REVIEW

SHORT REVIEW OF FOURTEEN YEARS MATERNAL MORTALITY IN ACHIEVING MDG5 IN UKMMC

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ABSTRACT

Worldwide maternal mortality rate had reduced tremendously including Malaysia. At the 2000 Millenium Summit, eight Millenium Development Goals (MDGs) were established with target for the year 2015. Three years remained until the dateline to achieve MDG5, which comprised of two targets and one being reducing the maternal mortality ratio by 75%. This review compared the trend of maternal mortality and its causes in our centre to the national data. The national data had shown a reduction from 44 to 27.6 in 100 000 live births in1991 and 2008 respectively. The subsequent rate had stabilized for the past seven years. In contrast the UKM Medical Centre (UKMMC) data in the past 15 years had not been stable. The target of MDG5 seemed to be achievable by our country but may require longer time as we have yet to find ways to overcome medical care inadequacy in remote areas.

Keywords: maternal mortality, UKMMC, MDG5, mortality ratio

INTRODUCTION

Maternal mortality is defined by the World Health Organization (WHO) as the death of a woman while pregnant or within 42 days of the termination of pregnancy[1]. This is irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management. Worldwide women still die from pregnancy or childbirth complications every minute. The number of deaths showed apparent difference between developing and developed countries. Maternal mortality ratio in developed and developing countries were 16 and 240 in 100 000 live births respectively[2].

The Millenium Development Goal (MDG) was officially established in 2000 by the United Nations. The MDG5 had two targets: to reduce the maternal mortality ratio by three quarters between 1990 and 2015 and achieving universal access to reproductive health by 2015. Ten countries had succeeded in achieving MDG5 by 2010. They are Estonia (95%), Maldives (93%), Belarus (88%), Romania (84%), Bhutan (82%), Equatorial Guinea (81%), Islamic Republic of Iran (81%), Lithuania (78%), Nepal (78%) and Viet Nam (76%) [2]. A report in trends of mortality 1990-2010 cause of death[4]. The main cause of death since early 2000 were obstetric stated that there are 50 countries that are making progress but 14 countries have insufficient progress and 11 have no progress which will likely miss the MDG target[2].

In Vietnam, the maternal mortality had declined from 233 in 1990 to 69 in 2009 per 100 000 live births. This was contributed mainly by expanding access to quality reproductive health, maternal and neonatal health and modern contraception. They were also able to improve the provision of quality services to the poor and vulnerable groups[3].

Malaysia had done well in reducing the number of maternal death over the years. The maternal mortality ratio (MMR) had halved between 1957 and 1970. It declined from 280 to 141 per 100,000 live births [4]. Further drop was seen in the 1990's and in 2008 it was reported as 28.9 per 100,000 live births [5]. However, the number seemed to be static with difficulty in achieving the mortality ratio of 11 deaths per 100,000 live births by 2015.

The national trend of maternal mortality had changed along with the reduction of the number. In the early 1990's postpartum hemorrhage was the major

embolism, followed by postpartum hemorrhage and associated medical

disorders[6]. This review is aimed to highlight the maternal mortality trend in our centre and hence hoping to reduce further the preventable causes of death.

METHODS

This is a retrospective study carried out in UKM Medical Centre over a period of 14 years. The records of all maternal deaths from 1997 till 2011 were obtained. The files were traced from the medical record and the maternal mortality reports in the department were scrutinized. The classification went through The International Classification of Diseases and Related Health Problems, tenth revision (ICD-10). Data were analyzed using SPSS version 20.

RESULTS

There were a total of 37 maternal deaths during the period of review. Demographic data were illustrated in figure 1,2 and 3 showing maternal mortality was highest among the Malays (64.9%) and majority was in the age group of 26-30 years old (27%). Death was higher among multiparous women (62.2%) as compared to nullipara (27.1%).

