Outcome of Maternal Death Surveillance and Response – 2016

Review of maternal deaths is recognized as an internationally accepted best practice for reducing maternal deaths. World Health Organization (WHO) in 2004 introduced a guide, *Beyond the numbers—Reviewing maternal deaths and complications to make pregnancy safer* to initiate maternal death reviews & response systems.

Sri Lanka started reviewing maternal deaths way back in 1981. The review process evolved over the years with the addition of quality dimensions. In 1985, the gazette regulation on mandatory notification of probable maternal deaths was issued. In 1995, structured review of deaths was started by Family Health Bureau (FHB). In 2000, a national maternal death database was established. In 2009, Ministry of Justice issued a circular to all coroners on compulsory post-mortems on maternal deaths. In 2010, the review process was revolutionized with the addition of several quality dimensions; mandatory post-mortems, case scenario development, central level expert reviews and strengthening the 'response' part. FHB coordinates the surveillance process island wide with the expertise contribution from professional Colleges of Obstetricians, Anaesthesiologists, Community Physicians, Administrators, physicians, cardiologists and Forensic Pathologists. The *British Journal of Obstetrics & Gynaecology (BJOG)* in 2014 acknowledged Sri Lanka's MDSR system to be the best organized and structured.

Maternal Death
-death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Maternal Mortality Ratio (MMR) is calculated as the number of maternal deaths per 100,000 live births. MMR is an overall quality index of a country's socio-economic development and healthcare. Sri Lanka reported a MMR of 1694 per 100,000 live births in the year 1947 and gradually reduced the same over the last few decades to achieve the best in the South Asian Region.

It is important to note that both health and non-health interventions made a significant impact on maternal care service delivery and reducing maternal mortality. These include; socio-economic development, free education and related high literacy rate of population, improved transport

services, free health services, improved quality of obstetric care, control of communicable diseases and well organized PHC systems.

When a probable maternal death is known, field and hospital health staff notify, conduct post-mortems, review at field and hospital levels and send a detailed report to FHB. At FHB, the Maternal & Child Morbidity and Mortality Surveillance Unit, a database is maintained and comprehensive case scenarios are developed to be reviewed by an expert panel. A national team of experts from related specialties visit each and every district in the following year to conduct National Maternal Mortality Reviews (NMMR) at district level with the participation of all concerned stakeholders. Each maternal death is reviewed based on 3 delays - deficiencies in seeking healthcare, reaching and treating, and lessons learnt are translated into practice, programs and policies at district and national levels.

For the year 2016, all NMMRs in 26 health regions were conducted and review of all deaths completed by November 2017.

Maternal death Notification Criteria: All female deaths (15 – 49 yrs), irrespective of the cause, during the pregnancy period and until one year after termination of pregnancy.

Preliminary review of all probable maternal deaths (n=190) reported during the year identified 112 deaths as maternal deaths giving a national maternal mortality ratio of 33.8 per 100,000 live births. Live births reported by the Registrar General's Department for the year 2016 was taken as the denominator (331,073) (**Figure 1)**. It is notable that there was a reduction of 3748 live births in the denominator (2015 - 334,821).

Figure 1: Calculation of MMR 2016

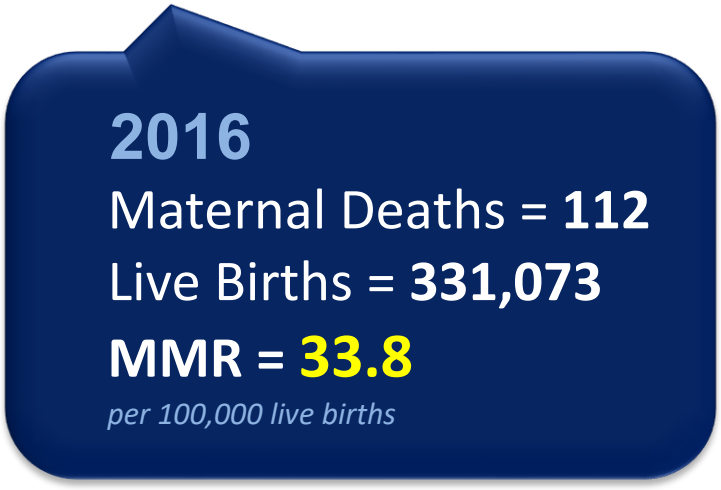


Figure 2 gives number of reported and confirmed Maternal Deaths from 2001 – 2016. Although there is a gradual reduction of number of deaths up to the year 2014, the number remains nearly the same over the last three years.

