



Family Health Bureau

Ministry of Health – Sri Lanka

Analysis of Maternal Deaths - 2022

Final Report

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Maternal Morbidity and Mortality
Surveillance Unit

Outcome of Maternal Death Surveillance and Response – 2022

Maternal mortality remains a critical indicator of a nation's health care system effectiveness, reflecting the overall health of women during pregnancy, childbirth and the post-partum period. It is also a key indicator of the health and well-being of women and girls, reflecting their overall health status, access to healthcare, and the responsiveness of the country's healthcare system to their needs.

Maternal Death Surveillance and Response (MDSR) system⁰ as a critical component of public health infrastructure aims at reducing preventable maternal deaths by identifying, investigating and response planning based on issues identified. Sri Lanka introduced its MDSR mechanism in 1959, followed by a mandatory notification regulation for probable maternal deaths in 1985. Since 2009, numerous quality dimensions have been added to the MDSR process. Today, Sri Lanka has a well-structured MDSR system that is recognized as a global model.

Process of MDSR

Notification of maternal deaths has been established as a legal obligation through the issuance of a gazette notification to all practitioners providing care to women in Sri Lanka. All deaths (irrespective of cause) of women in the reproductive age group (15 – 49 years), during the pregnancy period and until one year after termination of pregnancy should be notified to the Family Health Bureau (FHB). Following this a detailed review of the case is done at field level and institutional level where the index mother has received care. At FHB, the Maternal Morbidity and Mortality Surveillance Unit maintains a database and comprehensive case scenarios are developed. Institutional death reviews are held for all direct and indirect maternal deaths at the institution where the maternal death took place with the participation of institutional and field health staff involved in the care of the index case and the representatives from the Ministry of Health and Family Health Bureau. These reviews serve as platforms for healthcare professionals involved in the care of the deceased patients to come together and discuss the findings of their investigations and generate recommendations for prevention of similar cases in the future. These cases are then desk reviewed by an expert panel comprised of different specialties related to maternal care service provision. Each maternal death is reviewed based on 3 delays – (deficiencies in seeking healthcare, reaching and treating), and the lessons learned from these reviews are then used to improve maternal health practices, programs, and policies at the 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 174 probable maternal deaths during the year 2022. The Maternal Morbidity & Mortality Surveillance Unit gathered comprehensive information from family members, field workers, hospital staff, and medico-legal experts to create case scenarios for analysis. Institutional maternal death reviews were held for these cases with the participation of institutional and field health staff involved in the care of the index mother and the representatives from the Ministry of Health and Family Health Bureau.

Out of the notified deaths 91 deaths were identified as true maternal deaths due to direct or indirect causes. Central level desk reviews (n=8) were conducted for these 91 cases categorized according to major disease entities (eg. Obstetric Hemorrhage, Heart Disease, Disease etc.) during the period 2022 –2023. A panel of experts comprised of representatives from Sri Lanka College of Obstetricians and Gynecologists, College of Anesthesiologists 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. Confirmation as a maternal death
2. Determination of the underlying cause of 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

In the year 2022 as a further development in maternal mortality surveillance, Confidential Enquiry into Maternal Deaths (CEMD) was introduced as a pilot project for the Western and Southern provinces of Sri Lanka. The 24 pilot settings 24 maternal deaths reported from these pilot areas were reviewed under the CEMD methodology while the remaining 67 maternal deaths were subjected to the routine MDSR methodology.



Maternal Mortality Metrics

Maternal Mortality Ratio (MMR) is the globally accepted indicator to quantify the burden of maternal deaths in a country. MMR evaluates obstetric risk, or the possibility that a woman could die during pregnancy. It is calculated as the number of maternal deaths per 100,000 live births. MMR is also used as an indicator to assess the overall maternal health and the health status of a country.

In the year 2022, out of all reported deaths, 91 deaths were categorized as maternal deaths giving a National Maternal Mortality Ratio (MMR) of 33.0 per 100,000 live births (Figure 1). Live births reported by the Registrar General's Department for the year 2022 was taken as the denominator (275,321) which showed a reduction from the 2021 figure of 284,848 (9527). It is notable that, experiencing post COVID and economic crisis implications may have led to the inability to reach the pre COVID level of MMR in 2022. There were no maternal deaths due to COVID -19 in the year 2022.

