

Maternal Death Review (MDR)
in Myanmar
(2013)

Maternal and Reproductive Health Division
Department of Health

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Abbreviations

AMW	---	Auxiliary Midwife
BEmOC	---	Basic Emergency Obstetric Care
CEMD	---	Confidential Enquiry into Maternal Deaths
CEmOC	---	Comprehensive Emergency Obstetric care
COIA	---	Commission on Information and Accountability (under the GSWCH)
CRVS	---	Civil Registration and Vital Statistics
CSO	---	Central Statistical Organisation
CRVS	---	Civi Registration and Vital Statistics
DOH	---	Department of health (in the MOH)
EmOC	---	Emergency Obstetric Care
GDP	---	Gross Domestic Product
GAVI	---	Global Alliance for Vaccine Initiative
GFR	---	General Fertility Rate
GSCH	---	Global Strategy for Women’s and Children’s Health (of the UN)
HEF	----	Health Equity Fund
HMIS	---	Health Management Information System
HSS	---	Health System Strengthening
LHV	---	Lady Health visitor
MCH	---	Maternal and Child Health
MHVS	---	Maternal and Child health Voucher Scheme
MMEIG	---	Maternal Mortality Estimation Inter-agency Group (of the UN)
MOH	---	Ministry of Health
MDG	---	Millennium Development Goal
MDR	---	Maternal Death Review
MDSR	---	Maternal Death Surveillance and Response
PPH	---	Post-partum Haemorrhage
PIH	---	Pregnancy Induced Hypertension
RAMOS	---	Reproductive Age Mortality Studies
RMNCAH	---	Reproductive, maternal, newborn, Child and Adolescent Health
SAB	---	Skilled Attendance at Birth
SAMM	---	Severe Acute Maternal Morbidity
SEARO	---	South East Asia Regional Office (of the WHO)
TBA	---	Traditional Birth Attendant
UN	---	United Nations
UNOPS	---	United Nations Office for Project Services
WHO	---	World Health Organisation

Executive summary

The Maternal Mortality Ratio (MMR) in Myanmar has steadily declined, and the country is making progress to achieve MDG5. The MMR is a quantitative measure, a number and in itself is not sufficient for designing interventions and strategies to reduce maternal deaths. The Maternal Death Review (MDR) aims to “go beyond these numbers” to understand the circumstances surrounding every maternal death to enable remedial measures to be taken to prevent similar deaths in future. Maternal death review began in Myanmar in 2005 as a pilot project but has since then expanded nationwide. Brief reports were written but not published for 2011 and 2012. This report on the analysis of 863 maternal deaths in 2013 that were reviewed by the MDR process is the first comprehensive report.

The number of maternal deaths reported and reviewed annually has increased steadily since 2011. The analysis uses comparison of proportions except for State/Region for which MMR can be obtained. Seven Regions/States have MMR higher than the national average – Magwe, Ayeyarwaddy, Chin, Shan (South), Yangon, Bago and Kachin.

There is no association of risk of maternal death with education level of the deceased. In terms of occupation, the highest number is among housewives, farmers and manual/odd job worker. 80% of maternal deaths are in women aged 20 to 39, the age group 15-19 account for 5.6%. More than half of deaths are mothers who already had two to five previous pregnancies, while primigravida mothers account for almost one quarter of deaths. There is no correlation between number of antenatal visits and risk of death; more than two-thirds had 2 or more antenatal visits. In 61% of the deaths, the provider of care before death was a skilled health personnel. Two-thirds of the deaths occurred either during or immediately after childbirth. Almost half of deaths were in the hospital, slightly less than a third died at home, and 15% died on the way to the hospital. There is little correlation between distance to a health facility and risk of dying, except the distance to the nearest hospital. There is also no correlation between time needed to travel to the facility with the risk of dying. Only a small number had no delay in seeking, accessing or receiving care; the first delay was the commonest (47%), the second delay was in a much smaller number (only 5%, this unexpected finding needs explanation); and the third delay in 10%. In discussing these findings, the report attempts to further analyse them, and to seek possible explanations for the profile.

The leading three causes (PPH, PIH and abortion) contribute to two-thirds of pregnancy related deaths. Medical conditions account for 9% of deaths. If the incidental deaths are excluded, these three causes account for three-quarters of maternal deaths. The report highlights and elaborates on the difficulties in the accuracy of classification and attribution of cause of death.

There are strengths that had contributed to the encouraging progress made. These include effective leadership especially its role in scaling up of the pilot to nationwide implementation; skills, commitment and motivation of health staff at all levels; the formal evaluation of the MDR carried out by SEARO in 2011; the development and implementation of the COIA country roadmap; and coordination among stakeholders. Weaknesses are largely in gaps in information with lack of information on population at risk (livebirths); circumstances

surrounding the death; and issues related to classification and attribution of cause of death. In some remote areas, there is still under-reporting of maternal deaths.

A community-based MDR is conducted by verbal autopsy or interview of members of the family of the deceased and others. For this, the skill of the interviewer is critical, including filling in the forms adequately and accurately. There were some inadequacies in the filling up of the MDR from by the staff conducting the review.

These findings form the basis for the recommendations for the way forward – to sustain current progress; optimize the strengths; address the weaknesses to improve the MDR process; conduct a more comprehensive MDR; respond appropriately to the findings of MDR; implement COIA roadmap especially to move from MDR to MDSR; and finally to use MDSR as an approach to end preventable maternal deaths, since it has been recognized globally that “elimination” of maternal deaths is a possibility.

1. INTRODUCTION

Maternal death review (MDR) has been implemented in Myanmar since 2005 as a pilot project in 30 townships, and recently this was expanded to the whole country. The method used is community-based MDR using verbal autopsy. In addition there is a facility-based MDR in a few hospitals. In 2011, Myanmar participated in a five-country study conducted by SEARO to assess the extent of implementation of MDR. Reports of the MDR findings for 2011 and 2012 are available. This current report is for the 863 maternal deaths in 2013 that were reviewed by the MDR process, is the first comprehensive report on the MDR.

2. BACKGROUND

2.1. Getting the right numbers

The maternal mortality ratio (MMR) is the measure that is used to compare maternal health across countries and populations within countries. It is the indicator for MDG5, which requires a three-quarter reduction from 1990 to 2015. Therefore it is important that the MMR is calculated from information that is most reliable, a challenge in almost all countries even in developed countries.

The UN Inter-agency Group for Maternal Mortality Estimation (MMEIG) has been releasing annual reports on MMR estimates, with 1990 as the base year. The latest and seventh report of the MMEIG released in May 2014 gave the MMR trend since 1990 for 189 countries. The MMR cited for Myanmar are - 580 (1990), 470 (1995), 360 (2000), 260 (2005), 200 (2012), 200 (2013). This trend reflects a 65% reduction from 1990 to 2013, and Myanmar is classified as “making progress” in achieving MDG5. It is still short of the target of 75% reduction, which requires an MMR of 145 per 100,000 livebirths in 2015.

The MMEIG uses a complex approach to derive MMR estimates and the number of maternal deaths for countries; the methods used depend on the source of data on maternal deaths for the country, with the “gold standard” being complete vital registration with accurate attribution of the cause of death. In the past and current reports of the MMEIG, Myanmar is classified as one of 89 countries where there is lack of good vital registration but where other types of data are available (these include surveys, censuses, studies such as RAMOS, etc). For this category of countries, the number of maternal deaths and the MMR from these sources are adjusted using a complex statistical model. To allow for a more valid comparison among countries (which differ in their socio development status and risks to maternal death), the model factors in three covariates in three domains – Gross Domestic product (GDP) per capita, a proxy of socio-economic development; General Fertility Rate (GFR), a proxy for risk of exposure to a maternal death; and Skilled Attendance at Birth (SAB) coverage, a proxy for the process and standard of maternal care.

The MMEIG report released in 2012¹ cited the MMR for Myanmar in 2010 as 200 per 100,000 livebirths, and number of maternal deaths as 1,600. In the latest IGME report², released in May 2014, the MMR for Myanmar remained at 200, and the number of deaths was

¹Trends in Maternal Mortality 1990 to 2010 – WHO, UNICEF, UNFPA, World Bank Estimates, WHO 2012

²Trends in Maternal Mortality 1990 to 2013 – WHO, UNICEF, UNFPA, World Bank Estimates, WHO 2014

1,900. It is noteworthy that the number of maternal deaths released by the MOH for 2013 (922) is significantly lower than that estimated by MMEIG, and it is important to explore the reasons for this dramatic reduction.

2.2. Going beyond the numbers - MDR

Even if the MMR is reasonably reliable, it is not adequate for a full understanding of the problem; this quantitative measure does not provide an understanding of the reasons why a maternal death occurs. This understanding will enable the identification of interventions to prevent future deaths. To do this, there is need to “go beyond the numbers” by conducting a maternal death review (MDR).

Sometimes the term “audit” is used instead of “review” but is less popular because it connotes a judgmental exercise with punitive intent, which is what a MDR is NOT supposed to be.

Going beyond the numbers portrays the expression “*every woman who dies a maternal death has a story to tell*” and uncovering this story after her tragic death can help other women to escape from the same fate. In 2004, WHO released the guidelines on MDR, aptly titled “*Beyond The Numbers- Reviewing Maternal Deaths and Complications To Make Pregnancy Safer*” .

The earliest system of MDR, was instituted in the United Kingdom as early as 1928, taking the form of confidential enquiry into maternal deaths (CEMD). This method is now carried out routinely in many countries - Australia, Malaysia, South Africa, Israel, Jamaica, and others. Therein lies the paradox, MDR it is institutionalized in countries with low MMR, and is not carried out in countries with high MMR where it is more needed. In Malaysia CEMD started in 1991 when MMR had already begun to decline appreciably. It must be noted that CEMD and near-miss audit are more advanced and sophisticated methods of MDR. The WHO guide “*Beyond The Numbers- Reviewing Maternal Deaths and Complications To Make Pregnancy Safer*” describes five methods of MDR (i) community-based MDR using verbal autopsy; (ii) facility-based MDR (iii) CEMD (iv) clinical audits usually in hospitals as part of quality assurance, and (v) audits of severe acute maternal morbidity (SAMM) or near-miss cases, conducted where the number of maternal deaths is too small to allow for sufficient lessons to be learned.

2.3. Evolution of MDR in Myanmar

In Myanmar, all deaths including maternal deaths are reported to the Central Statistical Organization (CSO) under the Ministry of Population and Immigration. However the implementation agency is the health department, which means certification of that births and deaths is done by the township medical officers, who submits monthly returns on births and deaths to the CSO and the Regional/state health authority. Since 1996 to the Health Management Information System (HMIS) in the Department of Health Planning, Ministry of

Health also collects data on births and deaths. These systems therefore are the source of data on livebirths and on maternal deaths. The MCH section in Department of Health started maternal death notification from all over the country in 2003, which besides the getting the number of deaths, also collects information on pertinent variables such as place and time of death, type of providers and cause of death.

Of the five methods of MDR, two methods are conducted in Myanmar since 2005 – a community-based MDR in the 30 pilot townships which has now been scaled up nationwide, and a facility-based MDR conducted in the three teaching/university hospitals (Yangon-1, Yangon-2 and Mandalay) and a few other hospitals.

The community-based maternal death audit began as the first pilot in five townships of Sagaing Region, and it included perinatal death review too. In 2009, this was changed into maternal and neonatal death review, and was expanded up to the thirty townships designated as Essential Newborn Care Project townships. The verbal autopsy in the community-based MDR uses a 32-page reporting form which elicits information on socio-demography, medical history, and past and present obstetric history. The community-based MDR also includes a review of the home-based maternity record. In the case of hospital deaths, there are additional processes - review of the patient records, post mortem examination findings, and comments from the hospital doctors and other staff. The filled form is then reported by the township health office to State/Region level and feedback is given to Basic Health Staff. Maternal death review team members from State/Regional level review these forms, make comments and note the actions taken, and forward it to the central level. At the central level, maternal death audit teams review the reported deaths and provide feedback. The meeting of the review team is conducted monthly in Township level, four monthly at state/ Region level and six monthly at central level.

The Regional office for the South East Asia Region of WHO (SEARO) conducted a study in 2011 in five countries on the implementation of MDR. The objectives were to elicit information on the implementation of MDR in the country, document the experiences of the MDR initiatives, recommend strategies for strengthening of MDR, and draw lessons and share the country's experience with each other and with other countries in the Region.

Myanmar was one of the five countries for the study, and the study was conducted in ten of the thirty pilot townships. The study in Myanmar revealed that all the ten townships studied have established the structure and mechanism for MDR. In terms of the processes of the audit, many issues were raised related to the reporting form, which were often in short supply, necessitating the health staff having to make copies at their own costs. Transport to conduct the interview with the family members or members of the community was also a problem. The prescribed timing of audit which is required by policy to be conducted within 7 days of the death has led to unwillingness of the grieving families to give complete information. One major strength of the system cited was the fact that the audit could identify not only the cause of death, but also the contributing factors especially causes of delay in getting care which enables the health providers identify strategies to prevent future deaths. Several actions have been taken,

mostly in improving quality of service based on findings of the MDR, such as conducting health education and staff training. There was positive attitude and appreciation of the MDR by the township supervisory teams who wanted the MDR to continue. The heightened awareness, among health staff and among the community is another feature that portrays the success of the MDR.

Overall, this first well-organised effort for MDR is likely to be only a starting point for Myanmar, and that this will lead to more comprehensive MDR initiatives in future. Several recommendations made based on the findings of the MDR were made, such as - review the reporting format and ensure adequate supply, conduct training and skill building of midwives, strengthen health facilities in terms of adequate equipment, address problems of transport costs, scale up MDR to other townships, and strengthen advocacy for MDR.