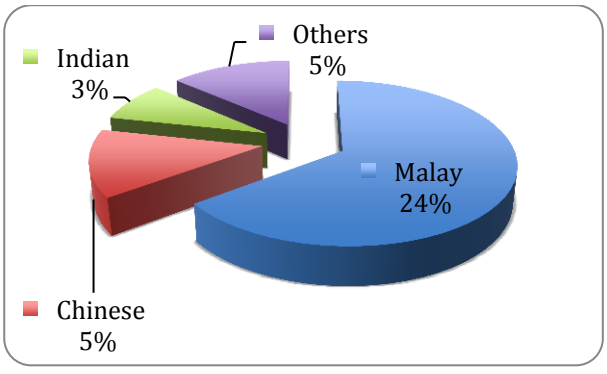

Figure 1: Race distribution of maternal mortality 1997-2011 in UKMMC.

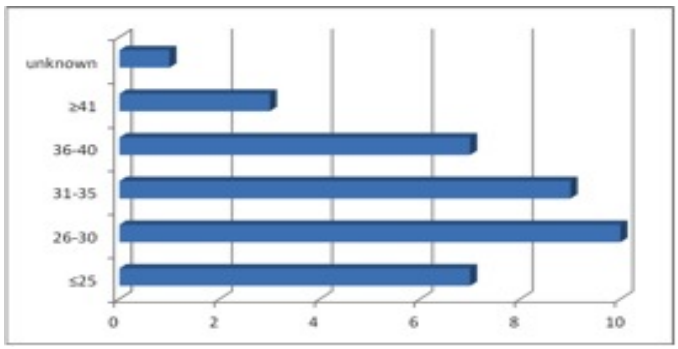

Figure 2: Age group distribution of maternal mortality 1997-2011 in UKMMC

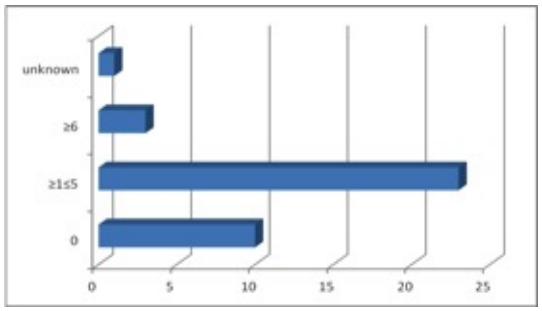

Figure 3: Parity distribution of maternal mortality 1997-2011 in UKMMC.

Trends in maternal mortality ratio

Figure 4 showed the maternal mortality ratio in the country and UKMMC. Maternal mortality in Malaysia had shown a rapid decline over the years. The ratio had halved between 1957 and 1970 and by 1990 it was below 20 per 100,000 live births [4]. In the subsequent years in the 1990s the MMR has hovered around this low level, except for a temporary rise in 1998, 1999 and 2001 [6]. The next following 10 years the ratio had remained stable[5]. There is still no data for 2011 MMR.

Figure 4: Maternal mortality ratio in UKMMC and Malaysia in 1997-2011.

In UKMMC there was no maternal death in the first two years. The subsequent three years (199-2001) the ratio was high but declined in the following four years (2002-2006). In 2006 there was only one fortuitous maternal death. There was a rise again from 2007(43.1) to 2010(46.7). The past 14 years we had not been able to stabilize the maternal mortality ratio.

Classification of maternal death

Maternal death is the death of a pregnant woman or within 42 days of termination of pregnancy, regardless of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes[7].

Maternal death can be classified into four[7]:

- Direct obstetric death is defined as obstetric complication of pregnancy (labour and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. Examples are postpartum haemorrhage and amniotic fluid embolism.

- Indirect death referred to those resulting from previous existing disease that developed at some point in pregnancy and aggravated by physiologic effects of pregnancy. Examples are cardiac disease or SLE in pregnancy.