Figure 2: Number of Maternal Deaths (2001 – 2016)

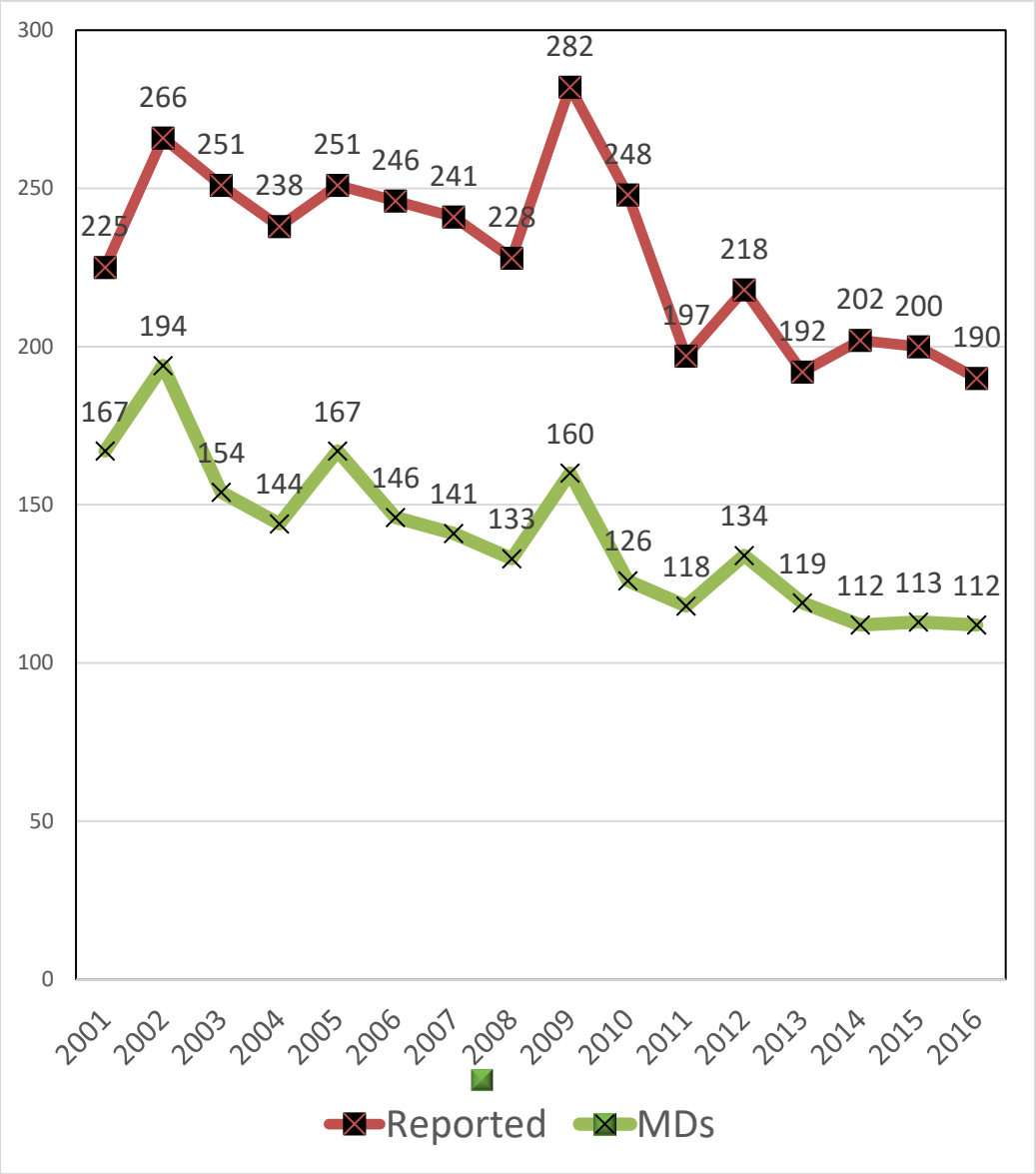
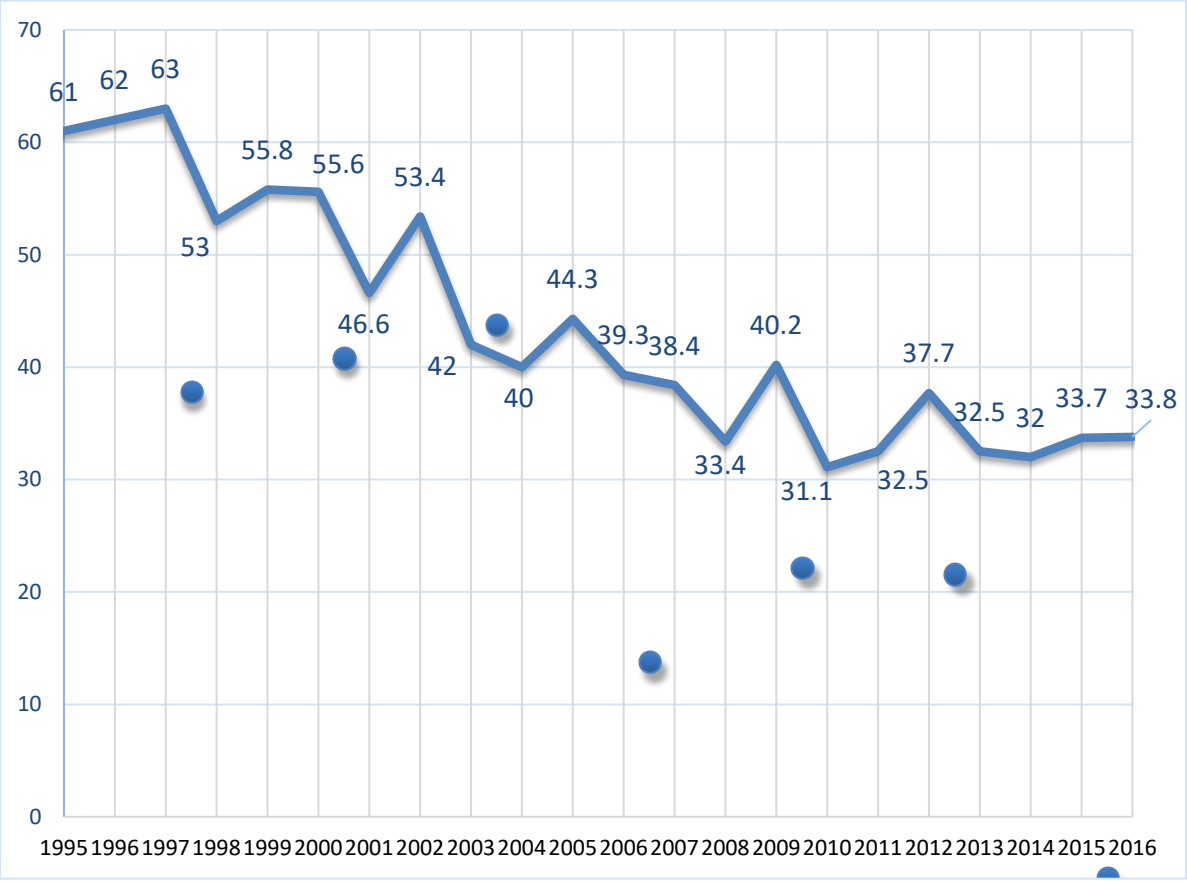