2.4. Profile of maternal deaths 2011 and 2012 – findings from the MDR

The writer was provided with a report³ of 211 maternal deaths from January to August 2011, and a power point presentation on 670 maternal deaths in 2012⁴. The deaths were profiled by several socio-demographic and other relevant variables. The writer was also provided with a power-point presentation of the profile of maternal deaths in 2012, from the facility-based MDR at the three teaching/university hospitals⁵.

Besides the distribution of maternal deaths by state/region, the deaths were analysed by maternal age, education and occupation, gravida, the number of antenatal visits and having received tetanus toxoid immunization, residence (urban, rural), distance and travel time to the nearest health centre and hospital, timing of death, place of death, the provider of care at the time/before death, delay in care (using the 3-delay model), and cause of death. There is very little difference between the profile of 2011 and 2012.

One parameter that lacks clarity in these two reports was the cause and classification of deaths. While the causes of direct maternal deaths are clearly assigned (PPH, PIH, sepsis, abortion), there is less clarity on indirect and incidental causes. There was also lack of clarity on the type of delay.

The reports made several recommendations including improving specific aspects of clinical service - such as using misoprostol where oxytocin is not available for managing PPH, making magnesium sulphate available to manage eclampsia, and providing post abortion care. The report also made several general recommendations such as improving competencies of health staff including in case identification and in communications skill, making resources available, conducting more advocacy, and conducting research in specific areas.

As expected, the data from the facility-based MDR in the teaching hospitals shows that the cause of death differs substantially from the community-based MDR, because these tertiary level facilities deal with more severe and referred cases; in fact 6% were brought in dead to the hospital, and 37% died within 24 hours of admission.

³Summary report on community-based maternal death review in Myanmar, 2011, unpublished

⁴Community based maternal death review in Myanmar 2012, power point presentation

⁵Power point presentation provided by Prof Mya Thida, Head of Dept of O&G, Yangon University1

3. PROFILE OF MATERNAL DEATHS 2013

The analysis of the maternal deaths below is incomplete and imperfect because of the weaknesses and gaps in information, which is discussed further in Section 4. The lack of denominator (livebirths) for each variable necessitates the analysis to be limited to the comparison using proportions or percentage distribution, instead of rates, which are more valid for comparison using tests for statistical significance for observed differences. The only variable for which a denominator (livebirths) is available is distribution by region/state. This gap is not unexpected, as number of livebirths by the other variables are seldom, if ever available in the HMIS. Even in countries where MDR is well established, this data is not available. For example, in the report of the CEMD for Malaysia 2006-2008, the analysis for most of the variables is based on percentages and not on rates⁶. Another problem is related to the categories of some variables – for some variables, the categories are different in the 2011, 2012 and 2013 data sets, making comparison by year difficult. There is also lack of information on circumstances surrounding the death. A major problem is the lack of clarity in the causes of death and the classification of the deaths. Because the profiling of maternal deaths by the causes and classification is an extremely useful analysis, the problems related to causes of death are described in detail in Section 4.

3.1. Trend of maternal death review rate 2011 - 2013

In the data provided by the Ministry of Health on maternal deaths for 2011, 2012 and 2013 three numbers are cited – the estimated number of maternal deaths, the number reported, and the number reviewed by the MDR, as shown in TABLE 1, and FIGURE 1.

TABLE 1: Trend of reporting and reviewing of maternal deaths 2011 – 2013

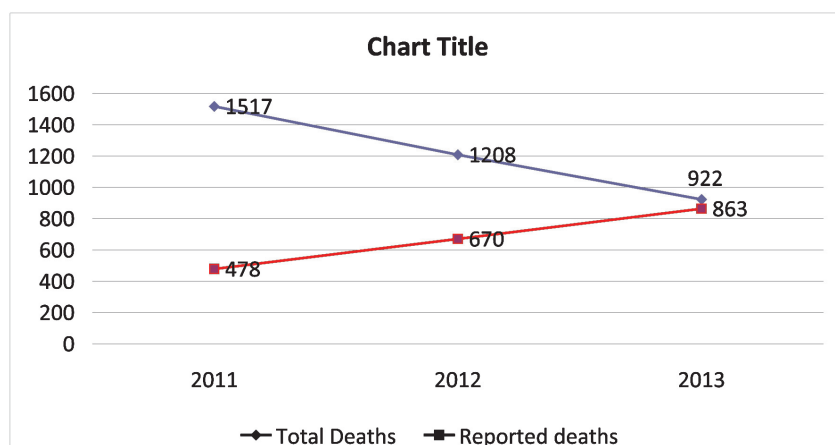
	Number estimated	Number reported	Number (%) reviewed
2011	2,000	1,517	478 (31.5%)
2012	2,000	1,208	670 (55.5%)
2013	1,900 (*)	922	863 (93.6%)

(*) This number was cited by the MMEIG in its latest report⁷

⁶Report of Confidential Enquiry Into maternal Deaths in Malaysia 2006-2008, Ministry of Health Malaysia

⁷Trends in Maternal Mortality 1990 to 2013 – WHO, UNICEF, UNFPA, World Bank Estimates, WHO 2014

FIGURE 1: Trend of reporting and reviewing of maternal deaths 2011 – 2013

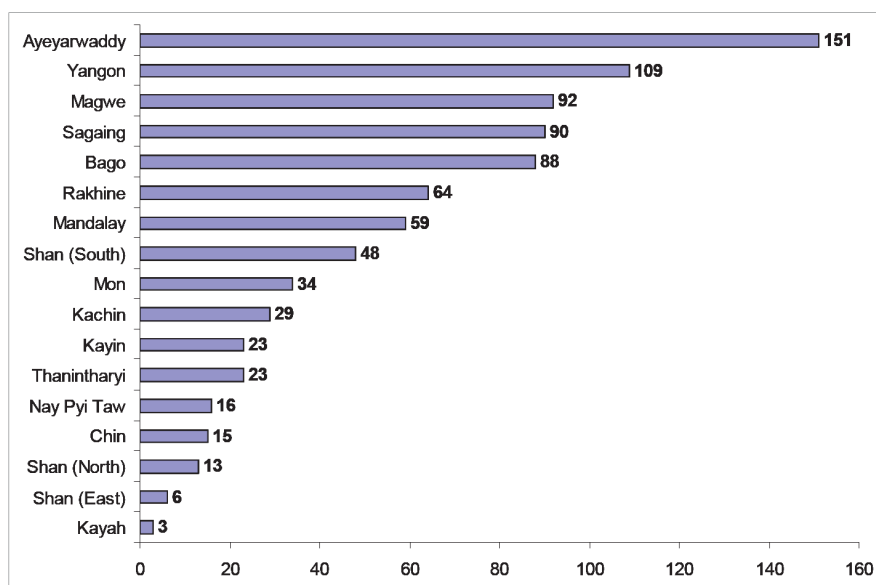


Clearly there is a very encouraging trend in the reduction in maternal deaths, with only 922 deaths in 2013, an all-time low never encountered before. Similarly, there is an equally impressive trend in the number of deaths reviewed especially the increase from 2012 to 2103 (55.5% to 93.6%).

3.2. Distribution of maternal deaths by region/state, and urban-rural

From FIGURE 2, every region and state report maternal deaths in 2013. The highest number, exceeding 100 deaths are reported from Ayeyarwaddy (151) and Yangon (109), followed Magwe, Sagaing and Bago with between 80 and 100 deaths. The lowest figures are from Kayah, Chin and Nay Pyi Taw. Comparing this to 2012, Ayeyarwaddy in that year reported an overwhelmingly large share of maternal deaths, 232 or almost 35% of the 670 deaths, with Sagaing and Yangon a relatively distant second and third, with 69 and 57 deaths respectively. The lowest numbers in 2013 are from Kayah, Rakhine and Chin.

FIGURE 2: Number of maternal deaths, Myanmar 2013, by region/state



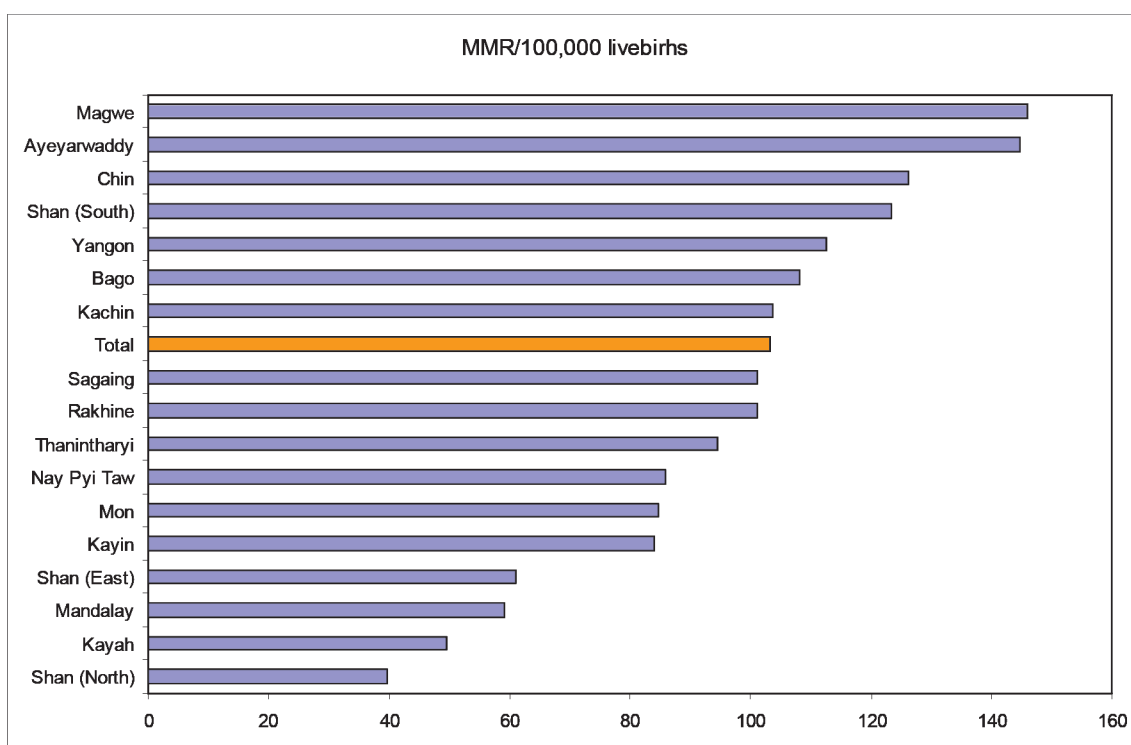
These proportions however do not allow for a valid comparison, since the number of livebirths differs significantly among regions/state and degree of the completeness of reporting. Data on livebirths for regions/states in 2013 is fortunately available, as shown in TABLE 2, and the MMR is shown graphically in FIGURE 3. Seven regions/states have MMR higher than the national figure of 103.3 /100,000 – Magwe, Ayeyarwady, Chin, Shan (South), Yangon, Bago, and Kachin. Two others (Sagaing Region and Rakine State) have MMR of 101, slightly lower than the national MMR. Four (Thaninthary, Nay Pyi Taw, Kayin, and Mon) have MMR between 80 and 100; while the remaining four – Shan (East), Mandalay, Kayah and Shan (North) have relatively lower MMR, ranging from 39.7 to 61.1 per 100,000.

It is observed that the MMR for the whole country is 103.3/100,000 livebirths is lower than the official MMR of 200/100,000 livebirths; the reason for this discrepancy is clear – the numerator – the number of maternal deaths reviewed (922) is much lower than the number (1900) used for the calculation of the official MMR. In fact, if the same livebirths is used a denominator, the MMR would be 227/100,000.

TABLE 2: Maternal Mortality Ratio 2103, by Sate/Region

REGION/STATE	Livebirths	Reported Maternal deaths	MMR/100,000 livebirhs
Magwe	63,061	92	145.9
Ayeyarwaddy	104,348	151	144.8
Chin	11,882	15	126.2
Shan (South)	38,912	48	123.4
Yangon	96,744	109	112.7
Bago	81,411	88	108.1
Kachin	27,954	29	103.7
Sagaing	89,027	90	101.1
Rakhine	63,365	64	101.0
Thanintharyi	24,306	23	94.6
Nay Pyi Taw	18,647	16	85.8
Mon	40,089	34	84.8
Kayin/Karen	27,422	23	83.9
Shan (East)	9,817	6	61.1
Mandalay	99,846	59	59.1
Kayah	6,046	3	49.6
Shan (North)	32,720	13	39.7
Total (national)	835,595	863	103.3

FIGURE 3 : Maternal Mortality Ratio 2103, by Sate/Region



Regions and states would of course have urban and rural populations. In the 2013 deaths, more than three quarters (77.4%) of deaths in 2013 were in women who resided in rural area, and 17.3% were in urban areas. In 2012, the profile was similar (77.7% rural, 22.3% urban). In the absence of livebirths, it is not possible to draw inferences about the difference (if any) in the risk of dying between rural and urban area.

