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## A review of maternal mortality in Malaysia

Hematram Yadav

**Abstract:** There has been a significant decline in maternal mortality from 540 per 100,000 live births in 1957 to 28 per 100,000 in 2010. This decline is due to several factors. Firstly the introduction of the rural health infrastructure which is mainly constructing health centres and midwife clinics for the rural population. This provided the accessibility and availability of primary health care and specially, antenatal care for the women. This also helped to increase the antenatal coverage for the women to 98% in 2010 and it increased the average number of antenatal visits per women from 6 in 1980 to 12 visits in 2010 for pregnant women. Along with the introduction of health centres, another main feature was the introduction of specific programmes to address the needs of the women and children. In the 1950s the introduction of Maternal and Child Health (MCH) programme was an important step. Later in the late 1970s there was the introduction of the High Risk Approach in MCH care and Safe Motherhood in the 1980s. In 1990, an important step was the introduction of the Confidential Enquiry into Maternal Deaths (CEMD). Another significant factor in the reduction is the identification of high risk mothers and this is being done by the introduction of the colour coding system in the health centres. Other factors include the increase in the number of safe deliveries by skilled personnel and the reduction in the number of deliveries by the Traditional Birth Attendants (TBAs). The reduction in fertility rate from 6.3 in 1960 to 3.3 in 2010 has been another important factor. To achieve the 2015 Millennium Development Goals (MDG) to further reduce maternal deaths by 50%, more needs to be done especially to identify maternal deaths that are missed by omission or misclassification and also to capture the late maternal deaths.

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**Keywords:** *Maternal mortality, Risk Approach in MCH Care, Confidential Enquiry, Malaysia*

### Introduction

According to the World health Organization (WHO), “A maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.”<sup>1</sup> It is estimated that there are about 529,000 maternal deaths worldwide with an average maternal mortality ratio of 400 per 100,000 live births, and majority (99%) of these deaths occur in developing countries and the vast majority of these deaths are preventable. For every woman who dies from obstetric complications, approximately 30 more suffer injuries, infection and disabilities.<sup>2</sup> Global initiatives to intensify maternal mortality reduction began with Safe Motherhood initiative in 1987 which was a response to growing recognition that primary health care programmes in many countries were not focused to maternal health. In 1994 the International Conference on Population and Development (ICPD) strengthened international commitment to reproductive health. The focus on maternal mortality was further strengthened when maternal mortality was made one of the eight goals of the Millennium Development Goals (MDG). The target for the MDG 5 is to reduce maternal mortality ratio (MMR) to three quarters from 1990 to 2015.<sup>3</sup> Despite longstanding international commitments to reducing maternal mortality, so far progress has been disappointing. At the Millennium Summit in 2000, States resolved to reduce maternal mortality by three quarters by the year 2015. In recent years, there has been increased recognition that reducing maternal mortality is not just an issue of development, but also an issue of human rights. Preventable maternal mortality occurs where there is a failure to give effect to the rights of women to health, equality and non-discrimination. Preventable maternal mortality also often represents a violation of a woman’s right to life and that maternal mortality and morbidity rates are often indicative of inequalities between men and women in their enjoyment

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of the right to the highest attainable standard of health. In Malaysia there has been a significant decline in maternal mortality<sup>4,5</sup> from 1957 to 2010 and this has been due to the introduction of the various strategies and the development of health services in the country. The objective of this paper is to review the various programmes and strategies for the reduction of maternal mortality during this period.

### Malaysian Situation

The main public health provider in Malaysia that provides primary care, secondary care and tertiary care through various types of health facilities (such as general hospitals, district hospitals and health clinics) is the Ministry of Health. There were 122 MOH hospitals (with a total of 30,021 beds), 6 special medical institutions (with 4,740 beds), 809 health clinics, 1,919 rural clinics, 89 maternal and child health clinics, and 146 mobile clinics in 2005. The fundamental principle of the Malaysian health care system is that accessibility to health care. Malaysia was ranked at 49 from 191 WHO member countries in the World Health Report 2000 which assessed the overall health system performance against three objectives of good health, responsiveness and fair financial contribution.<sup>4,5</sup>