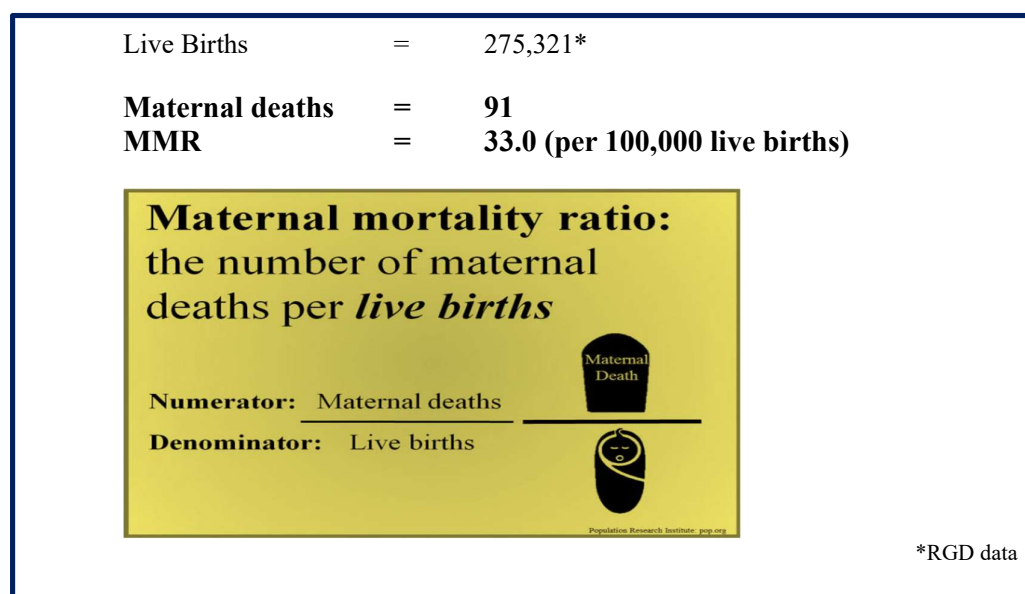


Figure 1: Calculation of National MMR 2022

A graph depicting the number confirmed maternal deaths from 2002 – 2022 is included in Figure 2. A gradual reduction in the number of maternal deaths can be seen up to 2020 however 2021 with the height of the COVID-19 pandemic in Sri Lanka, there was a sudden and drastic uptick in the number of maternal deaths. In 2022 the number dropped back to the pre COVID trend despite the post pandemic effect and the financial crisis effect in the country.

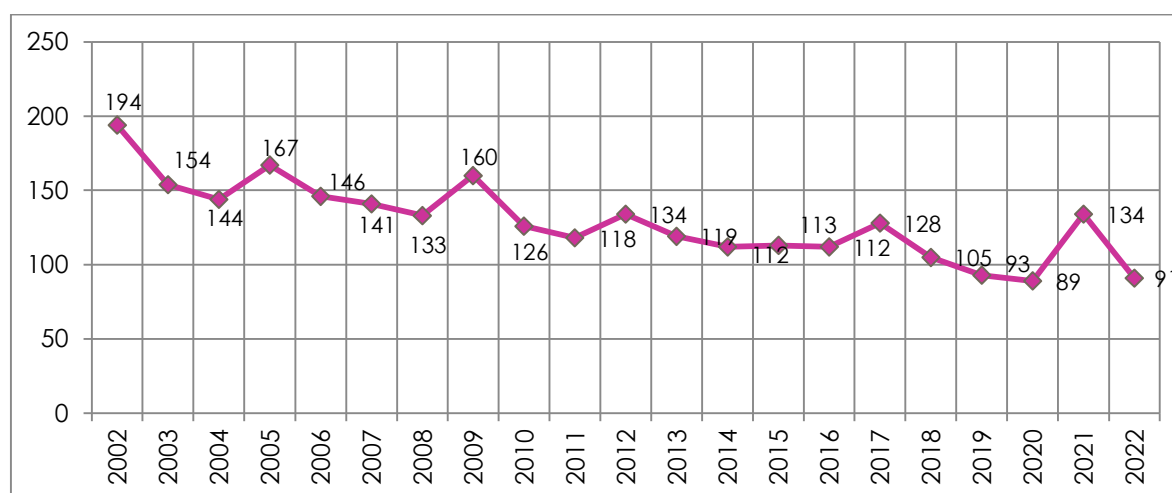


Figure 2: Number of maternal deaths (2002 – 2022)

Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Figure 3 shows the trend of MMR from 2002 – 2022. Though the gradual reduction of the country's Maternal Mortality Ratio (MMR) showed a drastic increase in the year 2021 due to COVID effect, in the year 2022 the situation returned almost to the pre-pandemic status. Even with the reduction of maternal

deaths number to 91 the MMR has not displayed the same reduction due to the reduction of the number of live births over the years.

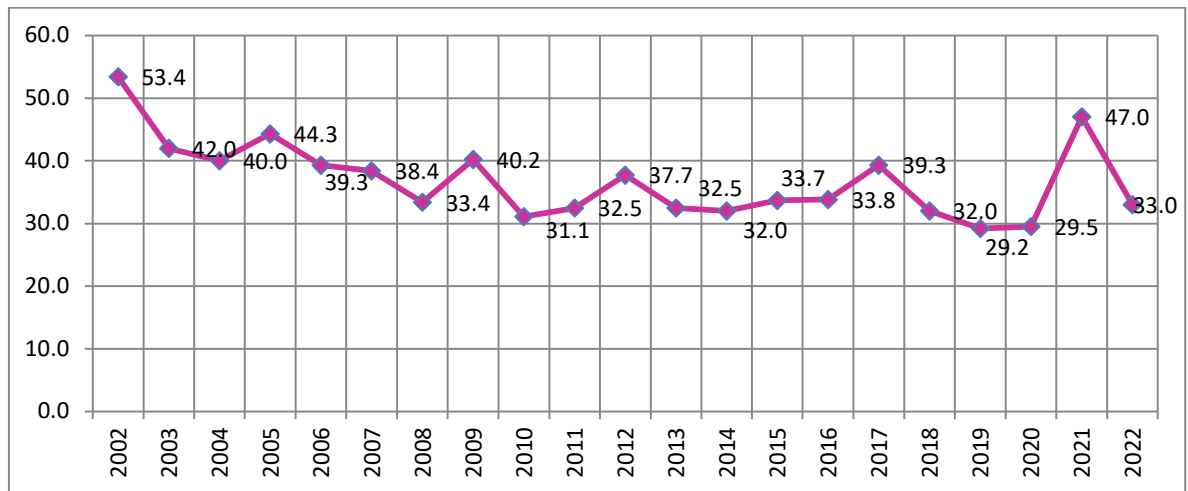


Figure 3: Maternal Mortality Ration from 2002- 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Figure 4 shows the number of deaths and MMR of each district calculated based on the number of live births reported by Registrar General's department for each district. When considered the district variability of MMR, the highest MMR was reported from Mathale as 101.7 per 100,00 live births (n=7). Other leading districts were Monaragala, Kaluthara, Nuwara Eliya and Gampaha. Mullaitivu districts reported zero maternal deaths. While lowest MMR was reported in Kalmunai as 11.1(n=1) as a number Gampaha reported the greatest number of maternal deaths with 11 compared to the 18 deaths reported in 2021.