Figure 3 shows the declining trend of MMR over the years from 1995 – 2016. The graph stagnates at a same level of MMR over the last 9 years. However, Sri Lanka is well-placed with regard to maternal mortality on par with high income countries.

Figure 3: Maternal Mortality Ratio from 1995-2016



Source: Maternal & Child Morbidity & Mortality Surveillance Unit - Family Health Bureau

Detailed analysis of maternal deaths revealed that the majority (n=71, 63%) of women died were Sinhalese and Tamils (n=22, 20%) and Muslims (19, 17%). Many (n=70, 62%) were from the rural sector while others were from urban (n=39, 35%) and estate sectors (n=03, 3%). A large proportion (n=99, 88.4%) had either secondary or higher level of education. Ninety five percent (n=106) of them were married. There were 6 (5%) women either unmarried or divorced.

In the year 2016, a post-mortem was conducted in 105 (94%) cases. Final determination of the cause of death was carried out through a consensus reaching process involving a panel of experts from different fields.

Cause of death profile of the year 2016 shows that the category of maternal deaths shifted from indirect causes to direct causes (55%) (Figure 4). The leading causes of deaths were; obstetric haemorrhage, Heart disease and Amniotic fluid embolism (Figure 5).

Figure 4: Category of Maternal deaths

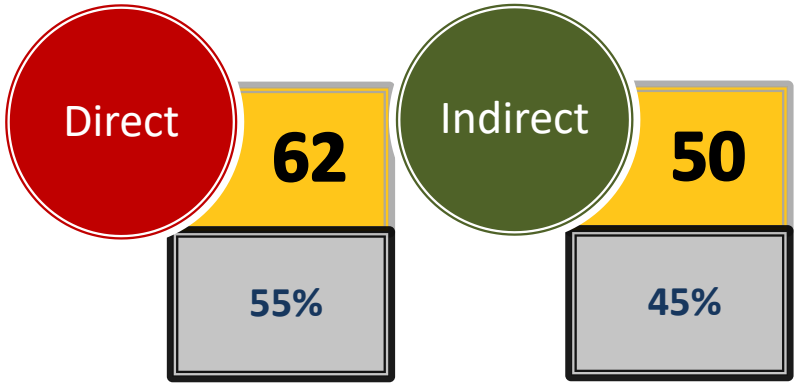
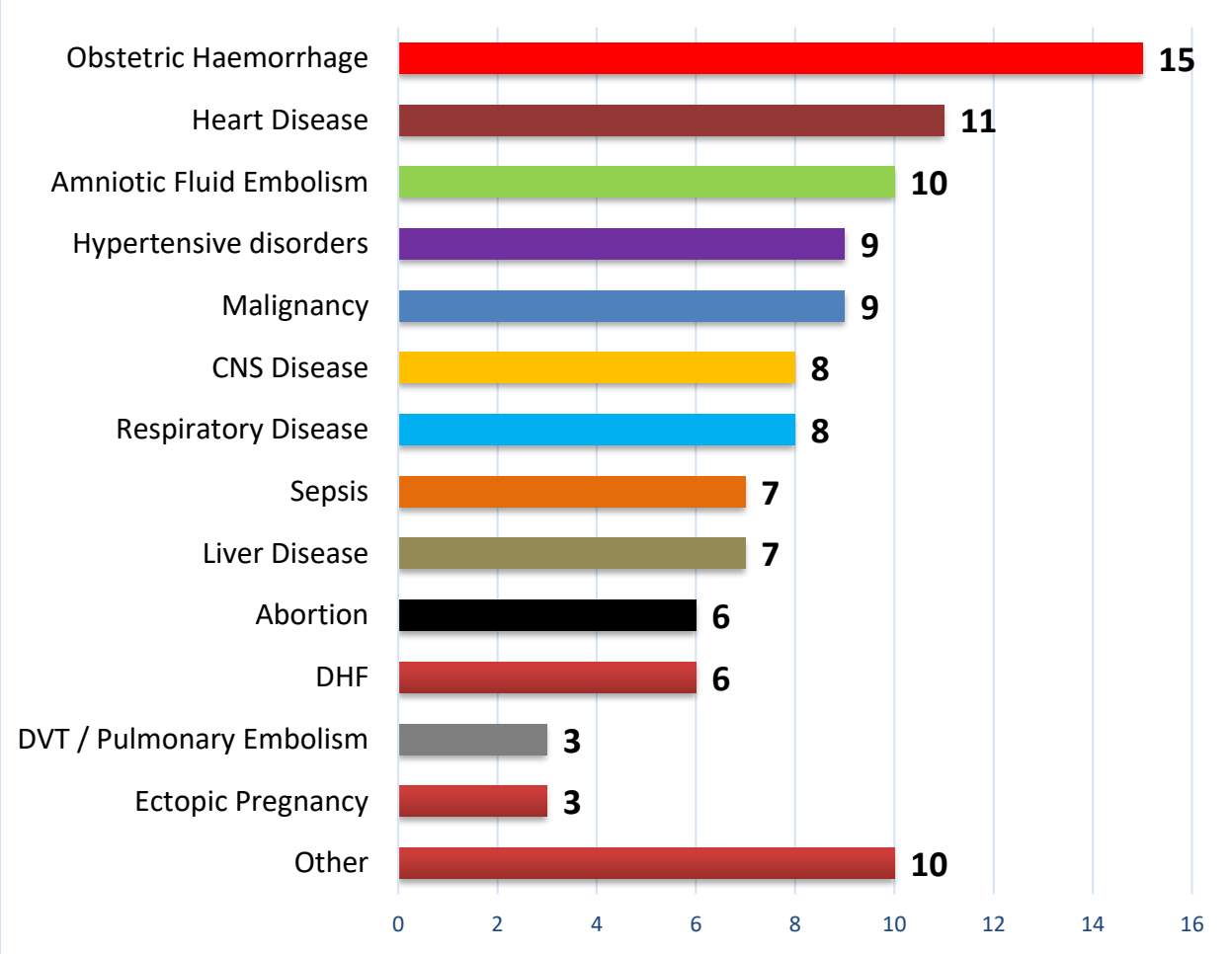


