Family Health Bureau
Ministry of Health - Sri Lanka

Analysis of Maternal Deaths - 2020

Final Report

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Maternal & Child Morbidity and Mortality Surveillance Unit

Outcome of Maternal Death Surveillance and Response – 2020

Maternal mortality has assumed as a pivotal index of human and social development. It reflects women's overall status, access to health care, and the responsiveness of a country's health care system to their needs.

The objective of a Maternal Death Surveillance and Response (MDSR) system is to improve maternal health and to end preventable maternal deaths. Sri Lanka's MDSR mechanism was introduced in 1959, which was followed by the issue of gazette regulation on mandatory notification of probable maternal deaths. A process of structured review of maternal deaths in collaboration with the professional colleges was started in 1995. In the year 2000, a national maternal death database was introduced by the Family Health Bureau (FHB). Numerous quality dimensions were added to the MDSR process since 2009. At present the country has a well-structured MDSR recognized as a role model at global level. Sri Lanka reported an 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 MMR in the South Asian Region.

Process of MDSR

The present process of MDSR mechanism covers the entire country with data originating from both community and facility levels. When a probable maternal death is known, field and hospital health staff notify, conduct post-mortems, review the index death at field and hospital levels and send a detailed report to Family Health Bureau (FHB). At FHB, the Maternal & Child Morbidity and Mortality Surveillance Unit maintains a database and comprehensive case scenarios are developed. These cases are then desk reviewed by an expert panel comprised of different specialties related to maternal care service provision. 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.

Definition of a Maternal Death

Sri Lanka adopts the WHO definition on maternal deaths: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes (WHO).

Review Methodology

Family Health Bureau was notified of 164 probable maternal deaths during the year 2020. Maternal & Child Morbidity & Mortality Surveillance Unit collated comprehensive information from family, field, hospital and medico-legal sectors to compile case scenarios for analysis. Due to the restrictions posed by the prevailing Covid19 pandemic situation, the usual maternal death review procedures involving central desk reviews and national maternal mortality reviews at district level could not be conducted as scheduled.

An initial document review of all reported deaths was conducted by a panel of two national program managers of MPDSR (Consultant Community Physicians) and a Consultant Obstetrician and Gynaecologist. All deaths of women while pregnant or within 42 days of termination of pregnancy were separated. A valid cause of death, based on the WHO ICD-MM classification was worked out for each death. The cases were then categorized as "Clearly maternal", Clearly non-maternal" and "Probable maternal" deaths based on the available data. A detailed analysis was done on probable maternal deaths to classify them as maternal or non-maternal.

Central level desk reviews (n=11) of cases categorized according to major disease entities (eg. Obstetric Haemorrhage, Heart Disease, respiratory Disease etc) were conducted during the period April 2021 – August 2022. A panel of experts comprised of representatives from Sri Lanka College of Obstetricians and Gynaecologists, College of Anaesthesiologists And Intensivists of Sri Lanka, Sri Lanka College of Internal Medicine, College of Forensic Pathologists of Sri Lanka, national program managers of maternal care, relevant Consultant Community Physicians and representatives from other related professional bodies reviewed the cases. For each index death, the desk review included;

1. Determination of the underlying cause of death
2. Confirmation as a maternal death
3. Determination of the category of maternal death (direct / indirect / incidental)
4. Identification of service deficiencies / provision of care and other issues
5. Formulation of recommendations

Maternal Mortality Metrics

Maternal Mortality Ratio (MMR) is the most widely used measure of maternal deaths. MMR assesses obstetric risk (i.e., the risk of dying once a woman is pregnant). It is calculated as the number of maternal deaths per 100,000 live births.

In the year 2020, out of reported maternal deaths, 89 deaths were categorized as maternal deaths giving a *provisional* national Maternal Mortality Ratio (MMR) of 29.5 per 100,000 live births (Figure 1). Live births reported by the Registrar General's Department for the year 2020 was taken as the denominator (301,706). It is notable that although the number of maternal deaths was reduced by 2 cases compared to the year 2019, the MMR for the year 2020 was increased by 0.3 point due to the substantial reduction of live births (17,304) in the denominator (2018 – 319,010).