- Coincidental (fortuitous) death is death during pregnancy, childbirth and the puerperium due to external causes. Examples are motor vehicle accidents and paraquat poisoning.

- Unspecified maternal death is death during pregnancy, childbirth and the puerperium where the underlying cause is unknown or was not determined.

There were a total of 37 maternal deaths for the past 14 years in UKMMC. Majority was due to direct causes and followed by indirect (figure 5). There was a case of maternal death in 1999 where the file had been scraped and unfortunately no information was available in the department annual report. The national data revealed the major contributor to maternal death was direct causes followed by fortuitous and indirect causes.

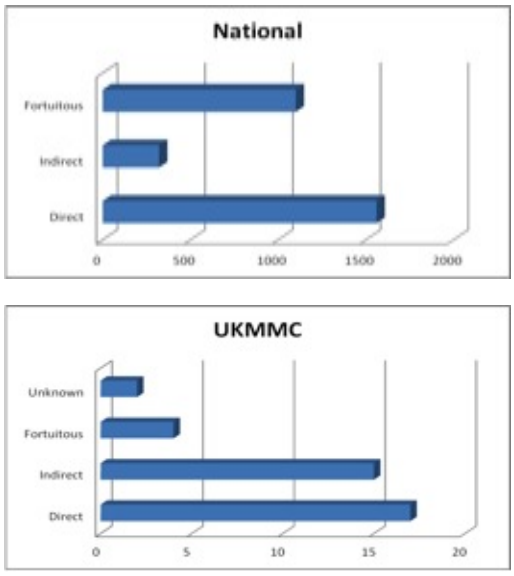

Figure 5: Classification of maternal death in Malaysia (national) and UKMMC 1997-2011.

i. Direct maternal death

In UKMMC (Figure 6) there were 17 cases of direct maternal death. The majority was due to obstetric embolism (amniotic fluid and pulmonary embolism). All of the seven cases were in the third

trimester ranged from 35 to 39 weeks. Two of them had emergency Caesarean section, one elective Caesarean section and one had vacuum assisted delivery. There was an unfortunate patient who had undergone an elective Caesarean section after a long stay in the ward for asymptomatic placenta praevia major. The event occurred after delivery of the baby and post-mortem performed confirmed a massive pulmonary embolism. Usage of prostaglandin and oxytocin was observed in four cases. The clinical presentations were almost similar whereby they experienced shortness of breath prior to cardio-respiratory collapse. Majority occurred following delivery except two cases in which there was intra-uterine death and neonatal death. However, except for one the other cases had no post-mortem to confirm the diagnosis

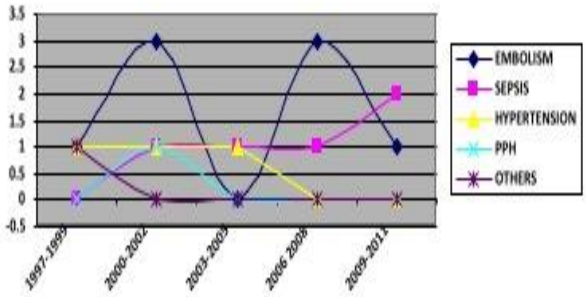

Figure 6: Direct causes of maternal death in UKMMC 1997-2011.

Infection leading to maternal death contributed to five cases. They are all young (19-28 years old) and with low parity (1-3). Two patients were in the early second trimester and two others were in the post-partum period. The first case presented to our centre with vaginal bleeding at 14 weeks of gestation. She was diagnosed to have incomplete miscarriage but developed disseminated intravascular coagulopathy (DIVC) during surgical evacuation. There was history of massage prior to the incident although the couple denied any attempts to abort the pregnancy. The second case came to our centre following an AOR discharge from another centre. She was already in sepsis due to leaking liquor at 17 weeks of gestation. Termination of pregnancy was attempted but the patient deteriorated and later succumbed to sepsis. The blood culture grew E.coli. The other two cases safely delivered at 37 and 38 weeks but developed sepsis post-partum. The causative organisms were group A and B streptococcus. The last case was an Indonesian lady who presented to the Emergency department in septicaemic shock and later succumbed. A post-mortem was performed and revealed evidence of illegal termination of pregnancy.