There has been a significant decline in maternal mortality in Malaysia from 1950 to year 2010 (Figure 1). It has declined from 540 per 100,000 live births to 28 per 100,000. The decline in maternal mortality has been due to several factors including the introduction of the new programmes. From 1955 to 1975 the drop has been significant (78.6%) and this is mainly due to the introduction of the Maternal and Child Health programme (MCH) introduced by the Ministry of Health in the health centres and midwife clinics. In addition to this, with the introduction of the High Risk Approach in MCH care programme in 1978 in all the health centres in the country, there was a further drop of maternal mortality by about 50% from 1978 to 1990. From 1990 to 2010 with the introduction of the Confidential Enquiry into Maternal Deaths (CEMD)

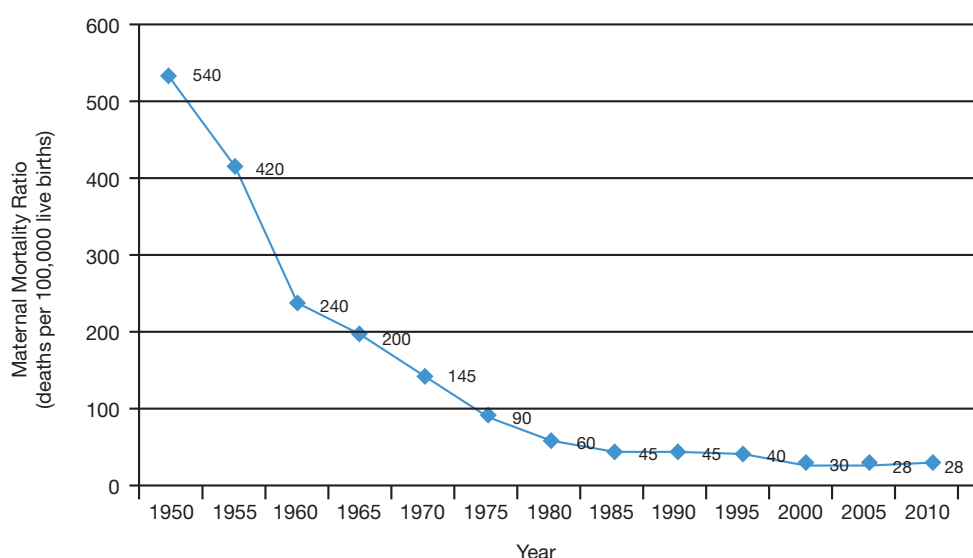
there was a further drop of 37%. maternal deaths. The WHO introduced the Safe Motherhood concept in 1987 but this was incorporated to the existing MCH programme in the country. Several studies have shown the causes of maternal mortality over the years. In a 5-year study (1976-1980) in Krian District of Perak<sup>6</sup> it was found that majority of the maternal deaths were Malays (91.4%) from the rural areas with low socio-economic income. Similar findings were found in another study.<sup>7</sup>

The main cause of maternal death was post-partum haemorrhage and post-partum haemorrhage with retained placenta (60%) and 41.4 % of these deaths were delivered by Traditional Birth Attendant (TBAs). Thus during the 1950s to 1970s the TBAs played a major role in the deliveries in the rural areas. In another study from 1968 to 1974 in a University hospital it was found that incidence of septic abortions was increasing and that maternal death due to septic abortion was also increasing.<sup>8</sup> The maternal mortality in the government hospitals in 1967-1969 found that hemorrhage continued to be the primary cause of maternal deaths death and toxemia as second followed by infection.<sup>9</sup> In another study the maternal mortality in University Kebangsaan from 1981-1990 was 74 per 100,000 live births and women who were not booked, grand multipara and women of Indian origin were at high risk of maternal death. The commonest causes were hemorrhage, hypertension, embolism, and sepsis.<sup>10</sup> In Hospital Kuala Lumpur a study from 1978-1981 showed that the maternal mortality was 70.54 per 100,000 live births and the mortality among the Malays was twice that of the Chinese or Indians. The major cause of death was toxemia, haemorrhage, embolism and associated medical conditions.<sup>11,12</sup> From 1991-1994 there were 1066 reported maternal deaths and the maternal mortality ratios for the successive years were respectively 44, 48, 46, and 39 per 100,000 live births. In this study<sup>13</sup> the primary cause of maternal deaths were post- partum hemorrhage (24%) hypertensive disease of pregnancy (16%) obstetric

pulmonary embolism (13%) and associated medical conditions about 7%. In this same study it was found that substandard care was identified in 52% of the 721 cases of maternal mortality. Of the 130 cases of substandard care examined in 1993, poor clinical management accounted for 77.6 %; inadequate resuscitation and delayed surgical intervention was 53% and no specialist

consultation and referral was 52%.<sup>13</sup> The investment in MCH in Malaysia was small compared to many countries. Malaysia only invested less than 0.4% of GDP on maternal health through the period of decline<sup>14</sup> as the large majority depended on publicly funded maternal health. Maternal mortality also raised several ethical issues when addressing the unwanted pregnancies.