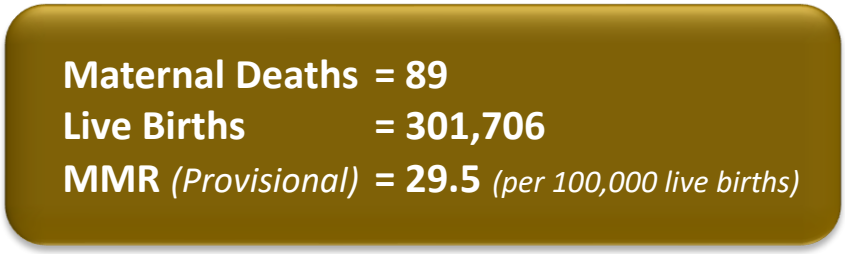

Figure 1: Calculation of MMR 2020

A graph depicting the number confirmed maternal deaths from 2001 – 2020 is included in Figure 2. It is noteworthy the substantial reduction of annual number of maternal deaths (n=39, 30.5%) between the years 2018 & 2020.

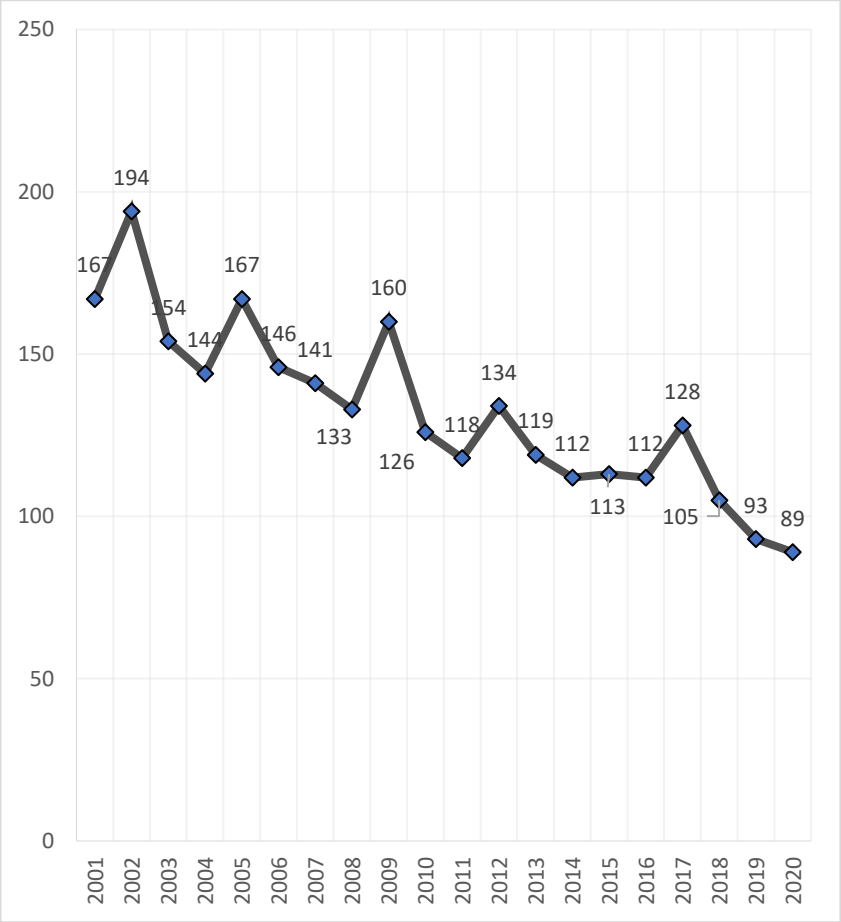

Figure 2: Number of Maternal Deaths (2001 – 2020)

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

Figure 3 shows the trend of MMR from 2001 – 2020. The reduction of the country's Maternal Mortality Ratio (MMR) over the years is impressive. However, a slight increase of MMR is visible in the year 2020.