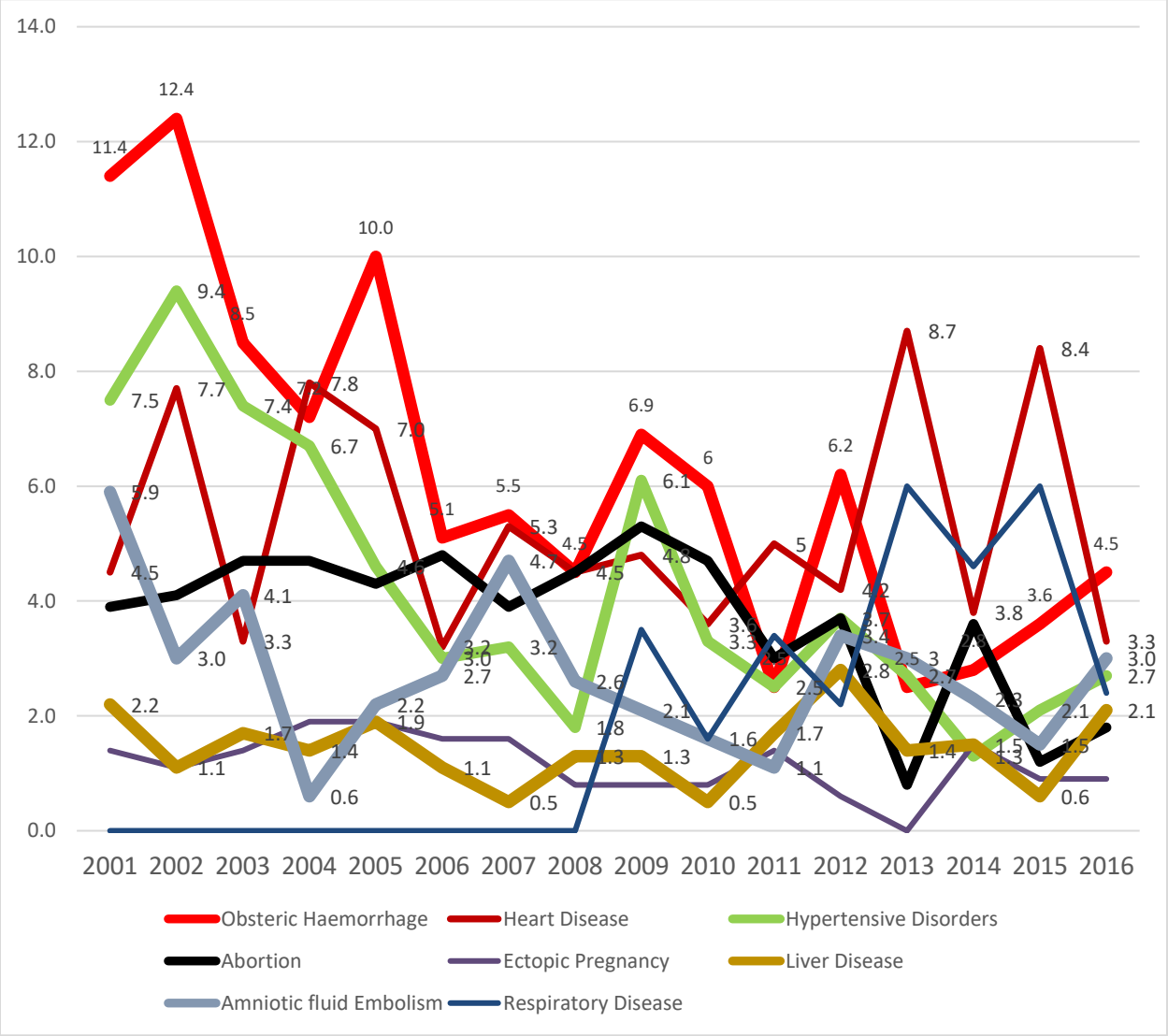
Figure 5: Leading causes of maternal deaths 2016



Source: Maternal & Child Morbidity & Mortality Surveillance Unit - Family Health Bureau