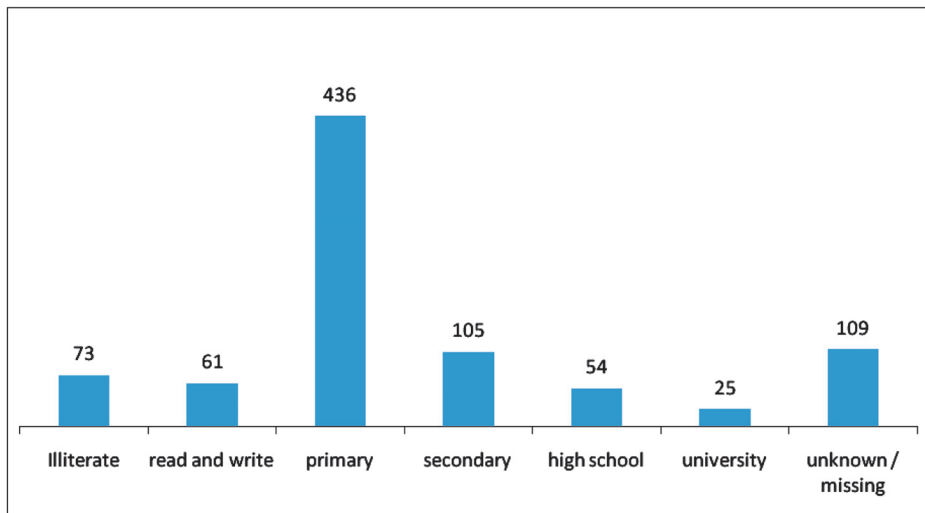
3.3. Socio-economic status (education and occupation)

Socioeconomic factors especially poverty are very strong determinants of maternal health and survival. There is abundant evidence worldwide to correlate maternal death and income; women in the lowest wealth quintile consistently have a higher risk of dying from a maternal death. The global statistic that cites 99% of maternal deaths occur in the lowest-income countries, largely in Sub-Saharan Africa and South Asia underscores this stark reality. Unfortunately the data set for this report has no information on socio-economic status (income or wealth quintiles), but two variables (education and occupation of the deceased) can be used as proxy indicators economic status. More than half (436 or 50.5%) of the deaths are in women with primary education, followed by women with secondary education (105 or 12.2%). Those with tertiary/university education account for only 2.9%. About 15% (134 deaths) are in women who were either illiterate or were able to only read and write. See FIGURE 4.

Although it is not possible to calculate the rate, it is clear that this distribution reflects the distribution of pregnancies/livebirths, suggesting that there is probably no association between education level and risk of maternal death.

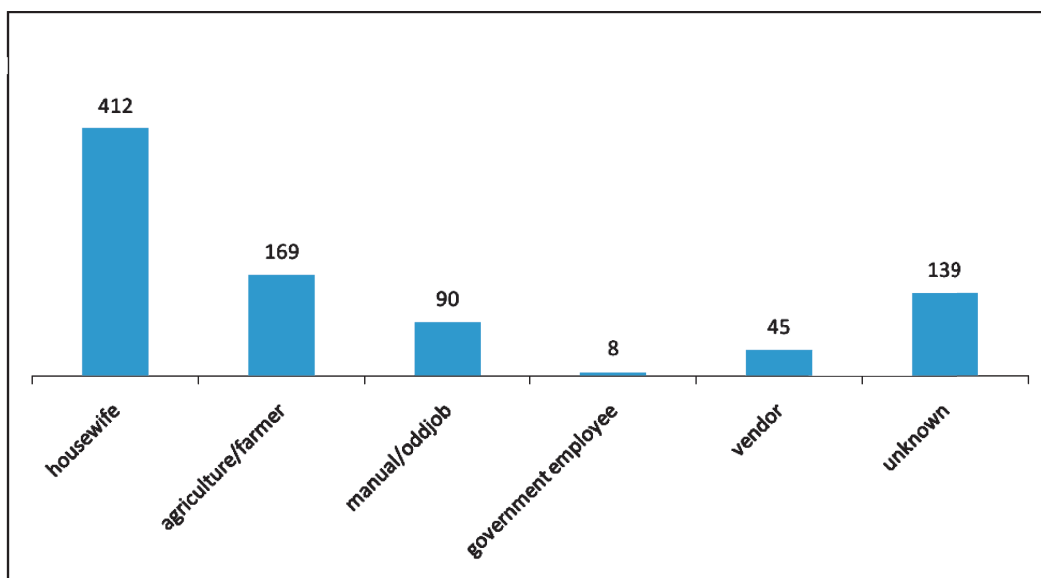
The education profile of the deaths in 2012 was similar, 57.7% were with primary education, 11% with secondary education and 4.9% with tertiary education.

FIGURE 4: Distribution of maternal deaths by education status of deceased



Occupation is also a proxy of socio-economic status. In FIGURE 5, the highest number of deaths are among housewives (412), farmers (169) and manual and odd job worker (90); these three categories jointly account for more than three quarters (77.7%) of the total 863 deaths. In 2012, these three categories accounted for an even higher proportion (90%). Again as for the other variables, this distribution is a reflection of the distribution of the general population of women and of pregnancies and livebirths. The data set does not capture the household income, a more valid measure of economic status, and a proxy for this is income, or if not available, or occupation of the husband.

FIGURE 5: Distribution of maternal deaths by occupation of deceased



3.4. Age and parity of mother

The highest risk of dying from complications of pregnancy and childbirth are at the extremes of age – the very young and the older women after age 40. Therefore of the variables studied, age is perhaps one that has most significance for the derivation of age-specific mortality rates, since the risk of dying is strongly correlated with age. Young girls are not physically and psychologically ready for childbirth and motherhood, and this can lead to fatal outcomes in several ways. Older women especially those who have undergone numerous pregnancies and childbirths, are especially vulnerable. In 2013 of the 863 deaths reported, the distribution by age is shown in FIGURE 6. Almost 80% of maternal deaths are in women aged 20 to 39, the age group with the highest number of pregnancies and childbirths. The age group 15-19 record 48 deaths (5.6%) In the absence of denominator, very little interpretation can be made. Notwithstanding this, it is reasonable to state that the proportion (5.6%) of deaths in those aged 15-19 is an over-representation, underscoring the point that very young women are at extremely high risk of a maternal death. In 2012, this age group accounted for 6.7% of deaths.

FIGURE 6 : Distribution of maternal deaths by age group

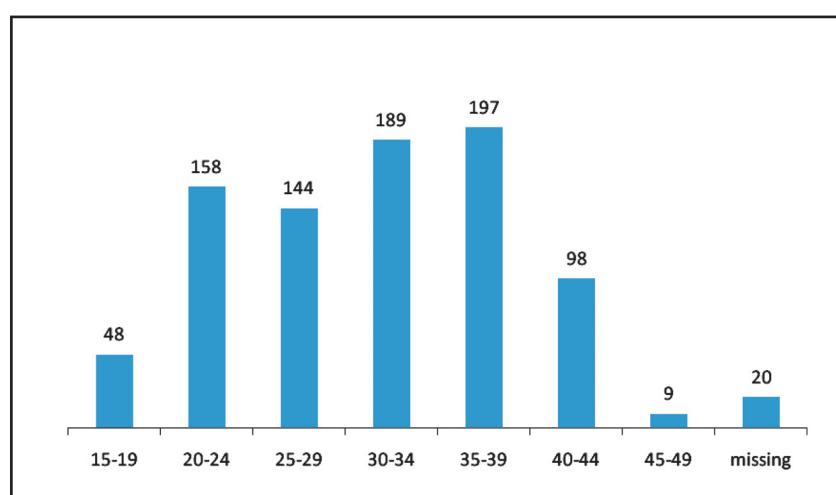
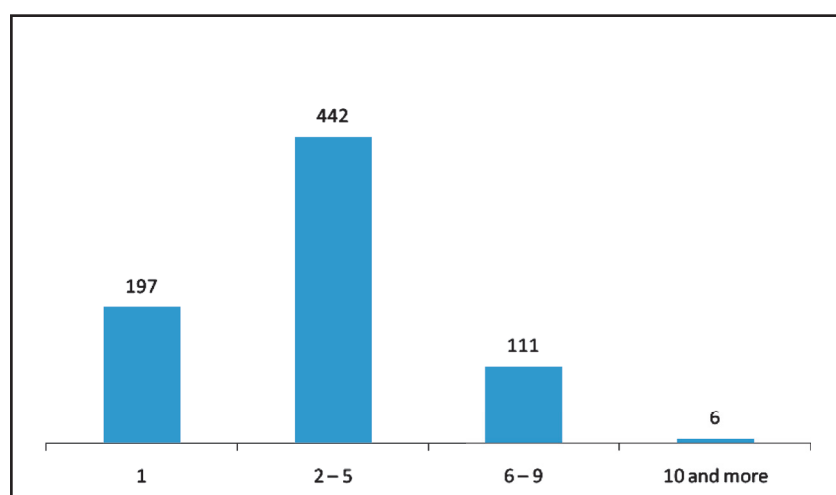


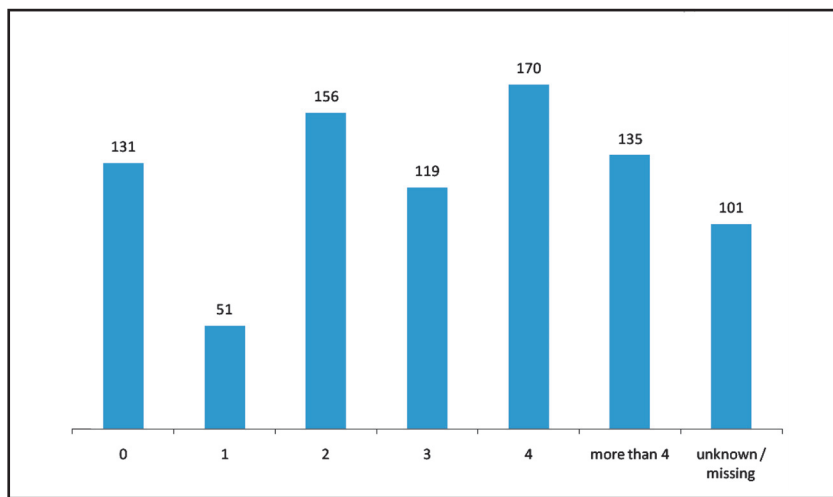
FIGURE 7 : Distribution of maternal deaths by gravida



3.5. Care provided (ANC, first provider, provider before death)

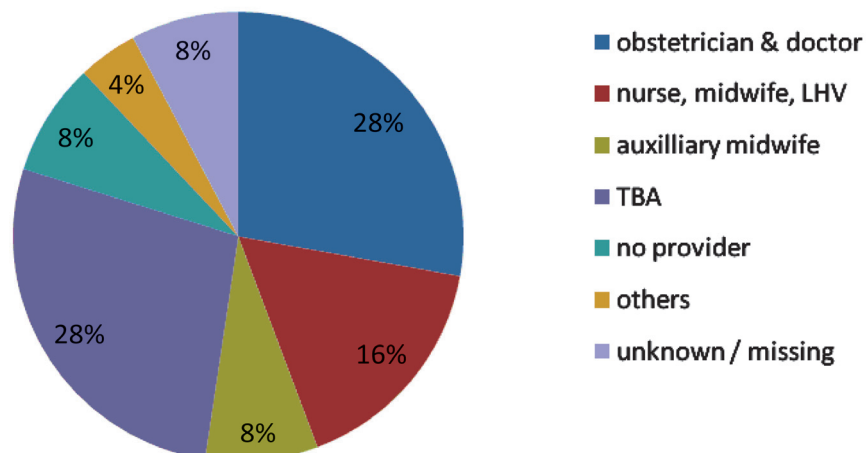
The overall health status and the care provided to the mother before and especially during pregnancy childbirth and the puerperium, has a strong influence on her survival. One of the indicators for MDG 5 is the proportion of mothers who receive at least one antenatal visit and at least four antenatal visits. From FIGURE 8, it is observed that there is no correlation between number of visits and risk of maternal death; more than two-thirds (580 deaths or 67.2% had 2 or more antenatal visits, and 135 or 16% had four or more visits. Only 131 or 15% had no antenatal visit at all, and only 51 or 6% had only one visit. It is noteworthy that if the data is “manipulated” by combining the number for no visit and for one visit, this frequency (182) becomes the highest, and it accounts for 21% of deaths.

FIGURE 8: Distribution of maternal deaths by number of antenatal visits



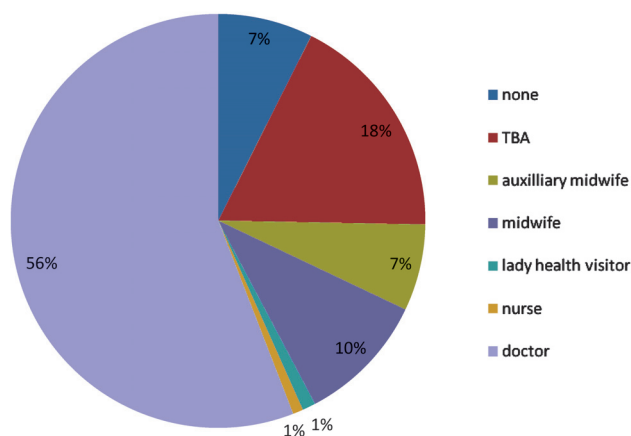
For the first provider of care (FIGURE 9), 240 or 28% of the women are first seen by doctors (and 8 of these are obstetricians); 16% are seen by nurses, lady health visitors and midwives. Therefore skilled health personnel are the first provider for about 44% of the mothers who died. The AMW attend to only 7% or 8% of the women, and the TBA see more than three times (237 or 27%) the number seen by AMW.