**Figure 1:** Maternal Mortality Ratio (per 100,000 live births) in Malaysia, 1950 – 2010



**Source:**

- Indra Pathmanathan, Jerker Liljestrand, Jo. M. Martin, et al. *Investing in Maternal Health: Learning from Malaysia and Sri Lanka*. The World Bank, Washington D.C, 2003.
- Division of Family Health Development. *Report on the Confidential Enquiries into Maternal Deaths in Malaysia, 1997 – 2000*. Ministry of Health Malaysia, 2005.
- Division of Family Health Development. *Report on the Confidential Enquiries into Maternal Deaths in Malaysia, 2001 – 2005*. Ministry of Health Malaysia, 2008.

In 2004 the Indians had the highest MMR (38.0 per 100000 live births) followed by the non- Malay Bumiputra (32.7) followed by the Malays (27.1) and the lowest was observed among the Chinese. (12.5). In Table 1 the drop in MMR was highest among the Chinese which was 31.6% followed by the Malays who had a drop of 19.3%. However the Indians and the non- Malay Bumiputra had an increase despite the implementation of the Confidential Enquiry into Maternal Deaths programme during this period.

**Table 1:** Ethnic group specific MMR in Malaysia, 1997 – 2004

Ethnic Group	1997	1998	1999	2000	2001	2002	2003	2004
Malay	33.6	38.5	34.0	29.2	33.5	27.9	28.8	27.1
Chinese	18.3	27.7	12.4	10.4	15.3	13.6	16.4	12.5
Indians	36.7	31.5	31.1	22.8	40.7	36.9	18.6	38.0
Non-Malay Bumiputra	27.4	23.1	39.2	19.0	49.4	30.8	33.4	32.7
Others	21.7	44.8	37.8	56.7	44.9	55.5	93.2	25.2

**Source:**

- Division of Family Health Development. *Report on the Confidential Enquiries into Maternal Deaths in Malaysia, 1997 – 2000*. Ministry of Health Malaysia, 2005.
- Division of Family Health Development. *Report on the Confidential Enquiries into Maternal Deaths in Malaysia, 2001 – 2005*. Ministry of Health Malaysia, 2008.

In Table 2 the MMR was studied between 1997 to 2005. There has been a drop of 39 maternal deaths from 1997 to 2005 (13.2%). The ratio of direct, indirect and fortuitous deaths has also not changed during this period. There was no change in the direct deaths from 1997 (54.4%) to 2005 (55.7%), compared to indirect deaths which were 10.6% in 1997 to 7.0 % in 2005. (33.9% drop) and the fortuitous deaths there was slight increase during this same period from 35% in 1997 to about 37.3% in 2005.

**Table 2:** Classification of all maternal deaths (Citizens and Non-Citizens) in Malaysia, 1997 – 2005

Classification	1997 n (%)	1998 n (%)	1999 n (%)	2000 n (%)	2001 n (%)	2002 n (%)	2003 n (%)	2004 n (%)	2005 n (%)
Direct	160 (54.4)	189 (58.7)	177 (56.4)	150 (56.4)	172 (54.4)	120 (47.8)	123 (52.1)	120 (46.5)	142 (55.7)
Indirect	31 (10.6)	42 (13.0)	38 (12.1)	28 (10.5)	32 (10.1)	25 (10.0)	23 (9.7)	27 (10.5)	18 (7.0)
Fortuitous	103 (35.0)	91 (28.3)	99 (31.5)	88 (33.1)	112 (35.4)	106 (42.2)	90 (38.2)	111 (43.0)	95 (37.3)
<b>Total</b>	<b>294 (100)</b>	<b>322 (100)</b>	<b>314 (100)</b>	<b>266 (100)</b>	<b>316 (100)</b>	<b>251 (100)</b>	<b>236 (100)</b>	<b>258 (100)</b>	<b>255 (100)</b>

**Source:**

- Division of Family Health Development. *Report on the Confidential Enquiries into Maternal Deaths in Malaysia, 1997 – 2000*. Ministry of Health Malaysia, 2005.
- Division of Family Health Development. *Report on the Confidential Enquiries into Maternal Deaths in Malaysia, 2001 – 2005*. Ministry of Health Malaysia, 2008.