Number of deaths and MMR of each district based on the live births reported by Registrar General's Department are shown in Figure 4. A wide district disparity is evident with 14 districts reporting their district MMRs above the national value. Quite peculiar to the pattern in the previous years, the highest MMR was reported from Matara district (60.7 per 100,000 live births). Other leading districts are Mannar, Batticaloa, Gampaha and Matale . The highest number of maternal deaths was reported from Gampaha (10) district.

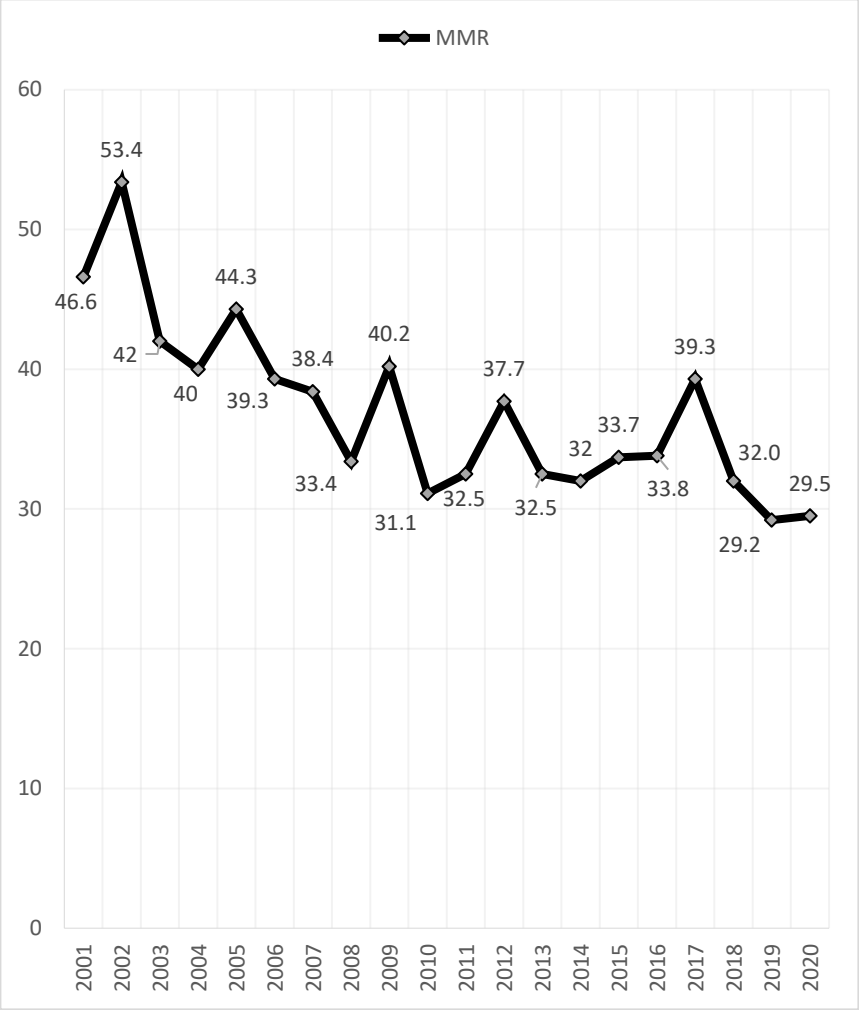

Figure 3: Maternal Mortality Ratio from 1995-2020

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

Maternal deaths are categorized into two groups, direct and indirect. Direct obstetric deaths result from obstetric complications of the pregnant state (pregnancy, labor, and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. Indirect obstetric deaths result from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiologic effects of pregnancy.
A majority (n=46, 52%) of the deaths were direct maternal deaths while 42 (47%) deaths were categorized as indirect and in one death the category could not be determined.