FIGURE 9: Maternal deaths 2013 by the first provider of care



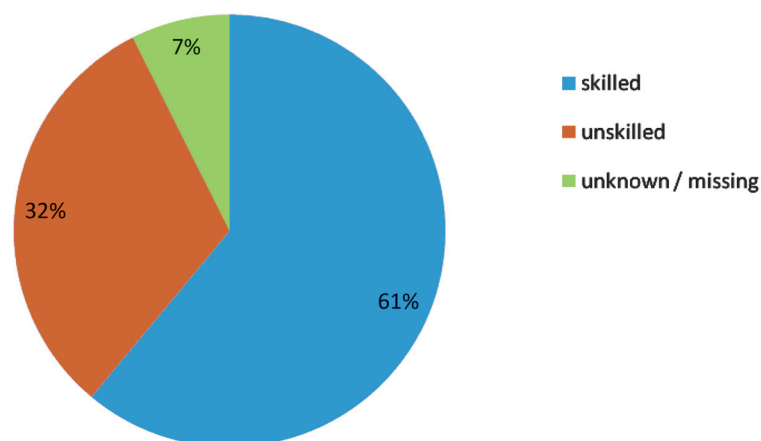
For the health care provider before the death, more than half (56%) are doctors. Midwives account for 10% and another 2% are by the lady health visitor and nurse. Just as for the first provider, the AMW is the provider before the death in only a small proportion (7%), and the TBA attend to more than twice this (18%) – FIGURE 10.

FIGURE 10 : Maternal deaths 2013 by attendant before death



This distribution can be presented in a simpler form – skilled (doctors, nurses, lady health visitors and midwives) versus unskilled (AMW and TBA). FIGURE 11 shows 61% are attended by a skilled provider, the proportion attended by unskilled health worker is about half of this (32%).

Figure 11 : Maternal deaths 2013 by attendant (skilled and unskilled) before death



3.6. Time and place of death

The highest risk of dying a maternal death is during and immediately after childbirth, especially in the first 24 hours. This is reflected in PPH being the leading cause of death. This gives critical importance to the place where childbirth takes place. This reality has led to the efforts to enable mothers to deliver in a facility that has services for basic and comprehensive emergency obstetric care (EmOC), which have been defined as signal functions. Basic emergency obstetric care (BEmOC) consists of the seven signal functions – 3 functions on administration of life-saving drugs (uterotonics, parenteral antibiotics, parenteral anti-convulsant), manual

removal of placenta, removal of retained products, assisted vaginal delivery and basic neonatal resuscitation. Comprehensive emergency obstetric care (CEmOC) comprise these seven functions plus blood transfusion and caesarian section.

In this series of maternal deaths (FIGURE 12), slightly less than half of them are after childbirth (418 or 48.4%), and 153 or 17.7% are during childbirth, therefore together they constitute two-thirds of the deaths. The deaths during pregnancy number 234 (27.1%). For the remaining 7% the timing is not known. In the 2012 deaths, the percentage of intrapartum deaths was higher (25.2%) while the post-partum deaths was lower (37.8%).. In terms of the place of death almost half (46.9%) of deaths are in the hospital, explained by the fact that the more serious and life-threatening cases are likely to be sent to the hospital either before, during or after the delivery when complications are impending or have set in. Slightly less than a third (30.1%) died at home, and note must be taken that a large proportion of deliveries occur at home. Another 15% died on the way to the hospital. See FIGURE 13. There is no information on place of delivery. The profile in 2012 was similar – 47% in facilities, 39.3% at home and 13.8% on the way to a facility.

FIGURE 12: Distribution of maternal deaths by timing of death

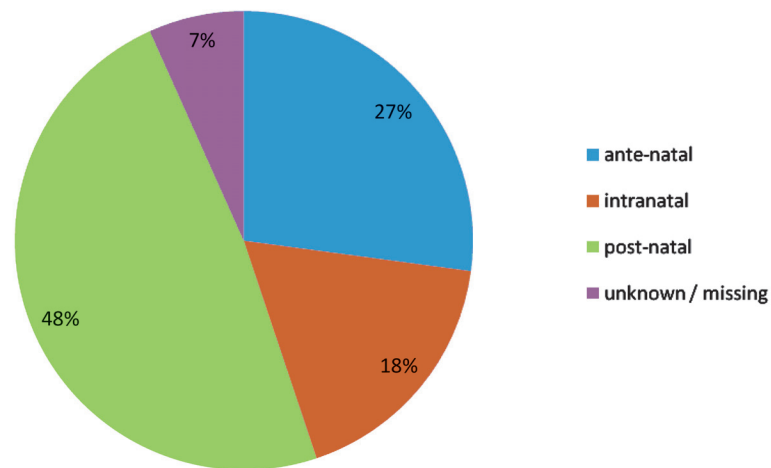
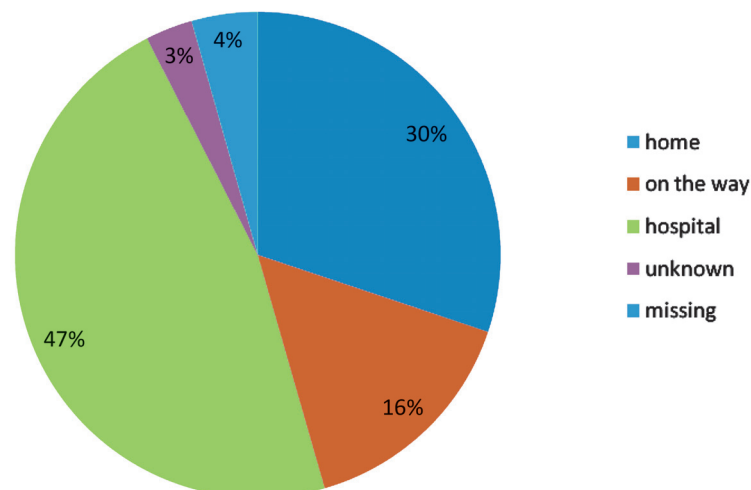


FIGURE 13: Distribution of maternal deaths by place of death



Clearly the timing and place of death has relevance to the ease/difficulty of getting emergency care or access to care, which can be assessed by the distance and the time needed to reach a health facility, described below.

3.7. Access to care (distance and time to nearest facility)

As mentioned above, the highest risk of dying a maternal death is has a lot to do with the ability (and this includes willingness) of the mother (or others who have influence over her) to deliver in a facility that has services for basic and comprehensive emergency obstetric care. From the data in the review (FIGURE 14), there appears to be little correlation between ease of access to a health centre and risk of dying. However there appears to be a correlation for distance to the nearest hospital – 62 deaths were in women who lived less than one mile from the hospital; 184 deaths for those between one and five miles; and 455 for those who lived beyond 5 miles.

For the time needed to travel, interestingly the pattern shows an inverse relationship -- a large majority (527) of the women who died needed less than three hours to travel to the health centre, a smaller number (169) needed one to three hours, and very few (19) needed more than three hours to travel to the nearest health centre. A similar (but less distinct) inverse pattern is observed for travel time to the nearest hospital in 2012.

This data also suggests that there is no association between distance to a health facility and the time needed to travel to these facilities, which is reasonable because travel time depends not only on the distance but also on other factors such as mode and cost of transport.

FIGURE 14 : Maternal deaths 2103 by distance from nearest health centre and hospital

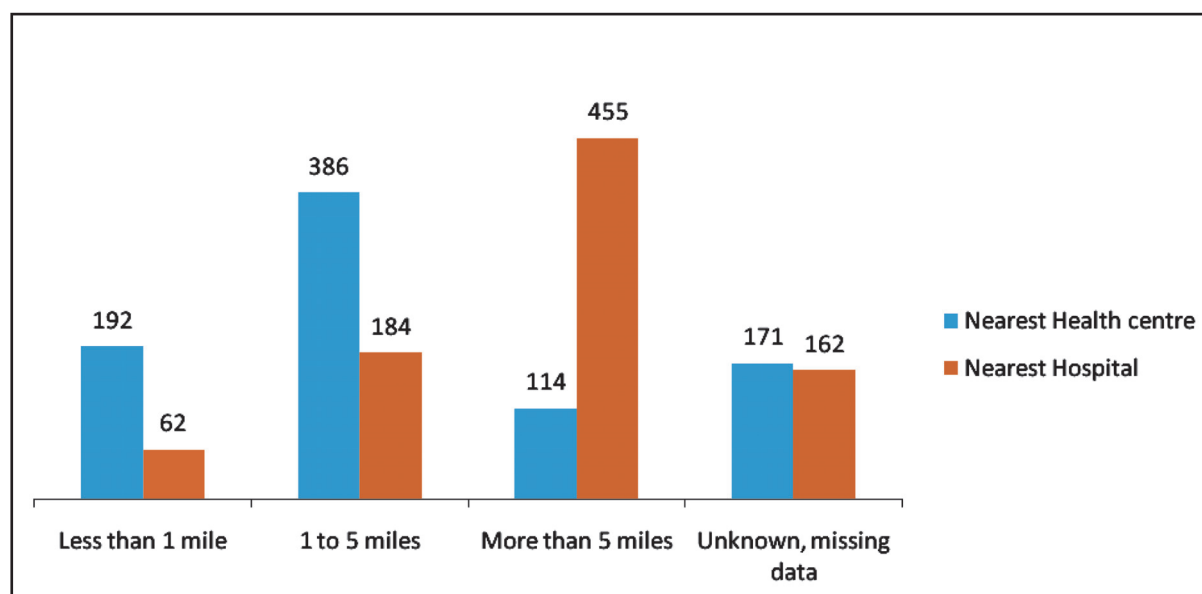
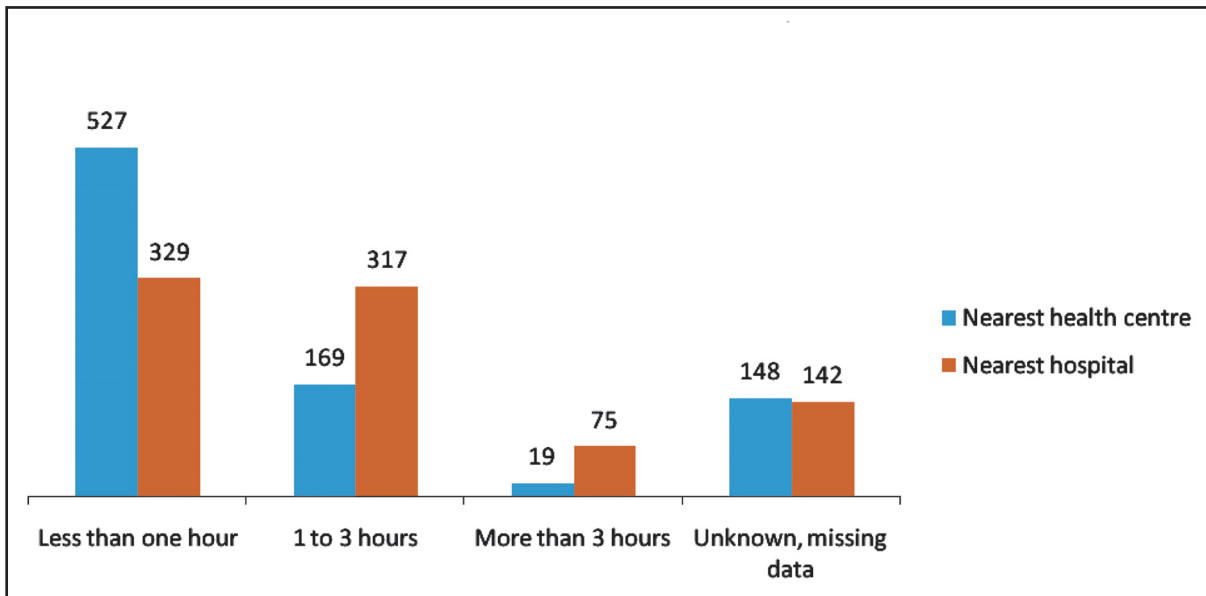


Figure 15: Maternal deaths 2013 by time to nearest health centre and hospital



3.8. Type of delay

The above analysis of time of death, place of death as well as the ease of reaching a facility with life-saving services is a reflection of the willingness and ability of the mother whose life is endangered, to seek these services.

This is very well-depicted in the “three delay” model – the first delay is the failure to RECOGNISE; the mother is not aware of the need to seek care either out of lack of awareness, or an unwillingness (even if aware, which can be an influence of culture and belief); the second delay is failure to REACH care, most often due to the barrier of distance, transport, and costs – well known as geographical and financial barriers; the third delay is failure to RESPOND, by the health facility, often under-staffed, under-equipped or uncaring and/or incompetent staff, in other words poor quality service.

From this 3-delay model one would assume that women who are subjected to the first delay (unaware of the need to seek care or unwilling to seek care) would not proceed to the next delays of inability to access care and failure of the system to respond to her need, because she does not come to use the services in the first place. But there is data on combinations of these three delays, without any explanation on how these numbers were arrived at. For example, there were 18 mothers who experienced all three delays – they were not aware of the need for seeking care, but despite that, they were claimed to have had barriers to reach a facility, and at the same time have had poor response from the facility. It is not easy to make sense of this information, and interpretation is not possible. Therefore in this report, no attempt is made to comment on the frequencies in the various combinations of the delays. See TABLE 3.