## Factors in Reducing Maternal Mortality

### Rapid development of rural health services and improving accessibility to maternal health care

One of the significant factors that helped in the reduction of maternal mortality was the rapid development of the health services after independence in 1957 and also the introduction of specific programmes to reduce maternal mortality in the country. In 1957 there were only 66 hospitals (10 general hospitals and 56 district hospitals) in the country and no health centres.<sup>15</sup> In both the Malaya Development Plans and the Malaysia Development plans a rural health infrastructure was set up for the rural population. This provided immediate access to MCH services to the rural population which was about 75% in 1957. The rural infrastructure plan included the 3-tier system which includes the main health centre, the health sub-centre and the midwife clinics. Later in the 1980s this was changed to the 2-tier system which included the health centres and the community nurse clinics. The objective of the rural health infrastructure was not only to reduce the number of deaths and incidence of disease but also the attainment of optimum health by all the people.<sup>16</sup> According to the MOH by 2010 there were 2833 health clinics in the country with 165 mobile clinics and 131 hospitals and 13 flying doctor stations in East Malaysia.<sup>17</sup> This increase in the health facilities provided accessibility of MCH care. Also the increase in the number of health centres and midwife clinics for the rural population provided preventive, promotive health care to the rural population. The increase in the number of skilled personnel to attend the deliveries also helped to reduce the MMR. One of the other significant findings in the reduction of MMR was the introduction of programmes which focused on maternal and child health care. This included the introduction of the maternal and child health (MCH) care. The newly built health centres provided the antenatal care, intra natal care and post natal care for the women. As shown in Figure 1 the MMR dropped significantly (78.6%) with the introduction of the new Maternal and Child Health Programme. Later in 1978 when the High Risk Approach in MCH was introduced after a pilot study in Krian District in Perak<sup>18</sup>

there was a further reduction of MMR to 50% till 1990. In 1990 the Confidential Enquiry into Maternal Deaths (CEMD) was introduced. This programme further helped to drop the MMR to about 37%. The Safe Motherhood programme was introduced in 1989 in 5 districts to further reduce maternal mortality through a combination of High Risk Approach and Safe Motherhood programme.

One of the main features of the High Risk Approach in MCH Care is the Color Coding System which identifies the high risk mother from the low risk and provides special care for high risk mothers. The development of specific modules (Post- partum hemorrhage, eclampsia, etc.) played an important role in the reduction of MMR. These modules were used in the training of nurses. The referral system was strengthened so that high risk mothers were referred to the higher levels of care in case of emergency.