Socio-demographic background of dead women show that they were from rural (n=68, 76%), urban (n=16, 18%) and estate (n=5, 5.6%) sectors. Ethnic composition included; Sinhala (n=60, 67.4%), Tamil (n=20, 22.5%) and Muslim (n=9, 10%) women. Average monthly income was below Rs. 50,000 in a larger proportion (n=64, 71.9%). The majority were married (n=86, 96%) with 2 (2%) unmarried and 1 (1%) woman who stayed living together. There were three (3%) teenage maternal deaths. Majority (n=65, 73%) were in the 20 – 35 year age group. It is highly significant that 21 (24%) women were above 35 years of age (Figure 5).

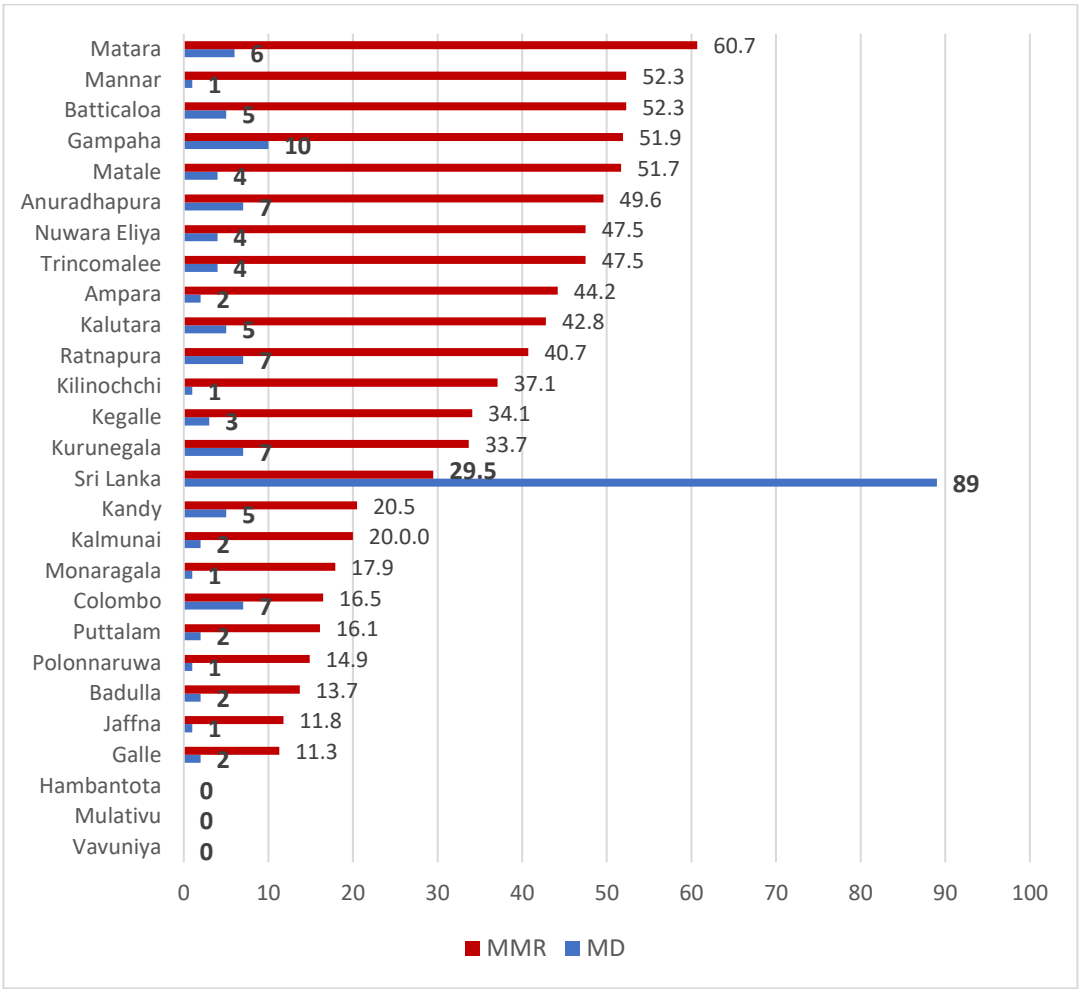

Figure 4: Maternal Deaths and MMR by District - 2020

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

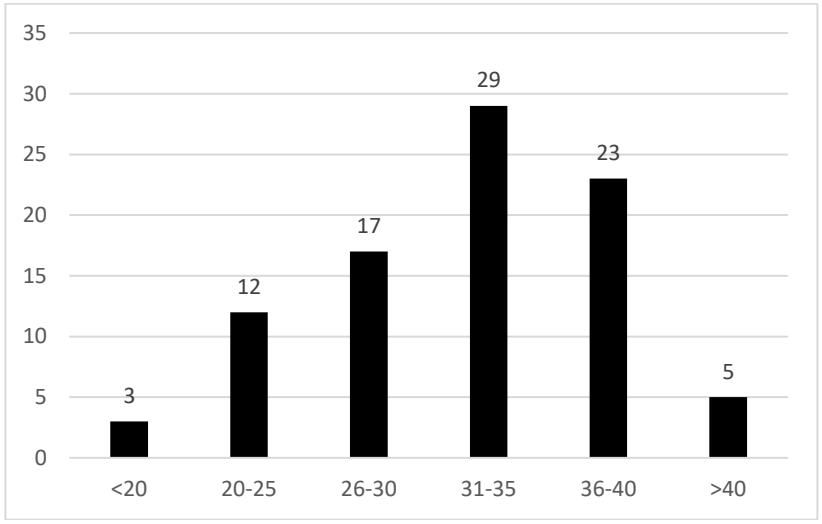

Figure 5: Age Category of Maternal Deaths - 2020

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