There were three cases of death due to hypertensive disease in pregnancy. Two cases occurred in the post-partum period but for the third one (in 1999) there was no available details except the cause of death being intra-cranial bleed secondary to eclampsia. Both patients were referred from other tertiary centers for ventilator support and they died in our center not long after admission. One of them delivered a live birth and the other had an intra-uterine death. They are young aged 24 and 27 but they are both multiparous women.

The only case of acute fatty liver in 1999 was diagnosed in a Japanese woman who was in Malaysia following her husband a university student. She presented late to our centre despite being referred twice for jaundice in pregnancy at 32 weeks of gestation. There was also a case of massive post-partum haemorrhage in 2001 in a patient with major placenta praevia. The patient had undergone an elective caesarean section at 37 weeks with unsuspected morbidly adherent placenta. Intra-operatively there was poor back-up from the blood bank causing a delay in resuscitation of the patient.

The national data was not available for 2009 till 2011.Unpublished data from 1997 to 2008 (Figure 7) showed the changing trend in obstetric embolism as the main cause of death. In 1997-1999 it was the fourth leading cause but for the

following eight years it had become the main cause of death among women in our country. Postpartum haemorrhage was still a major contributor during the review period. Hypertensive disease in pregnancy could be seen steadily declining and remained relatively stable.

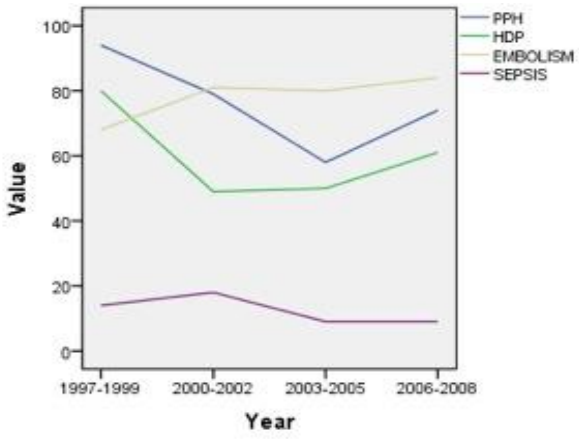

Figure 7: Direct causes of death in Malaysia 1997-2008.

i. Indirect maternal death

There were a total of 10 indirect maternal deaths. The two major contributors in UKMMC were infection (n=7) and cardiac disease (n=3) (figure 8). Three of the cases (30%) were due to dengue haemorrhagic fever and one case died from H1N1 infection. Three other cases had succumbed to sepsis and were also associated with medical illness i.e diabetes, chronic rheumatic heart disease and SLE. The last was a diabetic patient with infected brannula site. She came four days later in septicaemic shock and the blood culture grew *Staphylococcus aureus* which originated from the wound. All of them were Malaysians. The gestation ranged from 13 to 34 weeks. Four had miscarriages, one intra-uterine death and one neonatal death with only one live birth.

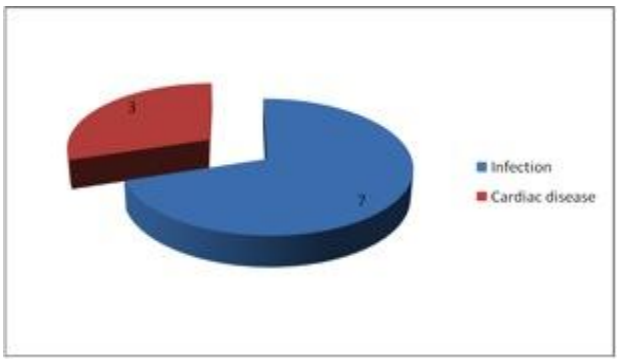

Figure 8: Causes of indirect maternal death in UKMMC 1997-2011.