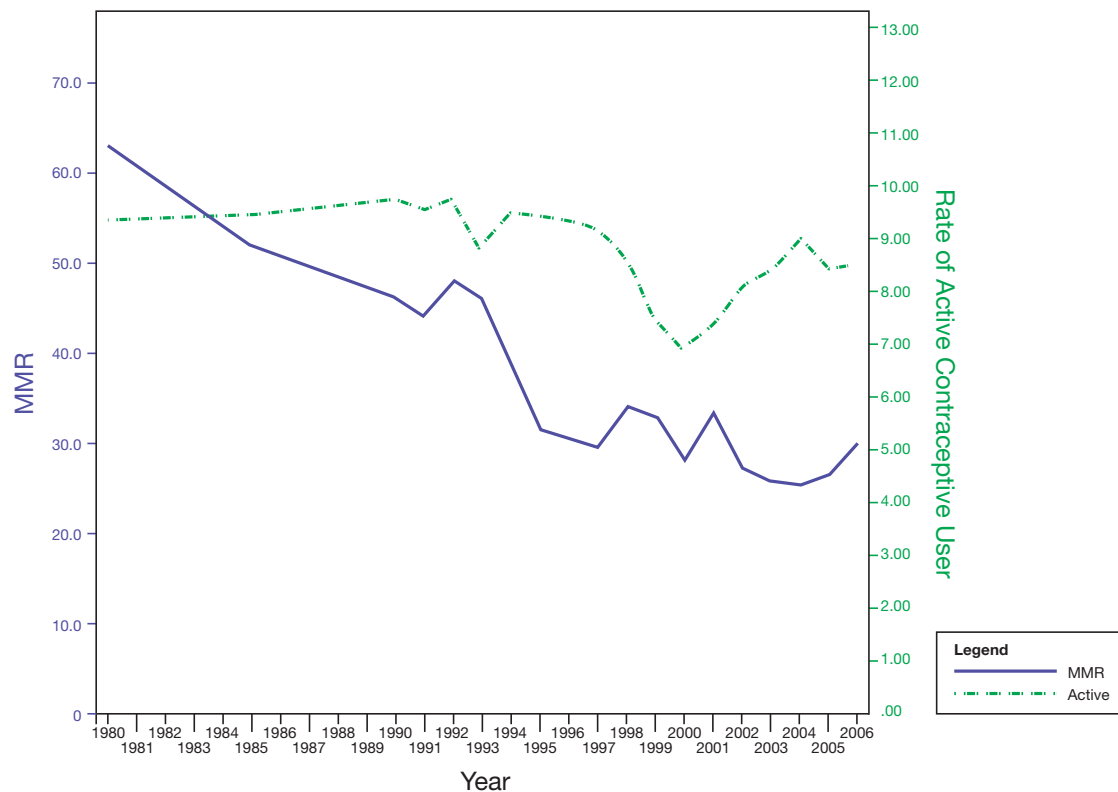
### Improved coverage and reduction in high-risk pregnancies

The coverage of antenatal care had a significant increase over the years. In 1957 there was only about 30% coverage of antenatal care. The number of antenatal visits per mother increased from about 6 visits per mother in 1980s to about 12 visits per mother in 2010. The increase in coverage of antenatal care played an important role in the reduction of MMR. Similarly with the introduction of High Risk Approach in MCH care more high risk mothers were identified and referred to the hospitals.

### Maternal Mortality and Contraceptive Prevalence rate

Maternal Mortality is inversely proportional to the contraceptive prevalence rate; however in the Malaysian context the contraceptive prevalence rate has played only a minor role. In Figure 2 the maternal mortality dropped from 60 per 100,000 to 30 per 100,000 in 2005 (50% drop). During the same period the rate of contraceptive users dropped from about 55 per 1000 to about 53 per 1000 population. This shows that contraceptive use played a little role MMR reduction during that period.

**Figure 2:** Maternal Mortality Ratio (MMR) (per 100,000 live births) with Rate of Active Contraceptive User (per 1,000 population) in Malaysia, 1980 – 2006



**Source:**

- Indra Pathmanathan, Jerker Liljestrand, Jo. M. Martin, et al. *Investing in Maternal Health: Learning from Malaysia and Sri Lanka*. The World Bank, Washington D.C, 2003
- Division of Family Health Development. *Report on the Confidential Enquiries into Maternal Deaths in Malaysia, 1997 – 2000*. Ministry of Health Malaysia, 2005.
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- Division of Family Health Development. *Annual Report (various years)*. Ministry of Health.