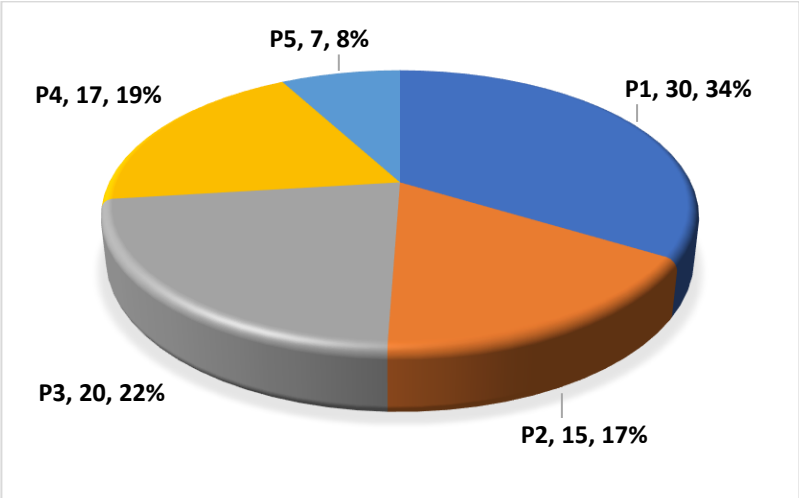

Figure 6: Parity of Maternal Deaths - 2020

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

One third (n=30, 34%) of the dead women were primies. Nearly half (n=44, 49.4%) of them were in their 3rd or more pregnancy when they died (Figure 6).

The underlying causes of maternal deaths reported in 2020 are indicated in figure 7. The leading causes were obstetric haemorrhage (n=12, 13.5%), heart disease (n=12, 13.5%), respiratory disease (n=8, 9%) and diseases of the central nervous system (CNS) (n=8, 9%). CNS disorders assumed a leading cause for the first time and other three causes were rotating over the past few years as the leading causes of maternal deaths in the country. Several categories of direct maternal deaths (eg. Sepsis, embolic diseases and abortions) have significantly reduced. There were no deaths due to Covid19 in the year 2020 despite the pandemic.