TABLE 3 : Distribution of maternal deaths 2013 by type of delay

Type of delay	Number (%)
No delay	37 (4.3)
First delay alone	402 (46.6)
Second delay alone	43 (5.0)
Third delay alone	91 (10.1)
Combination of delays	87 (21.0)

Therefore, the only inferences that can be meaningfully made are

- Only a small number, 37 deaths (4.3%) experienced no delay; these were women who desired to seek care, were able to reach the care and did not suffer any delay at the point of care
- Failure to recognize the need to seek care (first delay) is the commonest delay, in 402 deaths (46%)
- The second delay, failure to reach service is in a much smaller number, 43 deaths (5%), and we can assume these women were aware and desired to seek care but were unable to
- Failure for the service to respond (third delay) is in about twice the number for the second delay – in 91 deaths (10.5%), and of course these women would not have experienced the first and second delays, for them to have arrived at the point of service
- In 187 deaths (21%), there was various combination of the three delays, and interpretation of this is not possible

In the 2012 deaths, the profile was very similar, the corresponding figures were 59.9% for the first delay, 9.3% for the second delay and 7.3% for the third delay; and several were categorized as combination of delays

3.9. Cause of death

In any MDR, getting the profile of the cause of death is extremely important, and it can potentially provide specific and meaningful recommendations for actions, over and above the more general recommendations that can be made from the variables described above. As happened in 2011 and 2012, unfortunately the data for 2013 lacks clarity in the categorization by cause of death. While the direct causes (PPH, PIH, sepsis, abortion) are clearly assigned, there is less clarity on indirect causes, and no mention is made of incidental/accidental causes although these could have been captured by the category of “other causes”.

Because there is lack of clarity and consistency in the 2011, 2012 and 2013 data, and because this concept is critical, a brief background is given here.

In the WHO guide *“Beyond The Numbers- Reviewing Maternal Deaths and Complications To Make Pregnancy Safer”* the following definitions are given. The same definitions are also used by the MMEIG.

- Pregnancy-related death : The death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the cause of death.
- Maternal death : 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 the pregnancy or its management but not from accidental or incidental causes. A maternal death can be from direct or indirect causes.

Direct maternal deaths are those resulting from obstetric complications of pregnancy, delivery and the post-partum, interventions, omissions, incorrect treatment, or a chain of events resulting from any of the above. Deaths from PPH and PIH or from complications of anaesthesia or caesarian section are classified as direct maternal deaths.

Indirect maternal deaths are those resulting from previously existing diseases, or from diseases that developed during the pregnancy and that were not due to direct obstetric causes but aggravated by the physiological effects of pregnancy. For example, deaths due to aggravation of existing cardiac or renal disease are indirect maternal deaths.

Therefore pregnancy-related deaths, besides maternal deaths also include accidental or incidental deaths). There is universal agreement on the 42 days as the end of the puerperium; however, some countries conduct review of maternal deaths after this period, but the number is not included in the calculation of MMR. These are late maternal deaths.

- Late maternal deaths are deaths of women from direct and indirect obstetric causes, more than 42 days but less than one year after termination of pregnancy.

The difficulty of determining the correct cause and classification of a maternal death is well-recognised. In the MMEIG report (May 2014)⁸ it is pointed out that despite the standard definitions above, accurate identification of the cause of maternal death is not always possible. It can be a challenge for medical certifiers to correctly attribute the cause of death to direct or indirect cause, or to accidental or incidental events, particularly in settings where maternal deaths mostly occur at home.

In fact, the correct classification of a death as pregnancy-related deaths or maternal deaths will determine the estimated MMR figure since maternal deaths (and not pregnancy related deaths) is the numerator for the computation of MMR. One needs to recognize the importance of conducting a MDR on all deaths before they are correctly assigned to either of these two categories.

Knowing the cause of death allows specific recommendations to be made. The reader can appreciate the value of other parameters, such as socio-economic status (and its proxy education and occupation) which are well-known social determinants and can (indeed, must) be intervened even without conducting a MDR. On the other hand, the findings of MDR on cause of death have a different level of value. To illustrate, if almost all of the deaths due to PPH were not given oxytocic drugs, the recommended interventions would be obvious and specific, to ensure that oxytocics are given to all mothers after delivery. Similarly if all (or most) of the deaths from abortion were in women who resorted to illegal abortion, the access to

⁸Trends in Maternal Mortality 1990 to 2013 – WHO, UNICEF, UNFPA, World Bank Estimates, WHO 2014

safe abortion needs to be considered, but of course only to the full extent that the law of the land allows. And if safe abortion cannot be an option, other means for preventing deaths from unsafe abortion have to be found.

In the 2013 data, notwithstanding this lack of clarity, an attempt can be made to profile the deaths by causes, but this requires some assumptions to be made. The 89 (11.5%) incidental deaths are pregnancy-related but are not maternal deaths by definition, and are not to be included in the calculation of MMR. The MDR reviewers would have needed to study these deaths in detail before making the decision that they were indeed incidental deaths, because this is often not an easy decision to make. This underscores the need for an MDR to first review all deaths, and it is only after the review that the deaths can be classified as pregnancy-related deaths or maternal deaths (which needs to be further classified as direct and indirect deaths).

In 2013, as in the two previous years, post-partum haemorrhage (PPH) was the leading cause, the next two leading causes were PIH and abortion. It is useful to analyse the percentage distribution of causes for pregnancy-related deaths (includes incidental causes) and for maternal deaths (excludes incidental causes). This is shown below for the three leading causes.

Cause	% of pregnancy deaths	% of maternal deaths
PPH	34%	38%
PIH	19%	21%
Abortion	11%	12%
Incidental	11%	Not applicable

In both these categories, the number attributed to “missing data” and “unknown causes” (52 deaths or 6% of total) are excluded.

The percentage contributed by abortion can be considered as significant, it is about the same as the global figure of 12 – 13%, and is the highest compared to the other SEAR countries. This will be further discussed in Section 5.

FIGURE 16 shows distribution by causes of pregnancy-related deaths, and FIGURE 17 shows distribution of maternal deaths by cause.

FIGURE 16 : Distribution of deaths, by cause of death, of pregnancy-related deaths

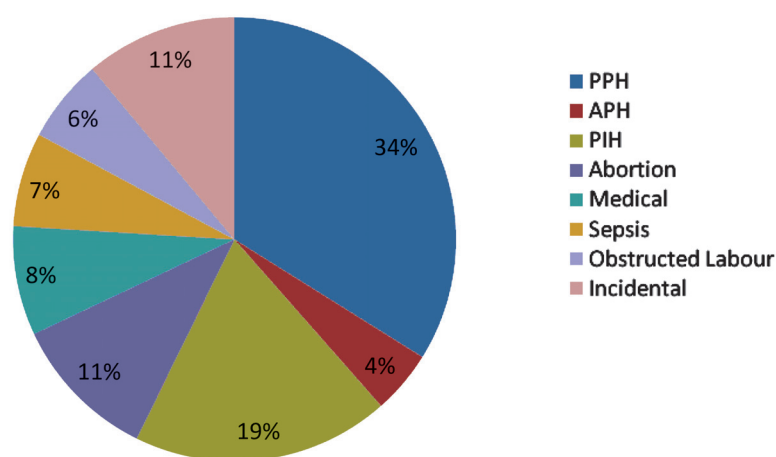
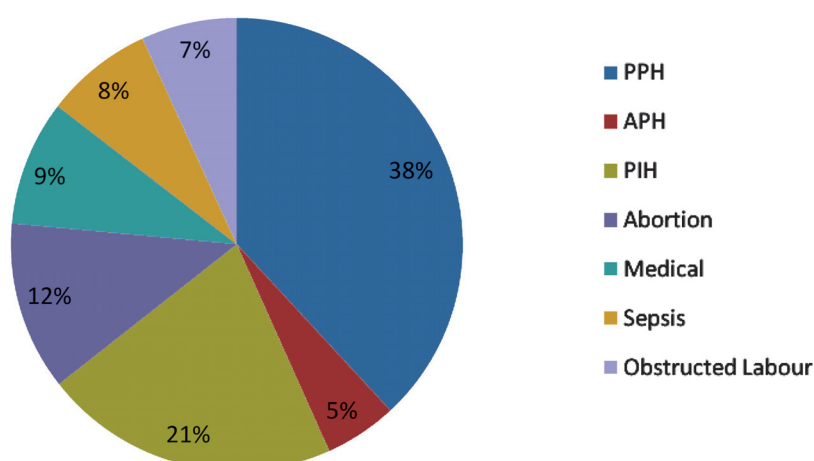


FIGURE 17 : Distribution of deaths by cause of death, of maternal deaths



The percentage distribution for 2012 is provided for comparison (using pregnancy related deaths), although for 2012 data, there is no category of “incidental” death. Therefore this comparison needs to be made with caution; the comparison may not be perfectly valid because of several differences between 2012 and 2013 in classification. In TABLE 4, the frequencies have been rounded to the nearest number.

TABLE 4: Distribution of maternal deaths 2013 and 2012 by category and cause

Category	Cause	2013 (%)	2012 (%)
Direct maternal death	APH	4	2
	PPH	34	37
	PIH	21	18
	Abortion	11	8
	Sepsis	7	4
	Obstructed labour	6	6
	Spinal shock	1	---
Indirect maternal deaths	Medical causes	8	19 (*)
Pregnancy related deaths	Incidental causes	11	----

(*) For 2012 data, these deaths were assigned as “indirect cause” and not as “medical” cause.

3.10. Use of investigation MDR form by reviewer

The completeness and accuracy in filling up the investigating form by the health staff who conducts the review (by verbal autopsy or interview of members of the family, care provider and the members of the community) is critical to the elicitation of information in the MDR process. The study in 2011 by SEARO had revealed that some health staff found the form too lengthy and difficult to fill, and that there is often shortage of the supply of the form. In the 2013 review, two parameters were included in the investigation, “comment in the form” and “action filled in the form”, shown in TABLE 5.

TABLE 5: Information filled in the MDR form by the reviewer

Parameter studied	Information filled	Number (%)
Comment in from	Yes	168 (19.5)
	No	108 (12.5)
	Missing info	587 (68.0)
	Total	863 (100.0)
Action filled in form	Yes	324 (37.5)
	No	161 (18.7)
	Missing info	378 (43.8)
	Total	863 (100.0)

It is observed that the frequency of filling up of these two parameters is generally unsatisfactory, with only 19.5% having the comments filled, and 37.5% having actions filled. The number of missing information is very high for both – 68% for comments and 43.8% for action.

4. STRENGTHS AND WEAKNESSES

Overall, there has been encouraging progress in the MDR especially in its scaling up from 30 pilot townships to country-wide implementation. The major weaknesses are those pertaining to incomplete information and gaps in data, which have been repeatedly emphasized in the preceding section.

4.1. Strengths : Factors for good progress made in MDR

The main achievement in the MDR is the encouraging progress that has happened since its introduction as a pilot in 2005. As pointed out in Section 3.9, there has been an encouraging trend in reporting and review rate since 2011, in particular the considerable increase the number of deaths reviewed in 2013 compared to 2012. Another significant progress is the setting up of the MDR Review Committees at various levels. The factors that have contributed to this are :

- (a) Committed and effective leadership – The senior management at central (Ministry of health) has demonstrated commendable commitment and seriousness in making sure the MDR in the 30 pilot townships is monitored closely, until it was ready for scaling up to the rest of the country. It has been noted through several interactions of the writer with regional/state and township level managers that the leadership and commitment at their respective levels is also commendable. From a wider perspective, the leadership given by the health managers at central, regional/ state and township levels has led to a clear interest and commitment of the local authorities, who have begun to appreciate the value of MDR and provide support to it.
- (b) Competence and motivation of staff – Overall, from the interactions of the writer with various levels of health staff, they have demonstrated adequate skills and competence in MDR. Health staff involved in the MDR often find the extra work

a burden, but they have appreciated that their work has led to positive changes when actions taken using findings and recommendations of MDR, such as in improvement in several aspects of service. In a township health office visited, it was seen that the staff members involved in the MDR processes have adequate competence and understanding of the MDR. The committee conducts review as soon as a report is received from the basic health staff of a maternal death.

- (c) Formal evaluation of MDR – The assessment of extent of implementation of MDR conducted by SEARO in 2011, with Myanmar as one of the 5 countries involved in the assessment, has contributed to knowledge on what was going right and what was going wrong with the MDR, making it easy to improve the review system. The strengths and opportunities identified in this study include a fairly long history and evolution in Sri Lanka and in Kerala and Tamil Nadu in India; strong managerial and organizational arrangements including committees and review teams; guidelines for implementation; commitment of senior staff in the hierarchy; positive response from community leaders; high motivation level of concerned staff when they realize that their efforts have led to positive changes. The major weakness identified is the difficulty of getting complete information on reported deaths, and under-reporting of deaths. Other problems are poor planning; resource shortage; poor skills of staff; and demotivated staff especially in fear of possible punitive action. In some cases, the design and approach of the MDR itself were found to pose difficulties such as inappropriate reporting forms.
- (d) Developing and implementing the COIA roadmap – The national COIA workshop in Feb 2013, a mere 5 months after the Regional workshop at which the roadmap was developed, gave a strong impetus for the MDR to be strengthened and expanded to be MDSR; the catalytic funding, although a small amount helped in this process. A meeting for the mid-term review of the COIA roadmap was conducted on 26th May 2014 with technical support from WHO, at which progress on the seven thematic areas⁹ in the roadmap was reviewed. Participants at the meeting from national, state/region and township levels contributed immensely to the mid-term assessment, and the way forward for the thematic areas (one is MDSR) was elucidated. The linkage between MDSR with the other thematic areas especially with CRVS, has led to strengthening of the death registration system, thereby contributing to the increased reporting of maternal deaths.
- (e) Technical support from WHO - The DOH has obtained support from WHO/SEARO which introduced the guidelines “*Beyond The Numbers- Reviewing Maternal Deaths and Complications To Make Pregnancy Safer*” since 2004, and provided advice and support on its use. Myanmar had participated at several regional meetings/workshops organized by SEARO; and was one of the 5 countries assessed in 2011 on implementation of MDR.
- (f) Coordination among stakeholders – Other agencies have also encouraged in several

⁹The seven thematic areas of COIA are CRVS, M&E, e-health, MDSR, tracking resources, country review process, and advocacy & outreach

ways the implementation of MDR. In November 2011, HO and UNFPA conducted a workshop on maternal mortality and MDR, at which senior leaders on MOH showed interest and commitment. The 3 MDG Fund in UNOPS has provided strong support to WHO to provide assistance to the country in strengthening MDR and moving from MDR to MDSR. At the country level, the teamwork and coordination between the hospitals and public health programmes has been strong; and the facility-based MDR carried out by some hospitals especially the teaching hospitals under the universities is evidence of this. For the CRVS which is crucial to MDSR, the CSO as the responsible agency collaborates effectively with the health agencies which implement the registration of vital births and deaths. The private sector has not yet been involved in MDR.