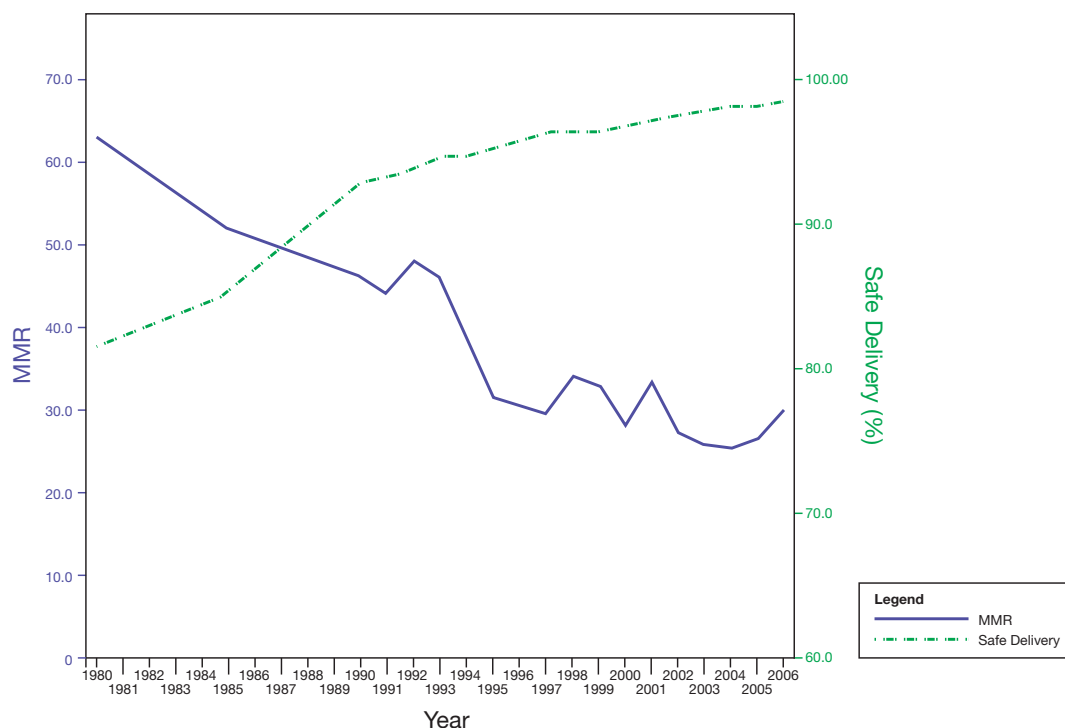


### Safe delivery and maternal mortality

A safe delivery is defined as a delivery that is delivered by a skilled attendant (doctor, midwife, trained nurse). Traditionally the TBA has been the main person for the deliveries in the rural areas from 1960s to 1980s. In a study<sup>6</sup> it was noticed that the number of maternal deaths dropped in Krian district from 1.89 per 1000 live births to 1.09 per 1000 live births from 1976 to 1983 (drop 42.3%). In the same period the percentage of TBA deliveries dropped by 27.8 % and the percentage of hospital deliveries increased by 6.4%. This was mainly due to the identification and training of the TBAs and the increase number of the government midwives. This reduction of MMR can be postulated to an increase in the number of skilled attendants in the area.<sup>18</sup> From 1980 the percentage of safe deliveries increased from 38% to about 98% (50% increase) (Figure 3). During the same

period the MMR dropped from 60 per 100,000 to about 30 per 100,000 (50% drop). This shows that deliveries by a skilled attendant reduced the MMR significantly. A similar finding was observed in another study<sup>9</sup> where there was an increase number of skilled attendants from 1945 to 1995 from 30% to 90% and this resulted in a significant drop in maternal mortality. In another study an analysis of 375 deaths that occurred in 1992 and 1993 showed that maternal mortality ratio was 53 per 100,000 live births for deliveries at home whereas it was 36 per 100,000 live births in government institutions and 21 per 100,000 live births in private institutions.<sup>13</sup> One of the key features of reduction of maternal mortality is the introduction of the trained midwives in the rural areas to attend to antenatal care, intra natal care and post natal care. This helped to introduce the skilled personnel in the rural areas and helped to reduce maternal mortality.<sup>19</sup>

**Figure 3:** Maternal Mortality Ratio (MMR) (per 100,000 live births) with Safe Delivery (%) in Malaysia, 1980 – 2006





**Source:**

- Indra Pathmanathan, Jerker Liljestrand, Jo. M. Martin, et al. *Investing in Maternal Health: Learning from Malaysia and Sri Lanka*. The World Bank, Washington D.C, 2003
- Division of Family Health Development. *Report on the Confidential Enquiries into Maternal Deaths in Malaysia, 1997 – 2000*. Ministry of Health Malaysia, 2005.
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**Reduction in fertility rate and mortality rate**

The total fertility rate (TFR) is an important factor in the reduction of maternal mortality. In Malaysia the TFR was 6.3 in 1960 and is about 3.3 in 2010. No significant decline of fertility rate has been noticed in Malaysia before 1960 and therefore the decline in maternal mortality cannot be attributed to TFR. However after 1960 the falling fertility rates contributed to the decline in maternal mortality. The introduction of the family planning along with delivery of MCH services and the setting up of National Family Planning Board and the Family Planning Associations in the country increased the contraceptive levels and helped in the decline in maternal mortality. Similar findings were noticed Sri Lanka and Nepal.<sup>9</sup> In Nepal fertility declined from 4.6 births per woman in 1994 to 3.1 in 2004 and maternal mortality also showed a decline.