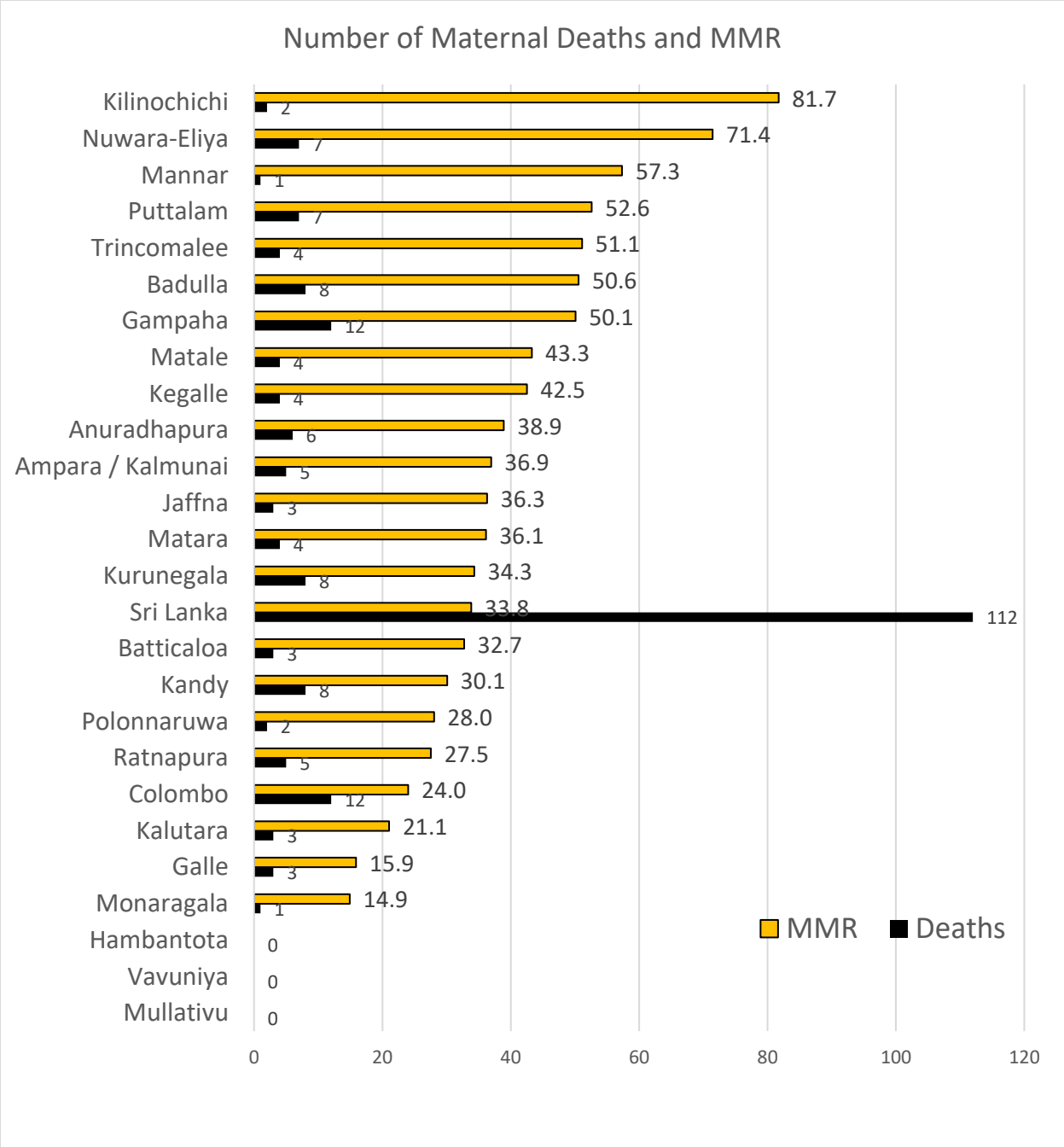
The changing cause specific maternal mortality ratios (CSMMR) are depicted in figure 6. It is evident that CSMMR for direct causes are in an increasing trend.

Figure 6: Cause Specific MMRs (2001 – 2016)



The analysis of district level number of deaths and MMR based on live births reported for each district by Registrar General's Department shows a wide variation. Gampaha and Colombo districts reported highest number of deaths. Kilinochchi reported the highest level of district MMR (Figure 7).

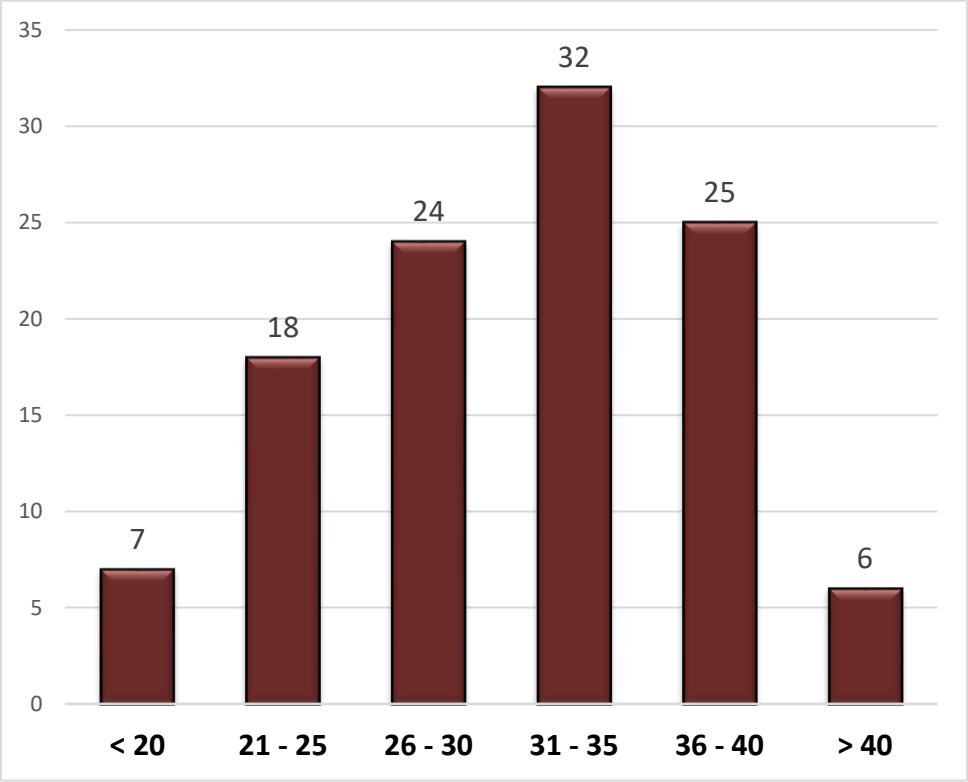
Figure 7: District MMRs and number of maternal deaths