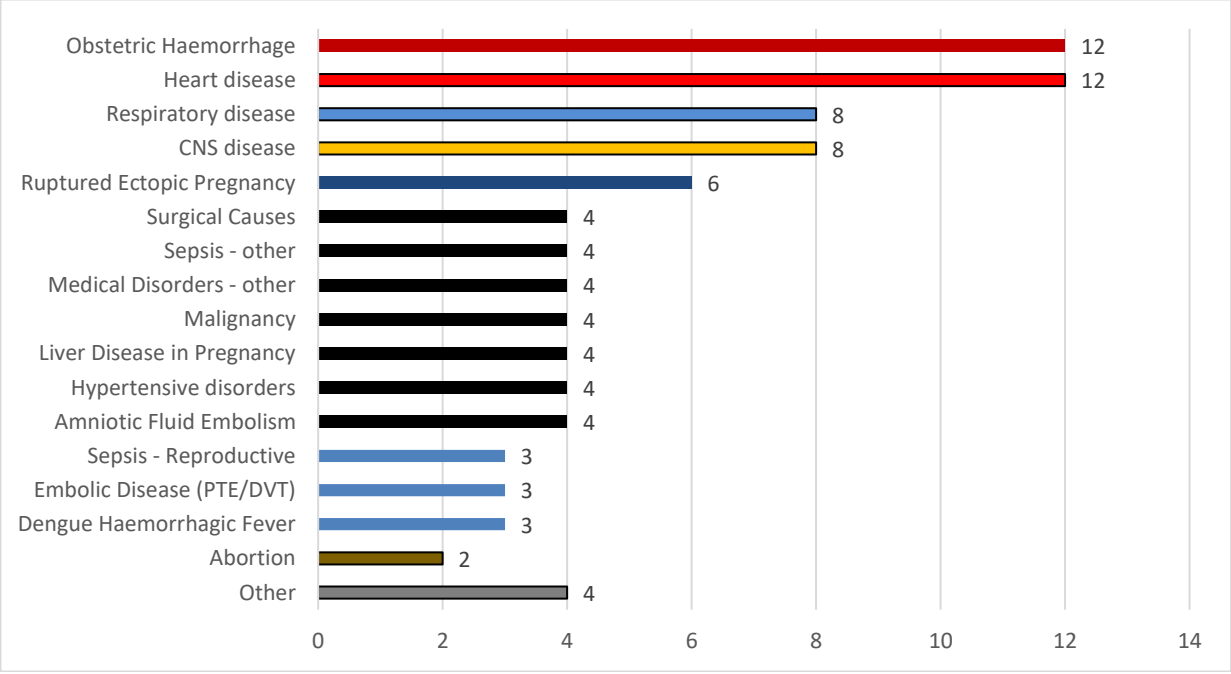

Figure 7: Causes of maternal deaths - 2020

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

The majority of women (n=75, 84.3%) died at a hospital. Of them, 98.7% (n=74) died at a hospital where specialized obstetric care was available (28 at Base or District General Hospitals, 45 at Provincial General or Teaching Hospitals). One each died at a district hospital and a private hospital. There were 2 (2.2%) home deaths, 9 (10.1%) on admission deaths and 3 (3.4%) deaths on the way to a hospital.

Monthly reporting of number of maternal deaths is shown in figure 8. A high number of maternal deaths occurred in December (13), March (11) and May (10). The frequency of reporting maternal deaths gradually increased towards the end of the year.