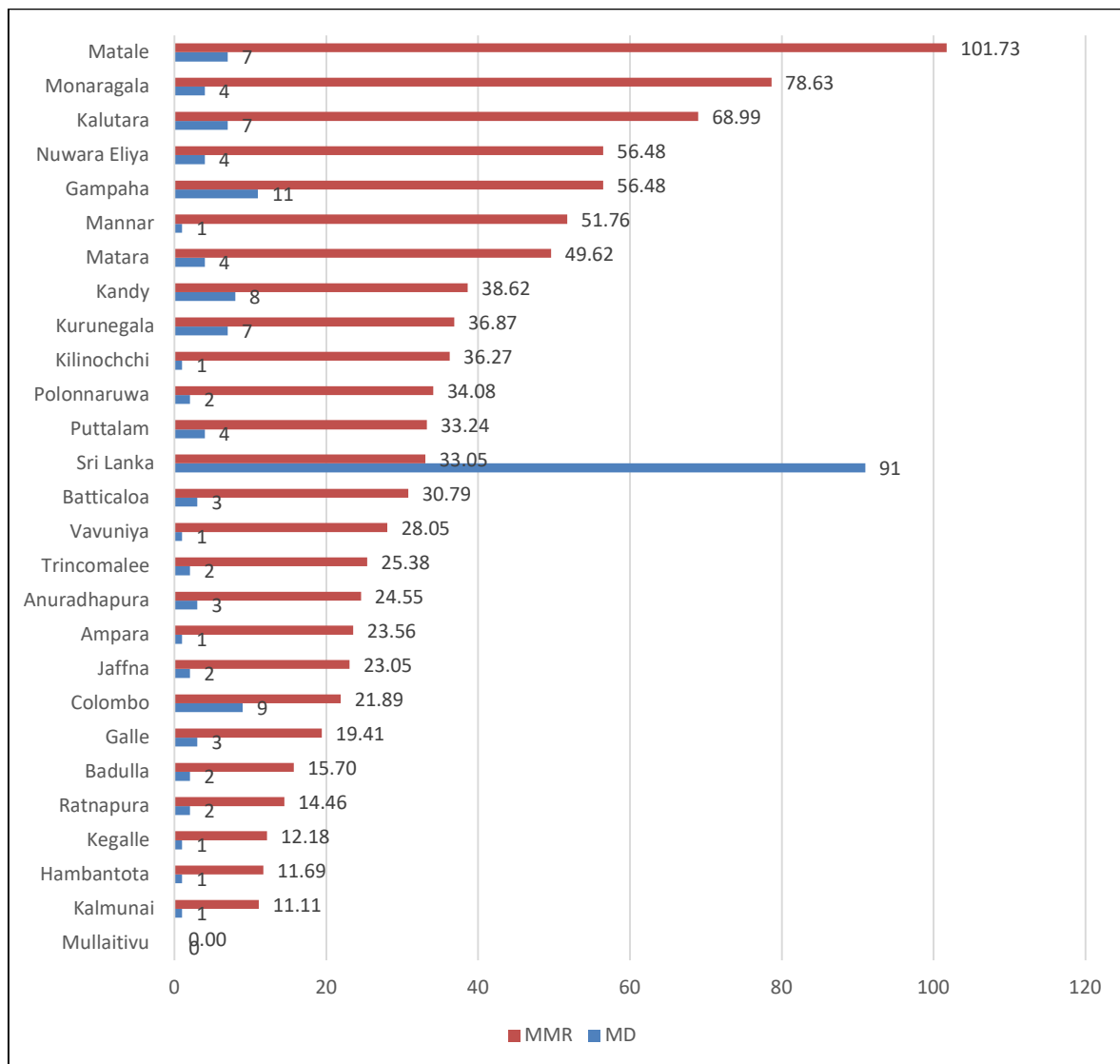


Figure 4: Maternal Deaths and MMR by District – 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Maternal deaths are classified into two distinct categories: direct and indirect. Direct obstetric deaths arise from complications related to the pregnant state, encompassing pregnancy, labor, and the puerperium. These fatalities may stem from interventions, omissions, incorrect treatment, or the cascading consequences of any such actions.

Indirect obstetric deaths occur due to pre-existing diseases or conditions that emerged during pregnancy, independent of direct obstetric causes, but exacerbated by the physiological effects of pregnancy.

A majority of maternal deaths in 2022 were indirect maternal deaths (n=55, 60%) while 36 (40%) maternal deaths were classified as direct maternal deaths.

Figure 5 shows the causes for maternal deaths reported in the year 2022. The leading cause of maternal deaths was reported as respiratory diseases (n=13, 14.2%) including viral and bacterial pneumonias. Heart disease and CNS related disease conditions reported 10 cases (10.9%) each. The comparative increase of CNS diseases related maternal deaths from n=3 in 2021 to n=10 in 2022 became a notable issue. Obstetric Hemorrhage reported as the fourth commonest cause (n=8, 8.8%). Compared to 5 cases in 2021 sepsis

other than reproductive sepsis reported 7 cases falling at the 5th place. There were no deaths reported due to COVID 19 infection in 2022.