Source: Maternal & Child Morbidity & Mortality Surveillance Unit - Family Health Bureau

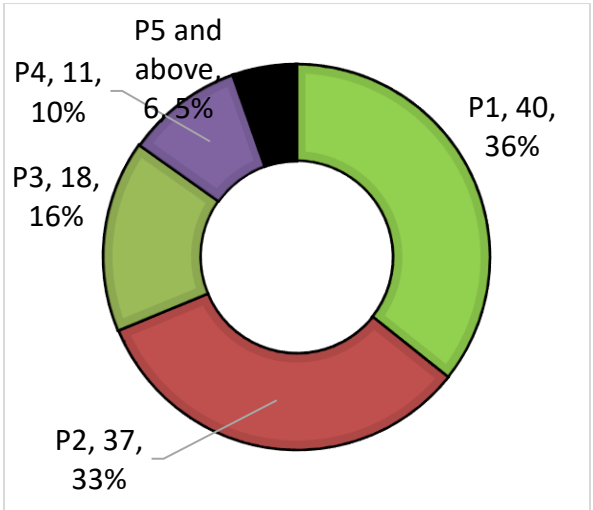
Age pattern of the women died are depicted in the figure 8. A significant number (n=7,6.3%) teenage maternal deaths and over the age 35 years (n=31, 27.7%) were also noted.

Figure 8: Age profile of the women died



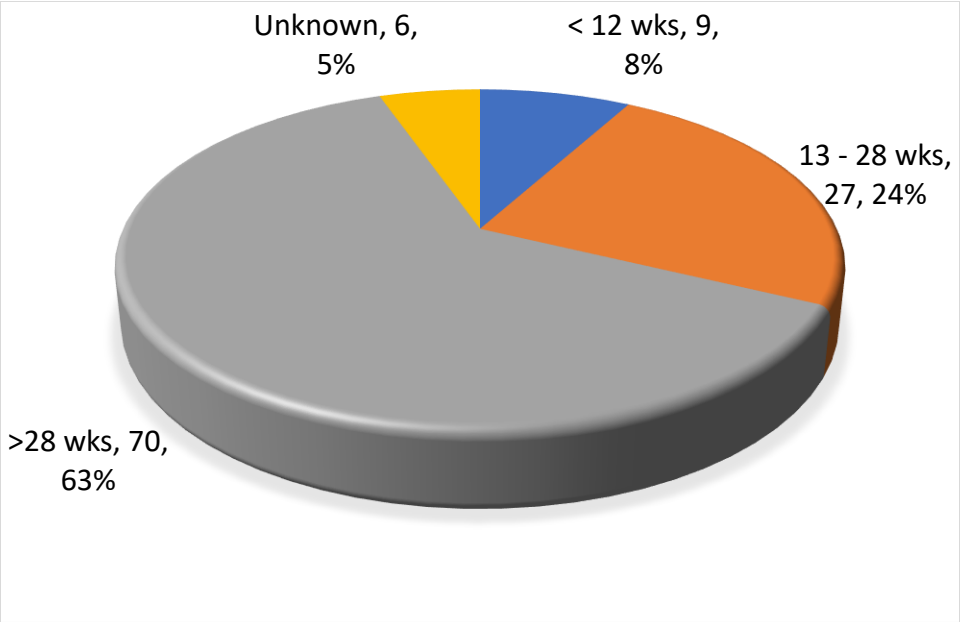
The parity level of the maternal deaths shows that one third of women were primies (n=40, 36%). A proportion of 31% (n=35) of women were in their third pregnancy or over. (Figure 9).

Figure 9: Parity of the women died



Many women (n=70, 63%) were in advanced pregnancies when they died (Figure 10).

Figure 10: Period of gestation completed before the death or delivery



Outcomes of the pregnancy of dead women are presented in table 1. A live baby was delivered in many (48.2%) cases.

Table 1: Pregnancy outcome of dead women

Pregnancy outcome	N	%
Abortion / Ectopic	10	8.9
Not delivered	31	27.7
Live baby	54	48.2
Stillbirth / Neonatal deaths	14	12.5
Not available	3	2.7
Total	112	100.0

Thirteen and three mothers were initially managed at peripheral hospitals (district hospitals or peripheral units) and Private Hospitals respectively. A majority (n=101, 90.2%) of women died at a hospital. Nine women died in transit or pronounced dead on admission to a hospital (Table 2). Out of the women died at hospital, a majority (n=57, 56.2%) died at a teaching hospital and 12 (11.9%) at a general or provincial hospital. Twenty eight (27.7%) women were last managed at either district general or base hospital before they died. Two women died at the Army Hospital.