**Poverty and maternal health**

Maternal health care needs to be part of the developmental strategy that includes poverty reduction and other basic services. The decline in poverty has been an important factor that reduced maternal mortality. The poverty has been addressed from 1971 with the introduction of the new Economic Policy (NEP) which was to reduce poverty and restructure society. However lately it was replaced by the National Development policy (NDP) for the hard core poor. With these the poor benefitted from increased household income which provided help to the poor. Poverty has declined from 49.3% in 1970 to about 5.1% in 2002. This significant

decline has improved the health status of the poor and also played a part in the reduction of maternal mortality.<sup>20</sup>

**Discussion**

Malaysia has experienced a significant decline in maternal mortality from 1957 to 2010 and this has been due to several factors. One of the most important factors is the introduction of the rural health infrastructure in Malaysia. This increased the number of health centres and midwife clinics provided access to maternal care for the rural population. This provided the primary health care to the rural population. From few centres before 1957 there are about 2833 clinics and about 165 mobile clinics in the country in 2010.<sup>16</sup> The introduction of health centres not only increased the coverage of ante natal care but also increased the number of skilled personnel over the years. The increase in the number of skilled personnel (doctors, nurses, midwives) over the traditional birth attendants was an important factor in the reduction of maternal mortality. The women started to use the government trained midwives for antenatal care and deliveries and as such maternal mortality declined.<sup>14</sup> From an increase in the number of health centres and midwife clinics, the antenatal coverage increased. from about 30% in 1957 to around 98 % in 2010. Not only was the coverage increased but the average number of antenatal visits per mother also increased to 12. More importantly the cost used during this period was minimal about 0.38% of GDP. Similar findings were noticed in Sri Lanka.<sup>14</sup> The falling fertility played an important

role in the reduction of maternal mortality. The total fertility rate declined from about 6.3 in 1960 to about 3.3 in 2010. Provision of access and removal of barriers and the use of skilled birth attendants has been the key to reduction of maternal mortality.<sup>21</sup> It included the introduction of trained midwives and the phasing out of the TBAs. It also meant the monitoring of the maternal deaths addressing critical gaps in the health system and reducing the disparities between the rich and the poor.

Along with the introduction of health centres and midwife clinics, the other major factor has been the implementing of programmes which addressed the health of the women. Immediately after independence the introduction of the Maternal and Child Health programme (MCH) to provide the promotive and preventive care for the urban and rural played a major role. This was a good strategy as at that time about 70% of the population consisted of women and children. The MCH programme increased the coverage and the average number of antenatal visits. Later in 1978 there the introduction of High Risk approach in MCH care which was mainly to identify the high risk mothers and provide special care for them in hospitals or health centres. This programme introduced the colour coding system which identifies the high risk mothers. This system is in place in all the health centres and community clinics today.

Although there has been a significant decline in maternal mortality in Malaysia more needs to be done to achieve the Millennium Development Goals (MDG) by 2015. There is a need to review and include all those deaths that are missed by omission, misclassification of deaths and deaths that are ill defined in the hospitals. In one study it was suggested in the paper that MOH also needs to record all the late maternal deaths (ICD 10) and see whether some of these are actually direct causes or indirect causes of death.<sup>22</sup> The main problem of maternal mortality measurement is the issue of the time of death and the second is the cause of death. The Centre for Disease Control (CDC) reported that 29% of the maternal deaths occurred after the 42 days as

defined by WHO. ICD 10 has included the 'late maternal death' category which captures maternal deaths till after 42 days but less than 1 year. We do not have data on how many maternal deaths happen after 42 days in Malaysia. Secondly the issue of classification of maternal deaths; are accidental deaths really accidental? We capture the maternal mortality ratio although it is sometimes synonymously used with maternal mortality rate. In many countries there is a move towards measuring the life time risk of women. In recent years, there has been a discussion of maternal mortality as a human rights issue. This is enshrined in the human rights treaties which include the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), and the International Covenant on Economic, Social and Cultural Rights (ICESCR).

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