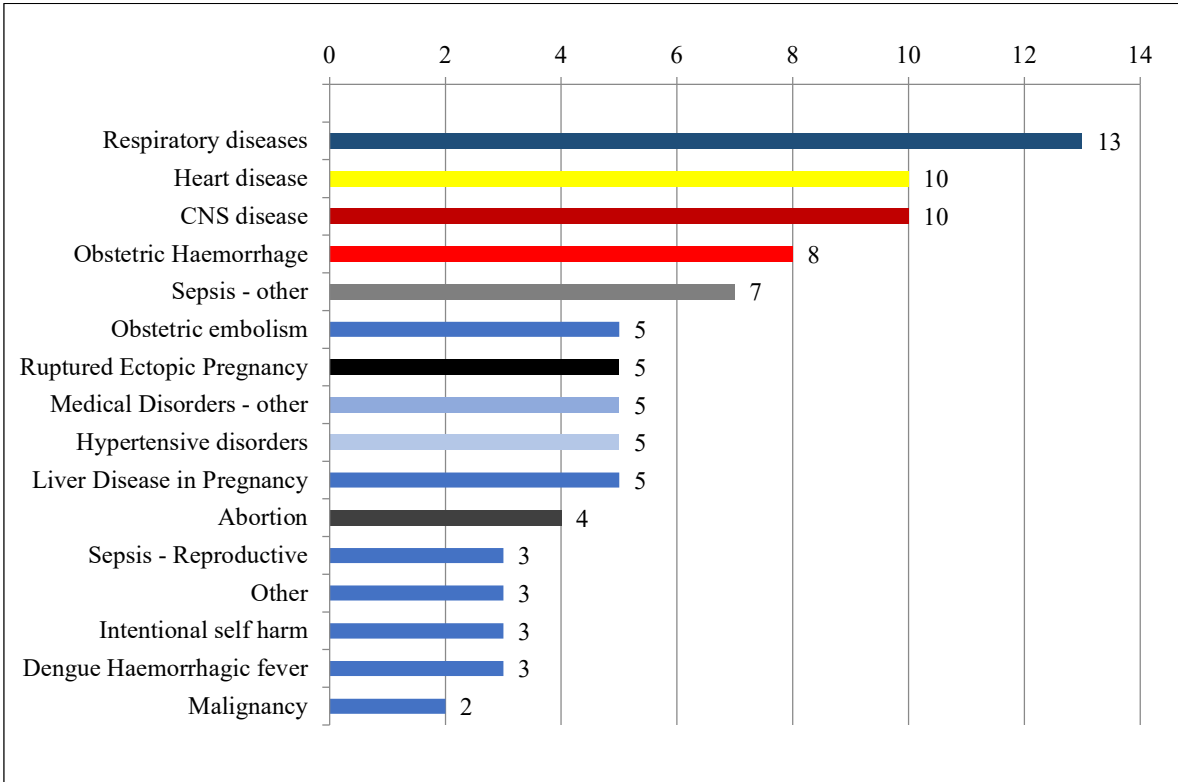


Figure 5: Causes of maternal deaths -2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

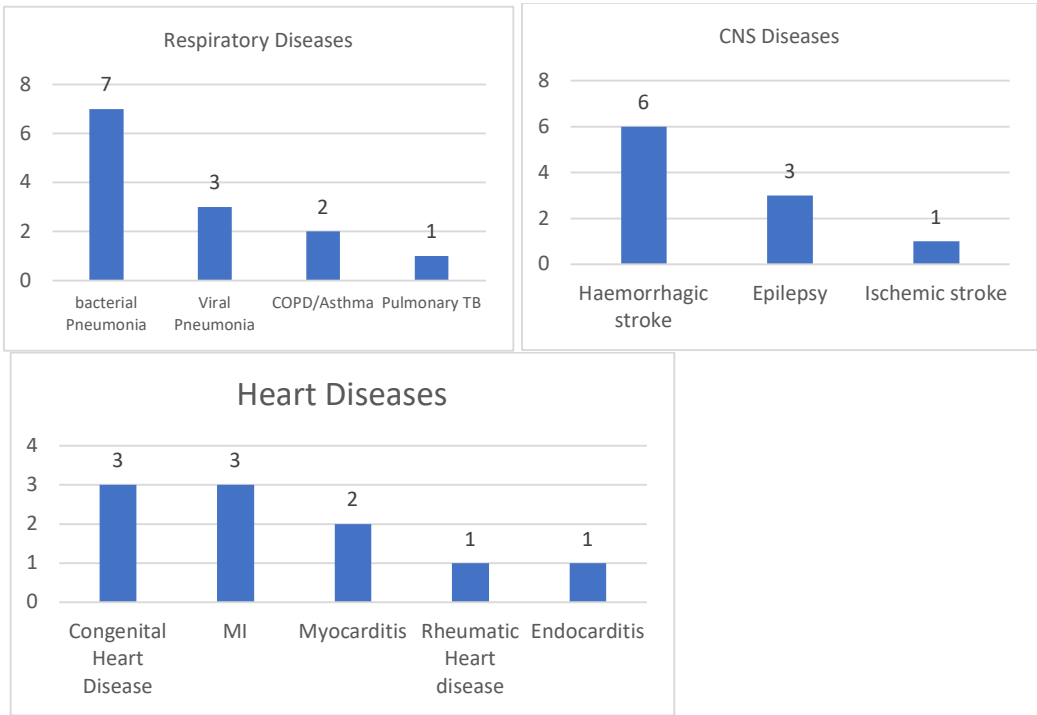


Figure 6: Breakdown of Causes of maternal deaths -2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Among the reported deaths, 64 deaths (70%) were reported from urban sector while 25 deaths (27.5%) and 2 deaths (2.2%) were reported from rural and estate sectors respectively. The ethnic composition included; Sinhala (n=61, 66.3%), Tamil (n=10, 11%) and Muslim (n=20, 22.7%). A majority were married (n=86, 94.6%) while a minority were unmarried (n=5, 5.4%).

Considering the age distribution of the maternal deaths there were 2 deaths 20 years of age, while the majority of deaths occurred within the age range of 26 to 30 years (n=23, 25.2%) (Figure 7).

