those countries have focused on upgradation of their basic health system. This is the high time to focus all our efforts towards the prevention of this continuing avoidable tragedy in Pakistan as rightly has been said, a healthy mother means a healthy nation.[3]

CONCLUSION

Almost all the women suffered first or second delay in their management which might be related to their poor socio demographic characteristics.

RECOMMENDATIONS

The effective and efficient referral system is essential. The female skilled health care workers are essential for the provision of antenatal, natal and postnatal care. The quality Emoc services should be accessible and affordable, hence bridging the gap in maternal health issues in reality.

REFERENCES

1. Meyer E, Hennink M, Rochat R, et al. Working Towards Safe Motherhood: Matern Child Health 06 Apr 2016
2. World Health Organization. The world Bankmaternal mortality 1990 to 2008: estimatesdeveloped by WHO, UNICEF, UNFPA and the worldbank. Geneva: WHO; 2010.
3. Jat TR, Deo PR, Goicolea I, Hurtig AK. Socio-cultural and service delivery dimensions of maternal mortality in rural central India. Glob Health Action Apr 2015
4. Bhutta ZA, Maqbool S. Perinatal and newborn carein Pakistan. A manual for physicians, Reproductivehealth Karachi J coll physician surg Pak 2002; 121:93-109.
5. PDHS, National Institute of Population Studies & Demographic and Health Surveys. Pakistan Demographic and Health Survey. 2006–2007.

6. Thaddeus S, Maine D. too far to walk: maternal mortality in context. Soc Sci Med 1994;38:1091-1100.
7. Midhet F, Jafarey SN, Ahsan A, Sheraz A. Adult and-Maternal Mortality Ch-14 in Pakistan Demographicand Health Survey 2006-07. National Institute of Population studies Islamabad Pakistan. MacroInternational Inc USA 2008 P 172-83.
8. Fahim F, Nabeel N, Utman N. Trends in maternal mortality in tertiary care hospital in Peshawar- Pakistan. Jpostgrad Med Ins 2012; 26: 422-27.
9. Gill Z, TACMIL health project. Pakistan demographic and health survey: tracking the millennium health development goals. Paksitan:TACMIL health project; 2009.
10. Kullima AA, Kawuwa MB, Audu BM, Geidam AD, Mairiga AG. Trends in maternal mortality in a tertiary institution in northerin Nigeria. Ann afr Med 2009; 8; 221-24.
11. Hussein J, Bell J, Iang MD, Mesko N, Amery J, Graham W. An appraisal of the maternal mortality decline in Nepal. PloS one. 2011 May 26;6(5):198-99.
12. Choudhury ME, Ahmed A, Kalim N, Koblinsky M Causes of materanal mortality decline in Matlab, Bangladesh. Jof health Pop Nutr 2009: 27: 108-23.
13. Iftikhar R, A Study of Maternal Mortality. J.Surg Pak(Int)2009; 14: 176-78.
14. Sami S, Baloch SN. Maternal mortality inBaluchistan. J coll physician surg Pak 2002; 12:468-71.
15. Safdar S, Inam SN, Omair A, Ahmed ST. Maternal health care in rural areas of Pakistan. J Pak Med Assoc 2002; 52: 308-11.
16. Begum S, Aziz un Nisa, Begum I: Analysis of maternal mortality in a tertiary care hospital to determine causes and preventable factors. Ayub Med Coll Abbottabad 2003 15: 49-52.
17. Jabeen M, Gul F, Rehman M. Maternal Mortality Ratio and its cause in a district headquarter hospital of KHYBER PAKHTUNKHWA: Jr Postgra Med Inst. 2005; 19. 377-81.
18. Shah N, Hussain N, Shoaib R, Gillani R, Khan HN.Socio-demographic characteristics and he threedelays of maternal mortality. J Coll physician surgPak 2009, 19: 95-98.
19. Spelke B, Zertuche AD, Rochat R. Obstetric Provider Maldistribution: Georgia, USA, 2011. Matern child health J. 15; 2016.
20. Donati S, Senatore S, Ronconi A. The regionalmaterhnal mortality working group. Maternalmortality in Italy: a record linkage study. BJOG 2011;118: 872-79.
21. Confidential inquiry into maternal and child health. Saving mothers lives 2013-2015. London: CEMACH; 2016.
22. Khan KS, Wojdyla D, Say L, Gulmezoglu AM, van Look PF, WHO analysis of causes of maternal death; a systematic review. Lancet 2006, 367:1066-74.
23. Goffman D, Nathan L, Chazotte C. Obstetric hemorrhage: A global review. Semin Perinatol. 2016; 40 (2): 96-8.
24. Mwaniki MK, Baya EJ, Mwangi-powell F, Sidebotham P. Tweaking the model for understanding and preventing maternal and neonatal morbidity and mortality in low income countries: BMC pregnancy childbirth. 25 Jan 2016; 16(1): 14-17.
25. Nisar N, Sohoo NA, Maternal mortality in rural community: A challenge for achieving Millennium Development Goal. J Pak Med Assoc 2010;60:20-24.
26. Sami S, Baloch SN. Maternal Morality in Balochistan: A challenge for the obstetricians. J Coll Physicians Surg Pak 2002;12:468–71.
27. Okusanya, BO. Okogbo, FO. Momoh, MM. Okogbenin, SA; Abebe, JO. Maternal mortality and delay: socio demographic characteristics of maternal deaths with delay in Irrua, Nigeria. Niger J Med. 2007; 16: 38-41.
28. Milne L, Van Teijlingen E, Hundley V. et al. Staff perspectives of barriers to women accessing birthing services in Nepal: BMC pregnancy childbirth. 2 Jul 2015; 15: 142-47.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Iqbal M: Substantial contribution to the concept and designed analysis and interpretation of data drafting the article.

Muhammad Z: Data analysis and interpretation of data regarding neonatal outcome drafting the article and revising critically

Akhtar Z: Drafting the article and its critical analysis

Naz T: Final Proof reading of the article and its final approval

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.