Heart disease in pregnancy was the second commonest (30%) cause of death and all of them had septal defects with associated pulmonary hypertension. They are aged 27-34 with low parity (1-4) and all were in the third trimester (32-37 weeks). Two of them had undergone caesarean section and there was one fresh stillbirth delivered vaginally at 32 weeks of gestation. Only one case was referred late from a private obstetrician where else the other two was seen early in the second trimester and one of them was advised for termination of pregnancy but refused.

In the national data 10-25% of deaths were due to medical condition especially heart disease in pregnancy[8] (figure 9). There were no details regarding the type of heart disease mostly encountered.

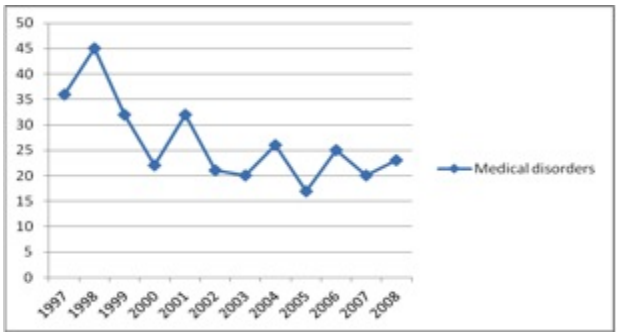

Figure 9: National data on death due to medical causes

i. Fortuitous death

There were 8 deaths in this classification. The principal causes are shown in figure 10. Motor vehicle accidents contributed to two deaths. Both of the cases were in their third trimester (37 and 38 weeks

gestation) and both fetuses died in utero. The others were paraquat poisoning for suicidal attempt and septicemia secondary to infected burn wound. There was a case of AIDS in a 19 year old girl who had undergone illegal termination of pregnancy 14 days prior to presentation. She presented with shortness of breath and finally died from clinically diagnosis of severe pneumonitis. Two patients died from malignancy. One of them was diagnosed of stomach malignancy only during the pregnancy as she presented with difficulty in swallowing. She was delivered prematurely at 34 weeks and the baby survived. She died soon after. The other patient was diagnosed of malignant melanoma but refused any treatment and got pregnant. She was admitted already in the advance stage of the disease at 20 weeks of gestation and died soon after she had a miscarriage. The last patient presented with symptoms and signs of intracranial bleed in the post-partum period. A CT scan showed a ruptured arterio-venous malformation.

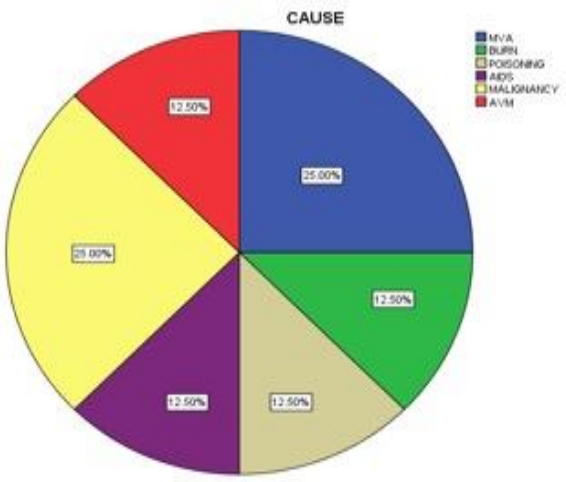

Figure 10: Causes of fortuitous death in UKMMC 1997-2011.

i. Others

There were two cases brought in dead to the emergency department. In 2005 the patient's death had no details available except for the department census. No diagnosis was also stated in regards to the cause of death. In 2009 another patient was found unconscious at home. On arrival to the hospital she was unable to be revived. A post-mortem was performed but unfortunately there was no written report on the findings and the cause of death. Therefore both cases were classified as unknown cause of death.