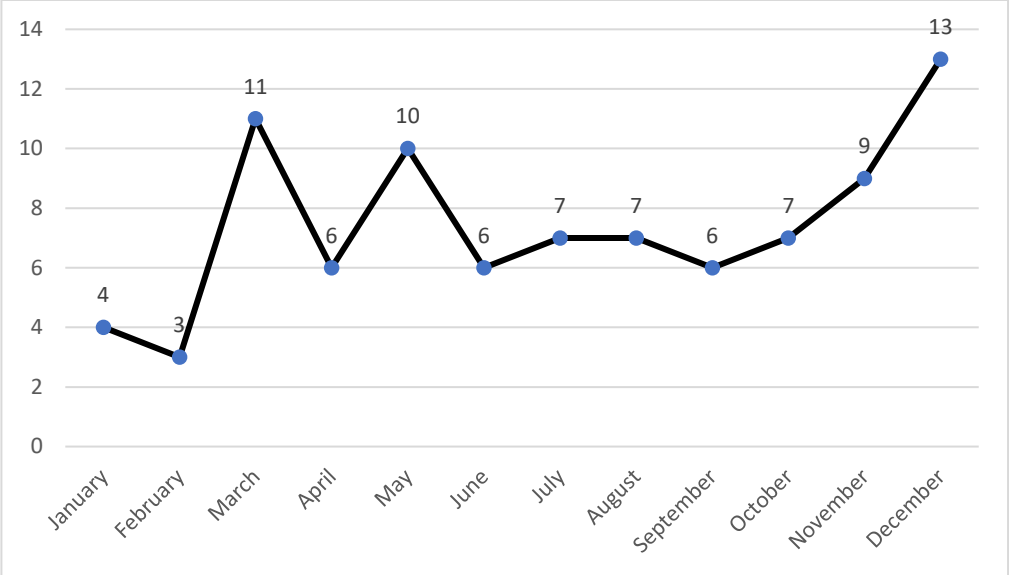

Figure 8: Monthly Frequency of maternal deaths - 2020

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

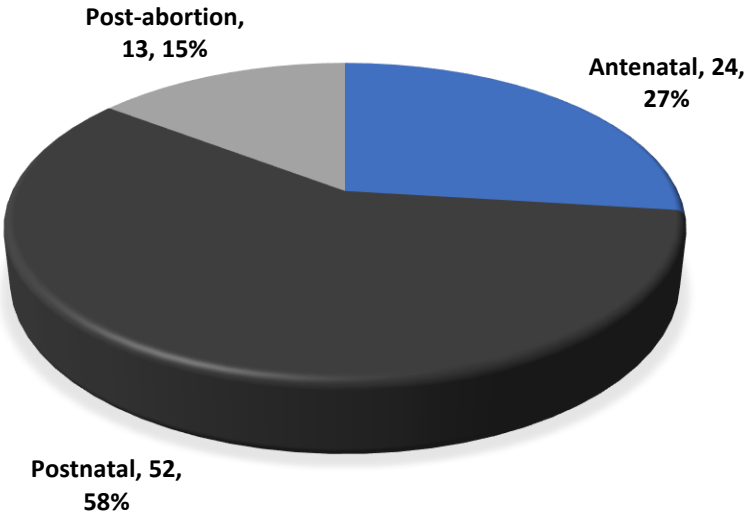

Figure 9: Causes of maternal deaths - 2020

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

Figure 9 depicts the timing of death. Many (n=52, 58.4%) of them had died post-natal, 24 (27.0%) antenatal and 13 (14.6%) post-abortion. Two-thirds (n=58, 65.2%) of them had completed >28 weeks of gestation before they died or were delivered. Women died / delivered after the completion of <12 weeks of gestation were 10 (11.2%) and 12 – 28 weeks were 21 (23.6%).

Table 1 illustrates the mode of delivery of dead women. One third (n=31, 34.8%) of them had not delivered or experienced abortions. The majority of them had been delivered by Cesarean Section (n=38, 42.7%). The outcome of the present pregnancy was a live birth in 44 (49.4%), stillbirth in 9 (10.1%) and fetal death below 28 wks in 7 (7.9%).

Table 1: Mode of Delivery

Mode	**N**	**%**
Not Delivered / Abortions	31	34.8
Normal Vaginal Delivery	9	10.1
Assisted Vaginal Delivery (Vaccum / forceps)	4	4.5
Unassisted Vaginal Delivery	2	2.2
Cesarean Section	38	42.7
Hysterotomy	5	5.6
Total	**89**	**100.0**

With regard to service provision, field Public Health Midwife (PHM) area was vacant in 14 (15.7) cases. An unmet need of Family Planning was identified in 24.7% (n=22) cases. This is of concern as one fourth of the maternal deaths could have been averted had the relevant caregivers provided appropriate contraceptives to the index women. Provision of field (n=62, 69.7%) and hospital (n=67, 75.3%) and hospital antenatal care was satisfactory.