4.2. Weaknesses : Gaps in information

The main weakness was the gaps in information uncovered from the review, not so much as the MDR form used being inadequate in its scope, as the failure for some information to be correctly or accurately captured. The specific problems are:

- (a) Under-reporting in some states – Although the reporting of all deaths and of maternal deaths has improved considerably in the past three years, especially with the strengthening of CRVS under the COIA roadmap, there is still under-reporting in some areas, especially in remote areas. Also, unlike birth registration, for which there is the strong incentive of requirement of a birth certificate for school enrollment and other procedures, the incentives for death registration are less compelling. It has also been stated that some health staff themselves are not convinced of the value of maternal death reporting and review. There is also a technical reason for under-reporting - a maternal death even if reported, can be missed due to misdiagnosis and misclassification, as has been explained earlier (which can and does happen even in developed countries where death notification is complete and ICD-10 is being used).
- (b) Lack of information on population at risk (denominator) – As highlighted above in Section 3 in the profiling of the maternal deaths, the lack of livebirth data for all variables except for distribution by region/state, has compromised the analysis, limiting it only to comparison of proportions/percentages and not on the more valid measure of variable-specific rates, and no tests for statistical significance could be conducted. It is however recognized that this data is not easily collected and this weakness occurs in other countries that conduct MDR. While proportions may allow for inferences on some of the variables, for some variables, this lack of denominator posed a serious setback; for example, age-specific death rates would have shown the correlation between early (teenage) childbirth and mortality, and if this is available for deaths due to abortion, the profile can lead to useful recommendations.
- (c) Issues related to causes and classification of maternal death - Of the variables

used to profile maternal death, the cause of death offers the most useful avenue for recommendations to prevent future deaths. As has been elaborately discussed in Section 3.9 (in which standard definitions are given and the difficulties described), the gaps in information on cause of death leads to limited ability to use the findings meaningfully especially in making specific recommendations to avert future death.

- (d) Lack of information on circumstances surrounding the death - There was no in-depth study of the circumstances surrounding the death except those available that pertain to the socio-demographic and other variables. In particular there was no information on the standard of care and the assessment of the MDR committee on whether the deaths were preventable/avoidable.
- (e) Issues related to variables studied in the MDR - While there was a broad range of parameters/variables captured by the MDR, some of the variables could have been improved. For example, poverty is a strong determinant of maternal death, and there was no data on economic status (such as wealth quintiles), and therefore proxy variables needed to be used - education and occupation of the deceased woman. The review does not capture the occupation of the husband, which perhaps is an equally if not more significant indicator of the economic status. There is also no information on marital status of the mother, place of delivery and mode of delivery. On the other hand, variables that have no relevance to maternal survival such as tetanus toxoid immunization, and number of deaths by month, were included in the death review.
- (f) Incomplete filling up of review form - Two parameters are included in the review form to be filled by the reviewer (see Section 3.9) – the “comments” and the “actions taken”. The rate of filling in this information is generally unsatisfactory. In addition, the number of missing information is very high for this information.

5. DISCUSSION : LESSONS FROM MDR

The impressive increase in the number of maternal deaths reviewed from 2011 to 2013 especially from 2012 to 2013 is phenomenal – 93.6% of maternal deaths reported were reviewed by the MDR process, as compared to 55.5% in 2012 and 31.5% in 2011. This increase can be explained by the priority accorded by the top management in the Ministry of Health to MDR and the MDSR component in the COIA roadmap. This commitment resulted in the directive given to all region/state health authorities in early 2013 soon after the national COIA workshop to conduct MDR, effectively scaling up the existing pilot in 30 townships to the whole country.

However the significant decrease in the number of maternal deaths reported (922 compared to 1,208 in 2012 and 1,517 in 2011) is not easy to explain. It is difficult to determine whether this decline is real (assuming the data is reliable) or spurious (due to incomplete reporting and unreliable data). This can only be made clearer after a study is conducted on this trend, including using other sources of data for comparison, such as data from household surveys and the recent national census.

The profiling of maternal deaths through a careful analysis should be able to suggest and even measure the risk of dying from a maternal death using the distribution of the deaths by specific variables, but this requires comparison of variable-specific rates, for which the denominator (population at risk) is needed. In this report, the only variable for which this was possible was by region/state. Magwe, Ayeyarwady, Chin, Shan (South), Yangon, Bago, and Kachin recorded MMR higher than the national average. The lowest MMR was in Shan (East), Mandalay, Kayah and Shan (North). This profile, by itself is not sufficient for making inferences. Differences in MMR and risk of maternal death in different geographical and administrative regions are the outcome of a complex range of factors, many of which are inter-linked.

Indeed there is evidence that the completeness of reporting varies among states, and that remote and difficult regions/states such as Rakhine and Chin tend to report relatively and unexpectedly lower number of deaths, suggesting that these numbers are likely to be spurious.

Myanmar is unique in its administrative structure by having “regions” and “states” based on the ethnic composition of the population; and in health status such as maternal health and survival, ethnicity has an influence, and findings from MDR can lead to appropriate interventions. The CEMD report of Malaysia 2006-2008¹⁰ can illustrate this. Malaysia is a multi-ethnic country. Besides the three major groups – Malay, Chinese, India - there is a host of indigenous groups (one group is the aborigines in Peninsular Malaysia - the *orang asli*). In addition Malaysia has a significant population of illegal migrants. In the CEMD report, besides analyzing all variables by ethnic group, also has two chapters dedicated to these two groups with high risk – migrant mothers (who do not access care because of their illegal status, and contribute to about 30% of maternal deaths) and indigenous groups (many of them are geographically remote). The CEMD has recommended that the authorities review the fee schedule for health service for illegal migrants, and the building of maternity waiting homes near the hospital for accomodating the *orang asli* before her delivery date).

Therefore, it is clear that it is not the ethnicity itself that places a woman at high risk of maternal death; it is the complex interaction of several factors that underlie ethnicity – such as political and economic power, social and cultural factors, geographical remoteness and terrain etc.

As expected, rural women had a higher risk of maternal death than urban women. And it is not the residence *per se* that places them at high risk – just like ethnicity, there are multiple factors that’s interact in complex ways that lead to this difference socio-economic status (and its proxy education); distance, remoteness and terrain.

Indeed the influence of socio-economic status as represented by education and occupation in this report, can also be seen in many of the other variables, such as urban-rural difference. It is also reflected in distance and travel time to a facility, provision of care in pregnancy and childbirth, the type of delay etc . There is extensive literature on the social, economic and cultural determinants of maternal health, including the seminal report of the Commission on Socio-cultural Determinants of Health¹¹ released by WHO in 2008 which emphasises the role of poverty in overall health, and especially in reproductive health.

¹⁰Report of Confidential Enquiry into Maternal Death in Malaysia 2006-2008, Ministry of Health Malaysia

¹¹Report of the Commission on Socio-cultural Determinants of Health, WHO, 2008

In this analysis, socio-economic status can be gauged only by two parameters (education and occupation), and it would have been more complete and more useful if real household income was assessed, which can also be measured indirectly by the husband's occupation. After all, a housewife may not be economically disadvantaged if her husband has good income. Information on household income would have allowed categorization by wealth quintiles, and this in turn, would allow comparison with other studies and related literature, since these often use wealth quintiles.

Another variable of social determinant not captured in the MDR is marital status of the mother. This may be explained by the fact that this social determinant is not significant culturally in Myanmar society, and being unmarried does not increase her risk.

One variable that is strongly associated with risk of maternal death is age of the mother, recognizing the high risk of death for very young mothers who are biologically, emotionally and socially not ready for pregnancy and motherhood, and this has been extensively studied and well-documented. From the limited data in this analysis, even though age-specific rate could not be calculated, it did suggest that very low age (below 20) was associated with higher risk, since the 48 deaths (5.6%) among women 15-19 years old can be deemed as relatively high.

The proportion of deaths in the different gravida/parity spectrum is not adequate to infer that there is proportionate risk. The percentage distribution seems to be in consonance with the distribution of pregnancies/livebirths, thus suggesting little correlation --- about 23% among primigravida, 51% among gravida 2 to 5, and 13% among gravida 6 to 9. There were 6 deaths among those who were gravida 10 or more. In most, if not all maternal health programmes, the mothers who are primigravida and gravida of more than five are classified and followed up as "high risk" mothers.

The finding that the number of antenatal visits is not associated with risk of maternal death is unexpected - 35% had four or more ANC visits and 15% had did not have any ANC. One possible explanation of this is the likelihood that those who had several antenatal visits were those who were at higher risk to begin with, and conversely low risk mothers tended to make less or even no antenatal visit. In addition we need to acknowledge that the number of visits is only one aspect, the quality of care during the visit is another aspect that has not generally been adequately assured.

Similarly, the first provider of care does not appear to influence the risk of dying -- skilled health personnel were the first provider for about 43% of the mothers who died. This is not unexpected because the first provider is likely to have seen the mother early in pregnancy, and the mother could have no or few contacts after that, while the condition/complications that led to the death would have appeared later after the first contact. In a fairly high proportion of deaths, a skilled personnel was the provider of care before death, with more than half being obstetricians and other doctors. One possible explanation for this is that mothers with higher risk or those having serious complications are likely to be attended to by personnel with high level skills including an obstetrician.

In terms of timing of death, is a well-known fact that the highest risk of dying a maternal death is during and immediately after (especially within 24 hours) childbirth, underscoring the importance of a facility childbirth and having access to emergency obstetric care. This profile showed that two-thirds of deaths were during and immediately following childbirth, thus reaffirming this well-known fact.

Obviously, the place of delivery is a strong determinant of risk. Delivering in a facility or hospital carries a much lower risk than delivering at home especially if there is no skilled personnel in attendance. The data set has information on place of death, not on place of delivery. There is also no information on the mode of delivery. The profile on place of death does not reveal much information – almost half of deaths were in the hospital, slightly less than one-third died at home, and a much smaller number died on the way to a health facility. The high numbers who died in hospitals can be explained by the fact that hospitals are called upon to manage the more serious and life-threatening cases. Relating the place of delivery to the place of death can have relevance in deciding on the policy for hospital discharge for normal uncomplicated delivery, especially where the health system is weak. In a township hospital visited by the writer, mothers with normal delivery are discharged on the third day, thus allowing time for the hospital staff to detect any problem that may arise. This policy may not be easily implemented where there is a shortage of maternity beds. In Malaysia mothers with normal delivery are discharged within 24 hours, but the health staff in the community clinic is informed (she needs to do postnatal visits daily on the next 3 days, then again on sixth, tenth, twentieth and forty-second day). In Malaysia where there is good health system, this policy is appropriate; and there has been no finding from CEMD to change this policy.

From the data in the review, there appears to be little correlation between ease of access (distance and travel time) to a health centre and risk of dying. A large majority of the women who died lived within five miles of a health facility and needed less than three hours to travel to the facility. However there is evidence that distance from a hospital is a contributing factor, there is no such evidence for health centre. This suggests that access to a facility with emergency obstetric care (basic and comprehensive) such as a hospital has the potential of saving a mother's life. This basic reality is a common finding in other MDRs conducted elsewhere, such as India, Sri Lanka, Indonesia, Nepal¹² The CEMD report of Malaysia¹³ does not show this very clearly (after all physical access to a hospital is relatively easy), but it does show the risk borne by women who are illegal migrants for whom lack of access is determined not so much by distance, but by financial and legal difficulties.

The paradoxical finding on time to reach a facility - many of the deaths were in women who needed less than an hour from a health centre and a hospital; and very few needed more than three hours to travel to the nearest health centre and the nearest hospital – is not easy to explain.

The observation that distance is not related to and travel time is a possible situation, because time is influenced not only by distance but also by other factors such as mode of transport.

¹²Report of Study on implementation of MDR in 5 countries, SEARO, 2011 (draft)

¹³Report of Confidential Enquiry Into maternal Deaths in Malaysia 2006-2008, Ministry of Health Malaysia

There are some problems about the accuracy of and cause and classification of deaths. But it is possible to draw some inferences from the profile. Of the direct obstetric causes, it is not unexpected that the two leading causes were PPH and PIH, this same profile is observed in many countries of the Region, as revealed in the five-country study conducted by SEARO in 2011. The finding that abortion was the third leading cause is significant, the 12% contribution by abortion is the highest among the countries of SEA Region. The assessment of the health equity fund (HEF) under the GAVI-HSS project in 20 townships¹⁴ showed that abortion was the third commonest cause of referral for obstetric emergencies in women eligible for the fund (eligibility id determined using a multi-factorial quantitative measure of poverty). In Myanmar, abortion-related services are limited to primary prevention (contraception) and tertiary prevention (post-abortion care), while the legal environment does not allow for secondary prevention (termination of unwanted pregnancies). Therefore it can be assumed that these women who received the HEF to be referred for abortion, were referred for complications of an unsafe abortion done (usually by quacks or unqualified persons) outside the health facility

These three leading causes deserve further discussion. For PPH, the MOH Myanmar has been making efforts to ensure the availability of oxytocin for all deliveries, but progress is impeded by policies and regulations, and lack of electricity and refrigeration facilities in many areas. As a second line management, the MOH has made a policy on the use of misoprostol. The report for the 2011 MDR contains the following statement --- *“Postpartum haemorrhage contributed to maternal mortality largely due to the lack of delivery facilities and to poor health status of mothers. Misoprostol, a new and inexpensive prostaglandin E1 analogue, has been suggested as an alternative for routine management of the third stage of labour in addition to the current use for induction in clinical settings”*

For PIH and eclampsia, it is encouraging that magnesium sulphate is increasingly being made available. In the 2011 MDR report, the following statement is made --- *“There is an urgent need to operationalize the use of magnesium sulphate for the care of women with severe PET or eclampsia, which was associated with statistically and clinically significant reductions in the recurrence of convulsions and reductions in maternal deaths. It is also needed to strengthen quality antenatal care to prevent and early identification of Pregnancy Induced Hypertension”*.