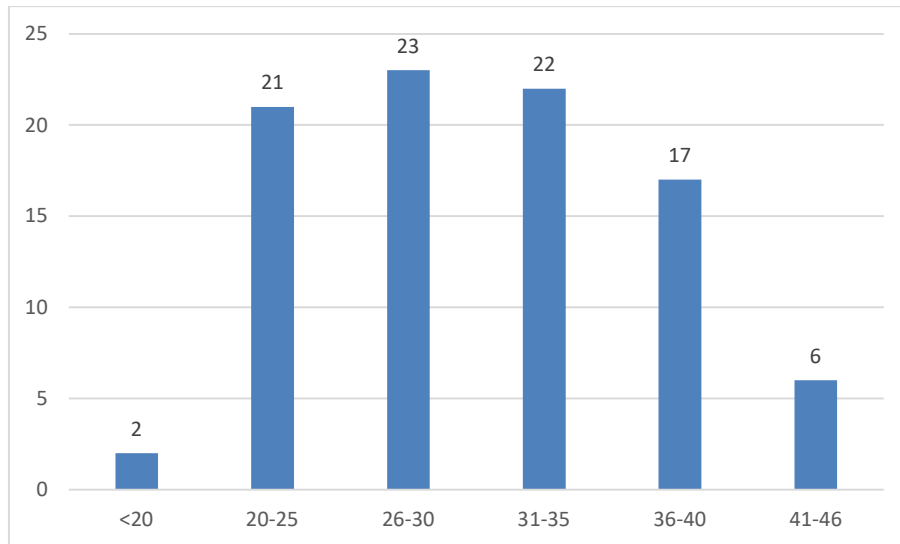


Figure 7: Age category of Maternal Deaths – 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Of all the maternal deaths 23 mothers were primi mothers (25.3%) while 68 were multiparous (74.7%). Figure 8 shows the parity of the maternal mortality cases.

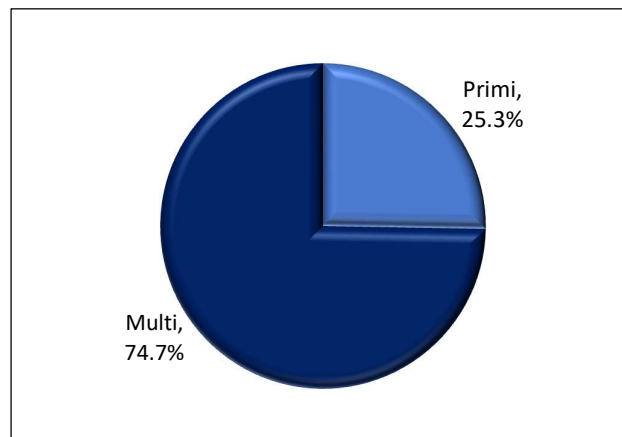


Figure 8: Parity of maternal deaths - 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Considering the timing of the maternal death, antenatal period deaths were much less in proportion 32.6% (n =30) compared to the postpartum 59.8% (n =54) and post abortion 6.5% (n =7). Out of the post-partum

and post abortion maternal deaths 24% occurred within the first 24 hours while majority 76% occurred during the period between postpartum day 02 - day 42.

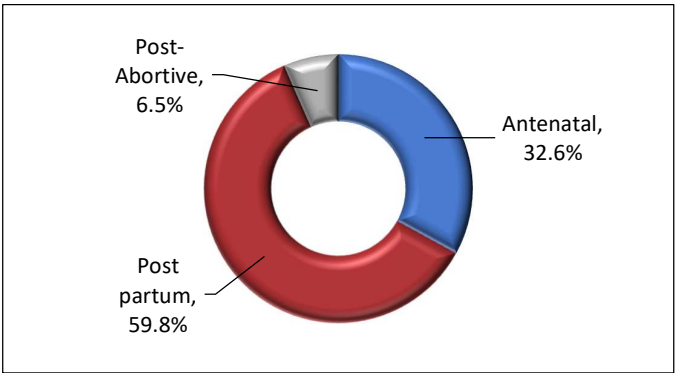


Figure 9: Timing of death of Maternal deaths - 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

The majority of maternal deaths happened in a hospital (n=80, 87.9%) while in n=11 mothers (11.1%) the death had occurred at home, while on transit or as an on-admission death. Majority of the death occurred in a tertiary care institution (n=64, 70%)

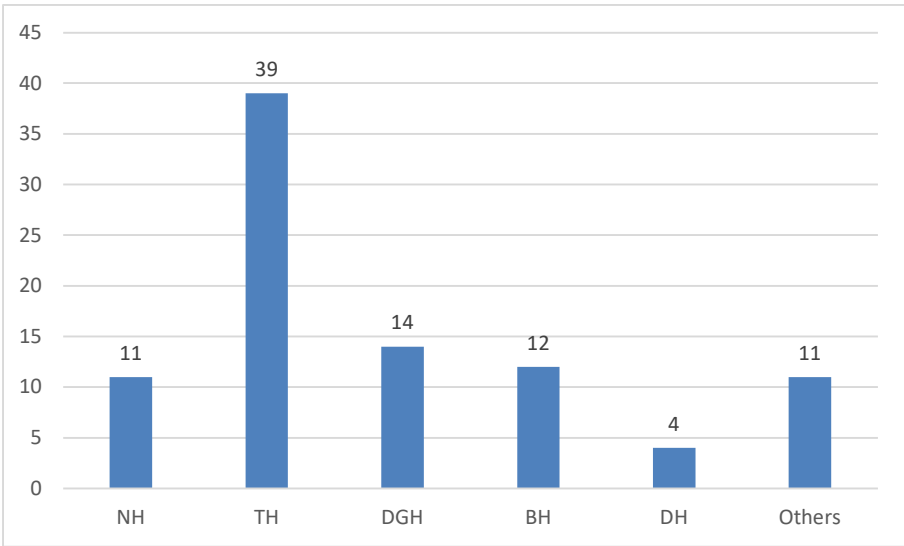


Figure 10: Place of death of Maternal deaths - 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

The graph in Figure 11 illustrates the monthly distribution of maternal deaths throughout the year 2022. Notably, the month of May reported the lowest number of maternal deaths which was 03 while January reported the maximum number which was 11.