Cases were assessed for the presence of 3-delays (seeking, reaching & treating) by the panel of experts and delays were noted in 46 (51.7%) cases (Table 2). Delay in seeking care has significantly reduced this year to 37.1%. Reaching to a hospital was delayed due to transport difficulties was noted only in 2 cases. Suboptimal care either at field, first contact or hospital level, although comparatively reduced this year, was observed in a significant proportion (n=20, 22.5%).

Table 2: Analysis based on 3 delay model

Type of Delay	**N**	**%**
Delay 1 (Seeking care)	33	37.1
Delay 2 (Reaching)	2	2.2
Delay 3 (Treating)	20	22.5

The preventability was assessed after reaching a consensus among the reviewers of the cases. Experts decided that 42 (47.2%) of the deaths were preventable and 29 (32.6%) were not preventable (Figure 10).

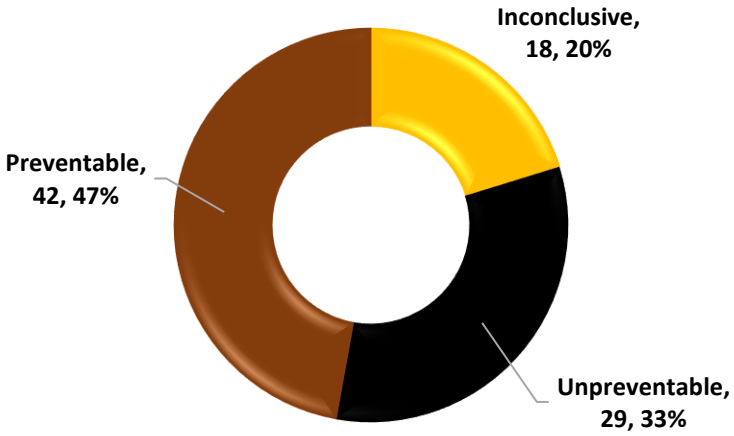

Figure 10: Preventability of maternal deaths - 2020
Source: Maternal & Child Morbidity & Mortality Surveillance Unit - Family Health Bureau

Coverage of conducting post-mortems was 98.9% and it was not conducted only in one maternal death.

Issues

Following key issues were identified during the review of the cases;

1. Delays in seeking care due to multiple reasons at home level, ignorance and not complying with PHM or medical advice
2. Delays in seeking and initiation of care due to fear of Covid-19 or enforcement of curfew.
3. Unplanned pregnancies and multiple issues in promoting contraceptives to needy and vulnerable women.
4. Substandard care at individual and team levels in managing index cases at field, first contact and hospital levels. such as non-adherence to guidelines, objective assessment of cases, failures in communication and late involvement in provision of care.
5. Not providing proper multidisciplinary care in the management of critically-ill women.
6. Unavailability of required medications, facilities or other logistics at hospital level in managing sick women.
7. Vulnerable reproductive age females were not followed up or provided with targeted care by field teams.
8. Several maternal suicides (although not counted as maternal deaths) showing deficiencies in field care for high risk women.

Recommendations

Main recommendations formulated are as follows:

1. To make pregnant women and their relatives knowledgeable on the availability of emergency obstetric care at all hospitals despite restrictions due to any situation.
2. All pregnant women and their relatives should be educated on the danger features during the pregnancy and post-partum periods and the need for attending to hospital irrespective of the epidemic or curfew situation.

3. Streamline the availability of specialist care without restrictions and with due safety precautions to all pregnant and post-partum mothers at specialized hospitals (Government and Private sectors). The emphasize should also be focused on shared care in referral and back referral following discharge from hospital and on quality of post-partum care.
4. Update and recirculate guidelines / circulars on the need for physical presence of each category of health staff in managing maternal cases and to emphasize the strict adherence to the same.
5. Identify gaps in essential logistics at hospital level in caring for pregnant and post-partum women and facilitate provision of them with due priority
6. Streamline the RED Book strategy in providing targeted field care for the vulnerable women at risk of dying.
7. To upgrade perinatal mental health literacy in the general public with a special focus on pregnancy and post-partum period.

A detailed report will be published with case vignettes, issues and actions recommended in due course.

Acknowledgements:
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