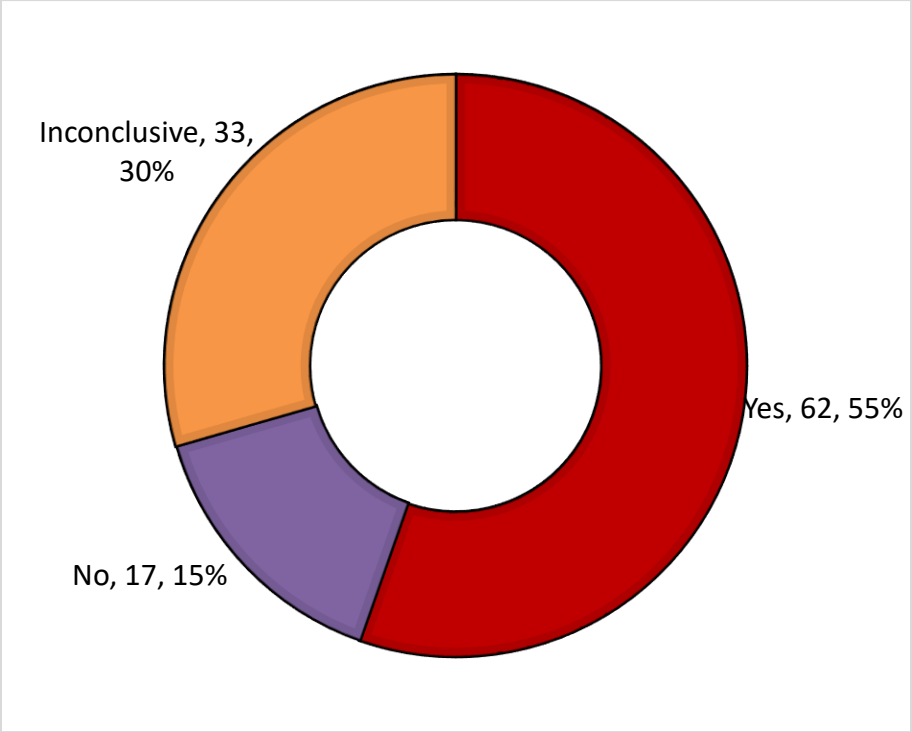
Table 2: Place of death

Place of death	N	%
Home	2	1.8
In transit / On admission	9	8.0
Hospital	101	90.2
Total	112	100.0

Delays were identified in 76 (68%) deaths. Delay in seeking care was attributable to 48 (42.9%) cases. Suboptimal care provision was revealed in 44 (39.3%) cases.

Out of the 112 maternal deaths reported, 62 (55%) were categorized as preventable based on the expert opinion. Unmet Need of Family Planning was incriminated in 20 (18%) cases. This is one third of the all preventable cases.

Figure 11: Preventability of maternal deaths



Notables issues discussed at national maternal mortality reviews are summarized in the following cage.

Notable Issues

- Complex social scenarios – sexuality issues / unwanted pregnancies
- RED book not properly maintained
- Many human resource issues
- Unmet need – Several issues in providing Family Planning to needy women
- Substandard documentation (BHT / Field records)
- Guidelines not followed (Induction / Misoprostol / Post-partum haemorrhage / Hypertensive disorders)
- Suboptimal Post-partum monitoring
- Issues in induction (without VOG decision) / issues in use of oxytocin
- Lethargic approach in Post-partum haemorrhage
- Transfusion specialists not utilized
- Pregnancy-specific dengue haemorrhagic fever not available
- Responsibilities entrusted to SHO
- Suboptimal care at peripheral hospitals
- 24/7 Blood bank services
- 24/7 Laboratory services
- Fast track management of obstetric emergencies
- Early detection of sepsis
- Administrative failures / Participation at NMMRs

National level dissemination of the outcome of the maternal death reviews was done on 12th December 2017 at FHB with the participation of all the stakeholders.

Sri Lanka College of Obstetricians and Gynaecologists (SLCOG) did a pivotal role in contributing to reviewing cases at national level and expert review at district level. Professional colleges of Anaesthesiologists and Forensic Pathologists also contributed in the maternal death review process.

Maternal and Child Morbidity and Mortality Surveillance Unit of FHB collated all documents related to index cases, compiled case scenarios, conducted national maternal mortality reviews, sent minutes of the reviews, processed data, analysed data and disseminated the outcome among all stakeholders.

Compiled by: Dr. Kapila Jayaratne
Maternal & Child Morbidity & Mortality Surveillance Unit
– Family Health Bureau, Ministry of Health Sri Lanka