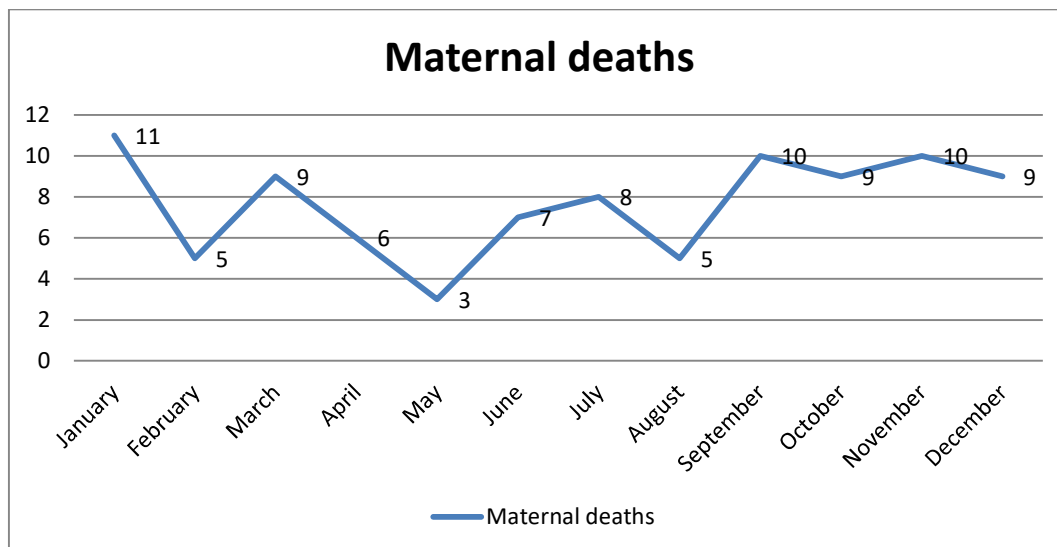


Figure 11: Monthly Frequency of maternal deaths - 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Figure 12 shows the mode of delivery which the deceased mothers had undergone. Cesarean section (40.2%, n =37) was reported as the commonest mode of delivery among the mothers who ended up as a maternal death, out of while n= 23(62%) were reported as emergency and n=14 (38%) were performed as elective sections. while another 3.3% (n =3) mothers underwent hysterotomy.

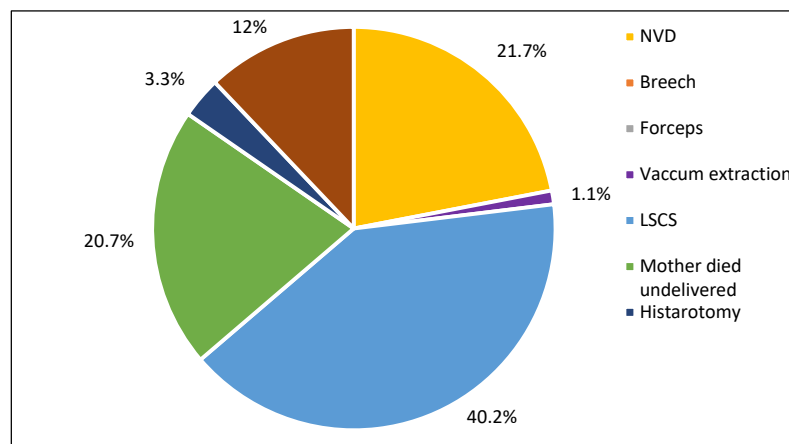


Figure 12: Mode of Delivery - 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

In a majority of maternal death cases the present pregnancy ended up in a live birth (n=47, 51.1%) and in n=15, 16.3% cases it ended in a still birth. Of all maternal deaths n=18, 19.1% of mothers died without delivering a baby.

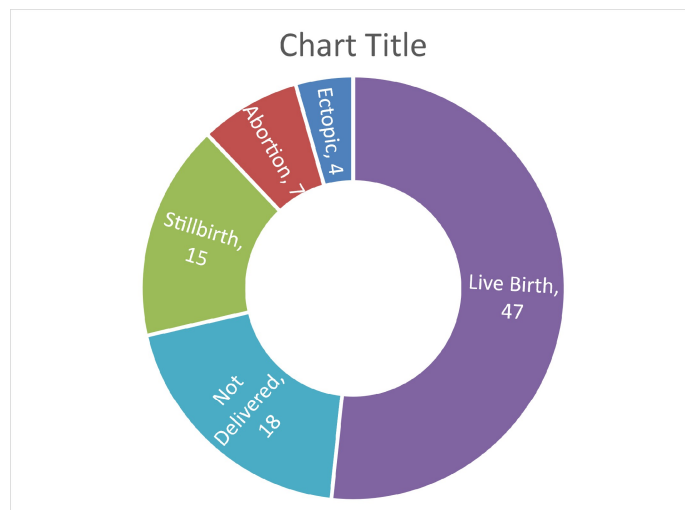


Figure 13: Outcome of pregnancy - 2022

Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Majority of deaths (90%) occurred at a health care institution while only 4% were reported as home deaths. A group of mothers (6%) died while on transit and reported as an on-admission deaths.