DISCUSSION

This 14 years review focused on the trend of maternal deaths in UKMMC and the ratio as compared to the national data. The number of maternal deaths in Malaysia seemed to be static for the past seven years. In contrast, maternal mortality in UKMMC still varied with the last three years showing increasing trend. We are left with another 2 years to achieve MDG 5 target of 11 deaths per 100 000 live births.

The main four leading causes of direct maternal death were amniotic fluid embolism, infection, hypertensive disease and pulmonary embolism. Unfortunately, amniotic fluid embolism is extremely difficult to anticipate and hence to prevent despite the precautions taken. We are still struggling in trying to improve the methods of prevention and early detection. Steps to reduce pulmonary embolism need to include identification of patients at risk and subsequently commencement of low molecular weight heparin. In most of the cases diagnosis was made only based on the clinical presentation. It is extremely important for a post mortem to be performed in order to establish the diagnosis. Therefore, a standard operative procedure had been established to ensure a post-mortem is consented either from the family members or via a police report. This is carried out for any maternal deaths without clear diagnosis of the cause of death. Nationwide the problem of getting a post-mortem is also present. There is a vital need to change the policies in every hospital, as this will

aid us in confirmation of the cause of death.

Despite being in a tertiary centre infection was still a major contributor. This is worrying as it is preventable and curable if detected early. Steps have to be taken to ensure that patients with risks of infection should be detected early, monitored closely and treated aggressively. Dengue is a serious public health threat in Malaysia. Unfortunately, we are still unsuccessful in curbing this problem. In addition to this, the H1N1 viral infection was also on the rise during this review. The awareness of these problems needed to be heightened among patients and physicians. However, in immune-compromised patients this is rather difficult to manage despite a combined care with the physician.

Postpartum haemorrhage was the least contributor in UKMMC. Similar trend could be seen in hypertensive disease in pregnancy. Aggressive management had been shown to lower the number of eclampsia or HELLP (haemolysis, elevated liver enzyme and low platelet) syndrome leading to maternal deaths. This is aided by adherence to the protocols outlined in the management of such cases that are available in the department. Patients with massive blood loss and severe complications of hypertensive disorders that did not lead to death were included into a near- miss audit. It is held regularly once or twice a month. The audit is aimed to improve the quality of care.

Indirect causes such as heart disease is still a significant contributor as there is lack of appropriate attention from the obstetricians and cardiologists. Patients with heart disease in the reproductive age group are frequently not counseled regarding contraception. Most physicians overlooked the social part of a patient and hence failure to find out the future reproductive plans. If a patient has been identified of her future plans for pregnancy, they could have been referred early to the obstetricians and a joint care will ensure a good plan of management. Patients with low education level failed to understand and appreciate the severity of the health problem. In view of this a combined cardio clinic had been started consisting of an obstetrician and cardiologist. Apart from monitoring the progress of the disease, this is also a valuable session to discuss and convince patients on the importance and most suitable method of contraception.

In the years to come we hope to bring down the national maternal mortality rate to 11 deaths per 100 000 live births. Every hospital plays an important role by aiming to do the same. Although it is difficult to prevent the occurrence of amniotic fluid and pulmonary embolism, there is still a role to identify the high-risk patients and managed accordingly. Hypertensive disease in pregnancy had been aggressively and well managed together with postpartum haemorrhage. However, we do notice that there were many near-miss cases involving these two common problems. Data for near-miss had been collected in our centre in hope to reduce the rate of postpartum haemorrhage and hypertensive disease with complications. We still hope by 2015 we are able to achieve the fifth Millenium Development Goal (MDG5).

CONCLUSION

Maternal death in UKMMC still varied throughout the 14 years review. The trend did not seem to change and the major contributor was obstetric embolism followed by infection. There is still room for improvement. Perhaps it is not too late to re-strategize maternal care in order to achieve MDG5.

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