For the third commonest cause (abortion) currently interventions are limited to primary prevention in the form family planning (contraception) to prevent unwanted pregnancy, and tertiary prevention in the form of post-abortion care to manage complications and prevent death (often due to unsafe abortions). The 2011 report states ---- *“Induced abortion is the fourth highest cause of deaths in this study, owing to lack of access to birth spacing methods and availability of reproductive health services. Complications of abortion are also the common reason for maternal death and severe maternal morbidity in the study, the amount of time and resources required to manage them rapidly”*

Clearly there is need to strengthen both family planning and post-abortion care. There is ample evidence from other countries that these are seldom sufficient to reduce the incidence

¹⁴Draft report on Performance Assessment of GAVI-HSS Interventions in 20 Townships, WHO Myanmar, unpublished, personal communication, May 2014

of unsafe abortion, and that provision of safe abortion services is needed. This has been exemplified by the experiences of countries in the SEA Region - Nepal, India, DPR Korea and Bangladesh¹⁵. Even in countries where the socio-cultural-religious environment is not enabling for the liberalization or even legalization of abortion, such as Cambodia and Bangladesh, great strides have been made in this; indeed the review of the abortion laws can be made in line with the social and religious reality of the country, as in Bangladesh where the service is made available only to women in very early stage of pregnancy (which is allowed in the Syariah law of Islam), and in whom there is no confirmation of pregnancy (so the service is for “menstrual regulation”) . As advocated by WHO, the provision of abortion services must be to the full extent that the laws of the country allow. The legal status of abortion in Myanmar is shown below¹⁶, and along with three other countries (Bangladesh, Indonesia and Timor Leste), it is the most restrictive in the SEA Region. The only allowable reason is to save the life of the woman.

In the Myanmar Penal Code Article 312, 313 and 314, abortion is generally illegal except when “performed in good faith for the purpose of saving the life of the woman” (Abortion Laws of the World). Abortion can be provided up to 22 weeks of gestational age and a doctor needs to certify the need. For example, if the woman has severe heart disease, a consultation is required with both a physician as well as an obstetrician/gynaecologist and both are required to certify the need for abortion procedure. Consent for abortion needs to be given by the woman alone or with her husband/partner. Any person performing an abortion outside of these restrictions is subject to up to 3 years’ imprisonment and/or payment of a fine. A woman who induces her own abortion is subject to the same penalties. If the abortion results in the death of the woman, punishment is 10 years’ imprisonment and a fine. The punishment varies depending on the gestational age of the pregnancy, whether the woman’s consent has been obtained and if the abortion results in the death of the woman

While on cause of death, note must be made of medical conditions that are associated with maternal deaths (indirect causes). In 2013, medical conditions account for 8% of deaths. In developed countries, this category account for a substantial proportion of maternal deaths. This trend can be seen in countries transiting from developing to developed; in Malaysia, medical conditions account for the same proportion of maternal deaths as PPH (about 18%). This underscores the importance of the obstetrics unit and obstetricians to work closely with the medical unit and physicians, and the need for basic health staff to be able to recognize women with medical conditions.

The findings on the type of delay can lead to specific recommendations and interventions. Only a small number (4.3%) had no delay in seeking and reaching point of service. These are women who want to seek care, were able to reach point of care, and received the care they needed. Yet they died. If these were analysed in greater detail, we may be able to see the circumstances surrounding these deaths, and even assess if they were avoidable or unavoidable deaths.

¹⁵Mapping Abortion Policies, Programmes and Services in the WHO SEA Region, WHO-SEARO, 2012

¹⁶ibid

An overwhelming number (46%) experience the first delay - failure to recognize the need to seek care; and only a small number (5%) deaths experience the second delay of failure to reach the service. This finding is unexpected because it is a common feature in many developing countries including Myanmar that access to care is constrained by financial difficulties (besides geographical barrier). There is convincing evidence from several sources that financial barrier is a common problem in Myanmar. The incongruence in the finding is probably the result of erroneous classification of the delays; we have seen that there are many deaths to which were ascribed a combination of delays, for which no interpretation can be made.

Because there is little doubt that the second delay is a big, problem, it has led to the various demand-side financing mechanisms for maternal and child health, such as vouchers, health equity funds, conditional cash transfers etc in many countries. The Health Equity Fund (HEF) under the GAVI-HSS project in 20 townships in Myanmar has been mentioned earlier, aimed to improve access poor women. Poverty status is assessed using a multi-factorial quantitative measure. The assessment of the GAVI-HSS project indicates that 89% of the HEF spending was for obstetrics cases (1,327 cases), and the three leading reasons for referrals were for caesarian section, spontaneous vaginal delivery and complications of abortion. It is reasonable to assume that this intervention would have led to some maternal deaths being averted, especially from these three conditions.

The GAVI-HSS project has also introduced another demand-side financing, the Maternal and Child Health Voucher Scheme (MCHVS). Initial assessment¹⁷ shows that this scheme has led to increased utilization of services by the poor, but it is too early to see any impact of this scheme. However it is reasonable to expect that the maternal deaths will be reduced by this intervention.

The third delay (failure of the service to respond) was 10% of deaths. This too is unexpected because weak health system is a common feature in countries such as Myanmar. The lack of clarity in this data set is also the likely explanation for this unexpected finding. It would be interesting to study this in further detail – for example, the expectation of the client (family of deceased mother) for adequacy and quality of care from the health provider or facility may be not too high, and in the verbal autopsy, they may not have cited this as a problem.

The profile in 2012 was similar - 59.9% for the first delay, 9.3% for the second delay and 7.3% for the third delay; and there was then also lack of clarity in the classification and analysis of this variable.

Combining the findings on cause of death, ease of access to service and the type of delay, it is easy to appreciate the importance of referral system for emergency obstetric care, an intervention that can prevent maternal deaths considerably. Reference as made earlier on the referrals under the HEF of the GAVI-HSS project. The 3MDG Fund in UNOPS has instituted a project on maternal emergency referral (it is also a form of demand-side financing scheme) in six townships in the Delta Region that were severely affected by cyclone Nargis in 2008. In a recent report¹⁸ by the Fund, it stated that in 2013, a total of 5,747 maternal emergencies were

¹⁷*Draft report of Mid-Term Review of Maternal and Child Health Voucher Scheme, WHO Myanmar unpublished, personal communication, may 2014*

¹⁸*Maternal Emergency Referrals in six Delta Townships 2013, the 3MDG Fund, UNOPS Myanmar, unpublished, personal communication*

referred in these townships. These referrals are categorized as direct obstetric emergencies; indirect causes of maternal deaths (mainly existing medical conditions); and high-risk pregnancies. Of the obstetric emergencies, the highest number was for prolonged or obstructed labour (1,762 cases), while PPH was noticeably less frequent (70 cases) and PIH was tenfold more (730 cases); and abortion was 261 cases.

It can be assumed that the referrals in these financing schemes would have saved some mothers from dying. This is illustrated the figures related to obstructed labour, for which morbidity (cases referred) was far higher than mortality (deaths reported in this 2013 MDR, only 6.3% of deaths were due to obstructed labour. Therefore it suggests that many cases of obstructed labour were saved from dying by being referred on time. Although this comparison is between different geographical area (6 townships for 3MDG Fund, 20 townships for GAVI-HSS, and nationwide for 2013 maternal deaths), we can consider this a valid, albeit not a totally accurate, comparison.

In the preceding sections, much has been said about the problems of lack of complete and accurate information. This has led to the dual problem of (i) under-reporting of maternal death, and (ii) difficulties in assigning the cause of death, and the classification of death into maternal deaths and pregnancy-related deaths. Because this is the very important in the understanding of maternal death and MDR, this is further elaborated here. The MMEIG report¹⁹ on trends on maternal mortality provides useful definitions.

- *Incompleteness* refers to incomplete death registration, and includes both the identification of individual deaths in each country and the national coverage of death registration.
- *Misclassification* refers to incorrect coding in civil registration, due either to error in the medical certification of cause of death or error in applying the correct code.
- *Under-reporting* is a combination of incompleteness and misclassification.

The report goes on to elaborate on the potential reasons for under-reporting and these are – inadequate under-reporting are inadequate understanding of the ICD-10 rules; pregnancy status is not mentioned in the death certificate; fear of litigation; and deliberate suppression of information such as often happens in death after an illegal abortion. There is however “the reverse side of the coin” that can lead to an over-estimation – some pregnancy-related deaths can be erroneously classified as maternal death. In fact this can be a difficult decision for the MDR committee to make and come to a consensus; as can happen in a pregnant unmarried girl committing suicide, because of the unbearable social and emotional burden due to the pregnancy.

A country’s MDR system will take several years before it becomes familiar with this problem, but when the system has matured and perfected itself, it will contribute to a more accurate counting of maternal deaths, by causes and classification.

A complete and in-depth analysis by the cause of death will lead to a deeper understanding of the circumstances surrounding the death, including standard and adequacy of care. This

¹⁹Trends in Maternal Mortality 1990 to 2013 – WHO, UNICEF, UNFPA, World Bank Estimates, WHO 2014

level of detail is able to elicit important information that can lead to specific recommendations. A comprehensive MDR system, such as the CEMD, conducts a detailed analysis of every death under each cause of death as case studies. For example, in Malaysia, the CEMD found that there was an increasing number of deaths due to thrombo-embolism after the mothers are discharged from the hospital following childbirth; it accounted for 14% of maternal deaths in 2006, 17.7% in 2007 and 30% in 2008. The CEMD found that for almost all of these cases, there was failure of the health provider to detect and suspect the diagnosis²⁰. This finding led to the development of clinical guidelines including a checklist for the early detection of deep vein thrombosis and awareness of the importance of thromboprophylaxis. In another example, each year, CEMD found that PPH was the leading cause of death in one state in the country. Although oxytocin is routinely given to all women immediately after childbirth, there were cases that needed transfer to hospital and the bleeding does not stop. The CEMD recommended additional measure for this state; a pilot was conducted in 2011 to use the balloon tamponade to arrest the bleeding while transferring the mother to the hospital. Initial data suggests that the proportion of maternal deaths due to PPH has declined from 57% in 2011 to 37% in 2012. The rate of postpartum hysterectomy due to massive PPH had reduced from 24% in 2010, to 13.6% in 2011, to 6.5% in 2012 and 6.6% 2013.

In the Myanmar MDR, it is understandable that this level of analysis is not carried out since the MDR is still “immature” and until very recently, was in a pilot phase. Essentially, an MDR, if conducted comprehensively can provide answers to the following :

- 1) Was the death a maternal death? Or was it a pregnancy-related death due to accidental or incidental cause? This will correctly classifies the death.
- 2) If it was a maternal death, was it avoidable or preventable? It has to be recognized that some “purists” may claim that all maternal deaths are avoidable. But in an MDR, this question is relevant, and it is up to the review committee to define what is deemed avoidable and unavoidable.
- 3) If it was an avoidable death, where was the shortfall in care? Was it client-factor (such as lack of awareness of cultural barrier, difficult transport – essentially these are the factors for the first two delays), or was it provider-factor (such as wrong or inadequate treatment, i.e. the third delay).

In this context it is important to note that MDR is not a fault-finding or punitive exercise; and it is important for health providers to be informed of this. Fear of punishment has been cited for an unwillingness for the health provider not to report a maternal death. This is one of the reasons for confidentiality, as required by the CEMD method of MDR.

It was mentioned at the beginning of this section that the profiling of maternal deaths through a careful analysis should be able to suggest and even measure the risk of dying from a maternal death using the distribution of the deaths by specific variables. In other words, findings of MDR can suggest the identification of “high risk” mothers. However it must be noted that the concept of “high risk” pregnancy should not be taken as an absolute truth; indeed the risk of dying in pregnancy, childbirth and puerperium is generally not predictable, some

²⁰Report of Confidential Enquiry Into maternal Deaths in Malaysia 2006-2008, Ministry of Health Malaysia

mothers tagged as “high risk” may go through pregnancy and childbirth with no untoward event, while another woman not having any detectable risk factor, may end up with a life-threatening complication.

This as it may, maternal health programmes do adopt the “high risk” approach, which can take various forms. In Malaysia, the high risk approach was piloted as a WHO project, and despite WHO’s subsequent stand not to recommend the approach, Malaysia adopted it and continues it till today. The CEMD investigating form captures this information on risk level of the mother which is colour-coded (white – no risk, green – low risk but can be managed at primary care level by a medical officer, yellow- moderate risk – to be followed up at the hospital by an obstetrician, red – high risk to be admitted to the hospital). The findings of the CEMD confirms the universal truth that the risk level does NOT predict the outcome, but the system is maintained, with the recognition by all health providers that, even though cases are colour-coded, risk of a bad outcome including death, is unpredictable. Besides primigravida and grand-multigravida mothers, other at-risk mothers include those aged below 20 (especially unmarried) mothers, those from geographically remote areas, and those with existing medical conditions, etc.