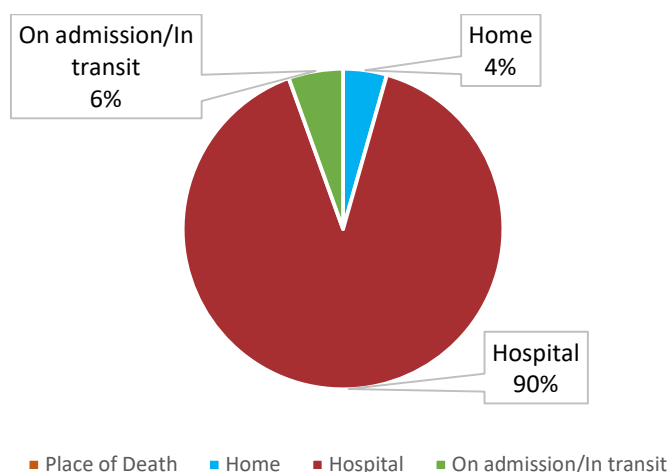


Figure 14: Place of occurrence of death - 2022

Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

According to the three delay model which is used in analysis, among all maternal deaths in the year 2022, 70%, (n=63) showed one or more delay types while 30% (n=28) reported no delays in the process of management. When the specific delay types were considered among the maternal deaths with delay identified, 47.3% reported delay one (delay in seeking care) either as the single delay or associated with other types of delays, while 45.1% reported Delay three (delay in receiving care) either as a single delay or associated with one or more delays. Remarkably delay two (delay in Reaching a Health care institution) was only seen in 5.5% of maternal deaths.

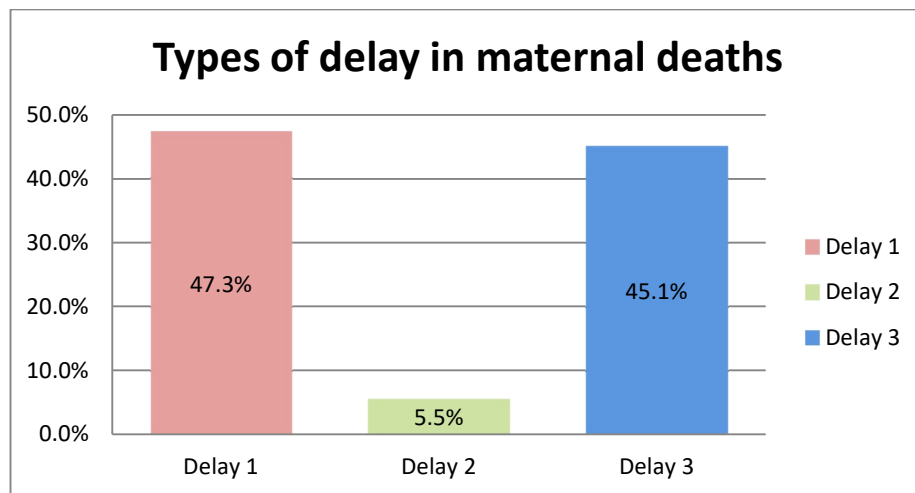


Figure 15: Types of delay in maternal deaths - 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

All maternal deaths are non-preventable. One of the main objectives of maternal mortality surveillance is to identify the preventability of maternal deaths. The national and global target is to achieve zero prevalence of preventable maternal deaths. Over the years the preventable portion of maternal deaths was in a reducing trend till 2021 when COVID maternal deaths increased the preventable portion to a very high figure. In 2022 the preventable portion of maternal deaths had reduced to 53 % while the non-preventable causes contributed to 22% of the maternal deaths. In 25% of the maternal deaths the preventability was inconclusive. The preventability was assessed using criteria and by a multidisciplinary team of experts considering all aspects of the cause of death and the sequence of events.

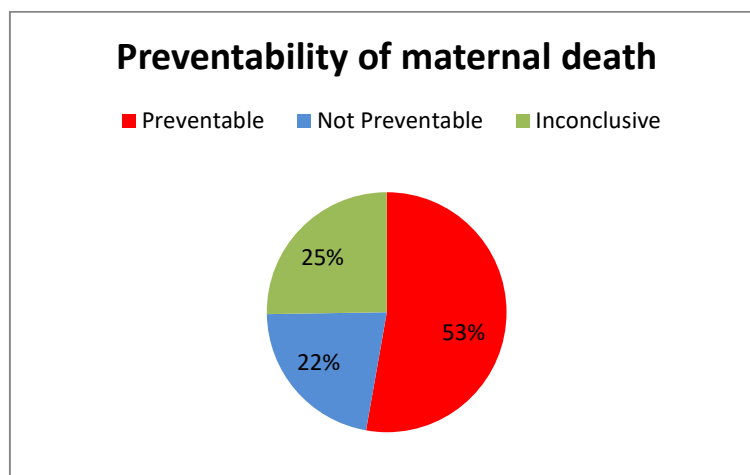


Figure 16: Preventability of maternal deaths - 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

The service provision for maternal care is an important area to follow as the pregnancy outcome is greatly influenced by it. Unmet need of family planning is one indicator to assess the service provision in Maternal health. Unmet need of family planning is defined as a woman or couple who are sexually active but do not practice a credible family planning method despite the fact that they do not intend to conceive and have a baby for a period of at least two years. Considering the maternal deaths in 2022, 27.5% (n =25) displayed unmet need of family planning while 72.5% (n =66) deaths did not show any unmet need of family planning.