In this context of profiling of maternal deaths to assess risk, this analysis of 2013 deaths has seen the use of variables, and mention has been made of the need to select the most appropriate, useful and meaningful variables. It was seen that some useful variables are not captured (household income, place of delivery) because they are not easy to obtain, while some that have little relevance are captured (deaths by month, tetanus toxoid immunization), because they are relatively easy to obtain.

Finally, the strengths and weaknesses identified from the analysis of these deaths, besides the profile discussed extensively above, will provide a useful basis for making recommendations.

6. RECOMMENDATIONS, AND THE WAY FORWARD

This analysis of maternal deaths in 2013, combined with the previous analysis for 2011 and 2012, for both the community-based MDR and the facility-based MDR in some hospitals, has provided basis for some recommendations to be made, and for Myanmar to pave the way forward for a strengthened MDR that will contribute to lowering of MMR and achievement of MDG5.

6.1. Respond to the findings of MDR, document them

As found in the analysis of 2011 and 2012 deaths, the MDR Committees at the various levels have made recommendations based on the findings. The assessment study conducted by SEARO in 2011 also found that MDR has led to recommendations. Both these – the MDR itself and the assessment of its implementation have made several recommendations. These include – to review the reporting format to make it more user-friendly and ensure adequate supply; conduct training and skill building of midwives; strengthening of health facilities

in terms of adequate equipment; review the policy on conducting the verbal autopsy within 7 days of the death (the family still in grief is not ready to be interviewed); address problems of transport costs for the staff member; ensure constant monitoring of the MDR; scale up MDR to other townships (this has been responded to), and strengthen advocacy for MDR. Besides taking action on the recommendations, it is important to document these findings and the actions taken.

From the 2013 analysis, besides the improvement in the collection, organization, review and analysis of the information collected in the MDR, the actions to be taken include several interventions, some to be implemented by the health sector (especially Ministry of Health), and some will need the input of other agencies. For the MOH, the actions needed may include (but not limited to) the following, and these recommendations have repeatedly been made especially since the movement on safe motherhood started.

- Encourage women to access antenatal care with adequate number of visit (at least 4), and to deliver in a health facility with skilled attendants.
- Strengthen family planning services to address unmet need which leads to unwanted pregnancies, and their consequences of grand-multiparity and unsafe abortion.
- Strengthen health services at every level, in terms of quantity (scope, coverage) and quality.
- Continue efforts to create enabling environment to address the two commonest cause of maternal death – PPH and PIH - from the aspect of availability of drugs, which has been discussed in Section 5.
- For the third commonest cause, abortion, to strengthen the only currently available interventions - family planning and post-abortion care. It is worthwhile to learn from experiences of other countries with restrictive abortion laws on how advocacy can be carried out for a review of the law, and how the existing law can be used to allow for some degree of liberalization.
- Recognise the magnitude (9%) of medical conditions leading to indirect maternal deaths, and ensure that these are followed up closely, together by the obstetrician and the physician (and any other subspecialists depending on the condition – heart disease is a fairly common cause of indirect maternal death.
- Conduct more health education and public information, and advocacy to community leaders on the importance of the need to reduce (even eliminate) maternal deaths.
- Work closely with GAVI-HSS and 3 MDG Fund implementing the demand-side financing schemes for MCH, and emergency obstetrics referrals.
- Work closely with other agencies and sectors especially to improve socio-economic status of the people, to reduce the second delay by improving the transportation services and building roads.

6.2. Sustain the good progress, optimize the strengths

The success factors or strengths of this achievement have been described earlier. It is imperative that this momentum is not lost. It is commendable that in Myanmar, the authority and leadership in the Ministry of Health has demonstrated a high level of commitment. This commitment has led to the scaling-up of the MDR pilot from 30 townships to all townships, and the development of the COIA country roadmap.

6.3. Improve the current MDR, fill in information gaps

The weaknesses in the current MDR have also been elucidated by the findings of the analysis of the maternal deaths in 2013, as well as in 2011 and 2012, especially the problems of incomplete and unclear information. Efforts need to be made to address these weaknesses. Of particular importance are (improvement in the recording of cause of death (and classification of the deaths), a clearer unambiguous analysis of the type of delay, and reviewing the variables to be analysed, which will facilitate the making of recommendations. It may be useful to expand the variables beyond education and occupation to generate a more complete picture of the household income level, on which analysis can be conducted on wealth quintiles. Finally make sure that the variables and their categorization is the same for each year to allow comparison over time. If there is a need, to consider developing / revising guidelines on filling up the forms.

It is also recommended to study in detail, and identify the factors, for the significant decline in maternal deaths from 2012 (1,208 deaths) to 2013 (922 deaths). While the phenomenal increase in the proportion of deaths reviewed by MDR is more easily explained, the reasons for the decline in number of deaths are not clear. Other sources of information need to be studied to determine if this decline is real (data is reasonably accurate) or spurious (data is inaccurate/incomplete).

In this context, special attention needs to be paid to study the differential in reporting rates among regions/states; and for encouraging those with low reporting rates to improve their performance. This is likely to require special efforts and resources since these are the states that are more remote (Chin) or are experiencing specific political and social difficulties (Rakhine).

6.4. Conduct a more comprehensive MDR

Reference has been made to the MDRs conducted elsewhere especially the CEMD in UK, Malaysia, South Africa etc. While it is acknowledged that Myanmar is not yet ready for this level of comprehensiveness and sophistication, the current community based MDR using verbal autopsy and the facility-based MDR in some hospitals, can be made more comprehensive with little extra effort and resources. After improvement is made on the classification and cause of death (recommendation 6.2 above), it is recommended that a sample (or even all) of deaths under each cause of death be further analysed. Some of these can be documented and reported as cases studies, because they have very significant features (as illustrated by the Malaysian experience in the analyses of deaths due to thromboembolism, an increasingly important cause

of death), upon which very specific recommendations can be made (checklist was developed and training conducted on diagnosis of deep vein thrombosis for health staff).

Another aspect of comprehensiveness is with regard to regional/state profile. Because MMR is influenced by a number of conditions (social, economic, cultural, geography, demography etc), knowing these conditions can be useful in interpreting the MMR; a standard template for these can be developed, which can be referred to when describing the MMR (and other parameters) in the region/state. Yet another level of comprehensiveness is the possibility of profiling the maternal deaths at sub-regional level such as district and township. While this is likely to have been done and is available in the Region/state MDR reports, including it in the national MDR report can throw light on issues of equity.

The time has not come for Myanmar to move from community-based MDR (verbal autopsy) towards CEMD. But this possibility should be kept in mind. And after that Myanmar may want to consider conducting review/audit of SAMM or “near-miss” but this is a distant need, this method is needed when the number of maternal deaths is too small to allow adequate lessons to be learned from the MDR.

6.5. Continue to implement COIA roadmap : from MDR to MDSR

In Section 4 above it was pointed out that the development and implementation of the COIA roadmap is one of the strengths of the MDR, it has provided the impetus for the scaling up of the pilot project. Efforts need to be focused on the other activities in the roadmap – priorities should include the upgrading of MDR to MDSR and to improve CRVS. The MDSR recommended by the Commission is an extension of the current MDR, but it requires that every maternal death is notified (CRVS is needed for this) and audited or reviewed; that active surveillance on maternal death be institutionalized; and that recommendations are responded to. The basis of MDSR is the simple Public Health concept and method of surveillance, which is the ongoing systematic collection, analysis, and interpretation of health data, and this has been used for a long time in disease control²¹. The implementation of MDSR involves the identification and notification on an ongoing basis, and their immediate notification (within 24 for death in facility and 48 hours in the community) , the review of maternal deaths by local MDR committees to examine the contributing factors that led to the death; assess avoidability and make recommendations for preventing future deaths, the analysis and interpretation of aggregated findings from reviews at the district level, and reporting to national level; and make priority recommendations for action, and response to implement the recommendations.

In addition to these activities for MDSR, advocacy and outreach also needs to be done, The COIA country roadmap has identified three constituencies to whom advocacy is to be carried out -- Parliamentarians, the media and civil society. A technical working group needs to be established to design the contents and approach of the messages to be given to each of these constituencies.

One of the thematic areas of the COIA roadmap is e-health and innovation. Advantage must be taken of this to optimise the use of ICT in MDR and MDSR, such as use text messages in mobile phones for rapid reporting of maternal deaths.

²¹Maternal Death Surveillance and Response: A Technical Guidance – Information for Action to Prevent Maternal Deaths, WHO Sept 2012 (draft)

6.6. Utilise findings/evidence from other sources

Reference has been to the initiatives by GAVI-HSS and 3MDG Fund for emergency obstetrics referral, and the GAVI-HSS initiatives on demand-side financing using health equity fund and MCH Voucher Scheme. There are several other initiatives of many other agencies and development partners (UN agencies, INGOs etc) that are targeting women and children, and some of these, either directly or indirectly, can have relevance to not only reducing maternal deaths, but also to approaches such as MDR. Information and evidence from these sources and initiatives will enhance the MDR.

6.7. Strengthen inter-agency and inter-sectoral coordination

From this report, the role of inter-agency and inter-sectoral coordination is clear. Within the government system, there are many agencies whose mandate can contribute to reducing maternal deaths (education, transport etc) and to MDR (CSO, Ministry of population and Immigration). There is need to initiate efforts to involve the private sector. For a start we need to know the number of deliveries and maternal deaths in private clinics and hospitals; and following that we need to find approaches of how to engage them in our efforts to review maternal deaths and to reduce maternal mortality. On the international front, Myanmar is a country that receives support from many international partners and donors. For maternal health (and also the full spectrum of RMNCAH), international funds managed by the 3MDG Fund in UNOPS is a major input, and it is imperative that close collaboration and coordination between the government and the 3 MDG Fund is forged and sustained. Similar collaboration is also imperative with the other donor agencies such as GAVI-HSS, especially recognising that health systems strengthening is an important strategy for reducing maternal deaths.

6.8. Use MDSR to eliminate and end preventable maternal deaths

In the preceding section, it was pointed out that the basis of MDSR is the simple Public Health method of surveillance that has been used for a long time in communicable disease control. Although pregnancy is not a disease and maternal mortality is not communicable, the principles and concepts of Public Health applied to disease control can be applied to maternal mortality. In their paper²² on elimination of maternal deaths, Hounton et al stated that the vision “no woman should lose her life when giving birth” reflects the human rights perspective on maternal mortality and would require that 90% of maternal deaths be avoided, making maternal mortality a potential target for the elimination strategy. The writers used the term “elimination” as it is used in Public health significant lowered level at which the problem (in this case, maternal mortality) ceases to be a major public health burden for the country. Needless to say, it is not easy to arrive at a consensus on what this target of elimination should be.

At the multi-stakeholder “Consultation on Targets and Strategies for Ending Preventable Maternal Mortality” convened by WHO in Bangkok in April 2014, a consensus statement²³ was made, in which two targets were agreed upon.

²²Hounton S, De Bernis L, Hussein J, Graham W, Danel I, Byass P, Mason E, *Towards Elimination of maternal Deaths : Maternal death Surveillance and Response, 2013, Biomedical Central Publications*

²³*Consultation on Targets and Strategies for Ending Preventable Maternal Mortality”, consensus statement, WHO April 2014*

- Global target – Reduce global MMR to less than 70 per 100,000 LB by 2030.
- Secondary target – By 2030, no country should have MMR greater than 140/100,000 (twice the global target).

This target of 140/100,000 is interesting in the context of Myanmar, because the MDG target for MMR for Myanmar for 2015 (145/100,000) is very close to this figure.

The consensus statement identified two cross cutting actions to achieve these targets, and one of them is on metrics and measurement, which underscores the importance of MDR and MDSR, and of CRVS.

- Improve metrics and measurement systems and data quality ensuring that all maternal and newborn deaths are counted.
- Prioritise adequate resources and effective health care financing.

Of the five strategic objectives towards meeting this target, one of them is directly relevant to MDR/MDSR i.e. address all causes of maternal mortality, reproductive and maternal morbidities and related disabilities.

Needless to say, this elimination strategy can only be achieved if every maternal death is notified (notification needs to be made mandatory), reviewed (using the existing MDR methods with further improvement), analysed, and recommendations acted upon – in other words, the essential elements in MDSR. This can only be achieved if, along with MDSR, there is also strengthening of CRVS, and implementation the other thematic areas in the COIA roadmap, to which Myanmar is committed.

7. CONCLUSION

Getting estimates of MMR that are as accurate as possible has become an urgent agenda in view of the need to track the progress of MDG5. Getting this number is a big challenge for almost all but especially for developing countries since they lack a complete civil or vital registration system. Getting beyond these numbers is equally important so that the circumstances that have led or contributed to the death can be elucidated and understood, and remedial actions taken to prevent a similar death in future. The MDR in Myanmar which began as a pilot in 30 townships has been scaled up to the whole country, and in 2013, the number of maternal deaths reviewed was impressive, with 863 or 93.6% of reported deaths having been reviewed. The analysis of these deaths has revealed findings, and identified the strengths and weaknesses of the MDR, making it possible for recommendations to be made, not only for reducing maternal deaths, but for further improvement of the MDR. The way forward is for the MDR to be upgraded to MDSR, and this will contribute to the lowering of maternal mortality in Myanmar, and it is envisaged that Myanmar by strengthening the MDR, will contribute to the ambitious goal global of elimination of maternal death.