This figure is much higher compared to the prevalence of unmet need of family planning among the eligible families in Sri Lanka for the year 2022 which is 5.5% (FHB data)

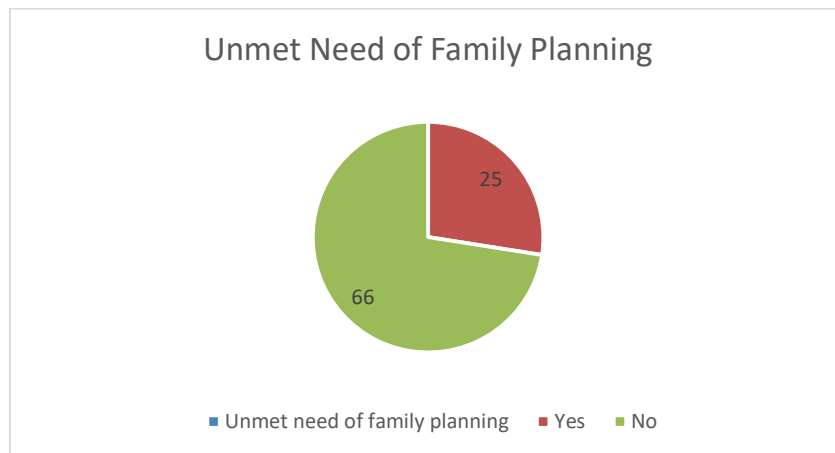


Figure 17: Unmet need of family planning among maternal deaths - 2022
Source: Maternal Morbidity, Mortality Surveillance Unit - FHB

Considering service provision, the relevant field Public Health Midwife (PHM) area was vacant in 10% of mothers who ended up as maternal deaths while in 90% of mothers were from areas where PHM was available.

Confidential Enquiry in to Maternal Deaths (CEMD)

This system of maternal death review was introduced as a pilot project in 2022 with the collaboration with the Sri Lanka College of Obstetricians and Gynecologists (SLCOG). The pilot areas being the Western and Southern provinces covered six districts. During the year 2022, there were 24 maternal deaths reported from the pilot areas. All 24 maternal deaths were subjected to CEMD expert panel meetings and covered at seven meetings conducted at central level. Recommendations made had been communicated to the national level and also the regional and institutional level.

Maternal and Perinatal Death Surveillance and Response (MPDSR) system

As a World Health Organization guided new initiative, MPDSR system was introduced to Sri Lanka in the year 2022. As an initial step it was introduced to the western and southern provinces by conducting training of trainer's program and the institutional level training through the MMMS unit of the Family Health Bureau. On the directions of the Director General of Health Services MPDSR committees are expected to be established in all hospitals to the level of base hospital (A) to ensure implementation of recommendations made through maternal and perinatal death review process.

Issues

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

1. Poor socio economical background leading to delay in seeking care due to family commitments lack of support leading to delay one and also lack of compliance by patients to attend necessary referrals and follow up
2. Poor awareness of the mother and the family members regarding high risk conditions danger sign identification and the emergency actions to be taken in case of danger signs
3. Inadequate pre-pregnancy and interpregnancy period preparation of high-risk mothers specially inappropriate family planning methods used resulting in unwanted pregnancies and poorly controlled chronic illnesses due to poor referral systems and follow up mechanisms.

4. The sub optimal postpartum care services received by mothers specially related to quality of the postpartum visits.
5. Delayed recognition, diagnosis, initiation of treatment and delayed escalation of management of medical and obstetric emergencies including obstetric hemorrhage sepsis, preeclampsia and amniotic fluid embolism.
6. Lack of adequate number of specialist staff including Obstetricians and Gynecologists anesthesiologists pediatricians and neonatologists specially in the peripheral health care institutions.
7. Human resource inadequacy, skilled trained staff including medical officers nursing staff midwifery and other staff categories to provide a quality care to the public in both field and institutional level.
8. Service availability and provision for pregnant women with special needs like psychological issues physical disabilities.
9. Shortage of some essential medications, facilities or other logistics at hospital level in managing sick women, specially at the first contact institutions.
10. Inappropriate and inadequate management of critical symptoms such as shortness of breath (SOB) at GP level.
11. Certain mothers have not registered at field level and continued management exclusively at private sector causing them to be missed by the field staff.
12. Late or inadequate multidisciplinary team (MDT) approach to patient management.

Recommendations

Main recommendations formulated are as follows:

1. 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 the nearest hospital early this planning should be done considering the social and environmental conditions of the individual.
2. High-risk mothers should be observed more frequently and be advised regarding danger signs and symptoms and the referral and the follow up mechanism need to be strengthened.
3. Protocols and guidelines should be prepared on management of medical and obstetric emergencies and all staff should have in service training sessions to update their knowledge and practices based on the protocols and guidelines.
4. Pre-pregnancy counseling and preparation of mothers with medical conditions should be initiated at the field level specially if the condition is contra indicated for pregnancy.
5. Introducing an appropriate family planning method, considering the requirement of the client as well as medical conditions, and following uptake of a method, ensure regular and responsible follow up to be done by the field staff.
6. Develop short videos and posts on danger signs in pregnancy and steps to be taken if noted, to be used at antenatal clinic settings and through social media.
7. Introducing a checklist for PHM's for observation of postpartum mothers in their postnatal home visits and a methodology to plan the postpartum visit based on the history of the relevant mother. specially including PR and RR with the expected ranges.
8. MOs attached to MOH offices, peripheral hospitals and GPs should be given an opportunity on continues learning process to update and revise their knowledge on important areas in clinical medicine and link it to CPD point system
9. Patients with critical medical conditions on discharge should have a comprehensive follow plan which should be agreed by a Multi-Disciplinary Team of Consultants who cared for the mother at the hospital and should be communicated to the mother and the field team clearly.
10. Circular to be issued on registering all mothers attending private sector antenatal clinics in the field clinic to ensure proper antenatal and post-natal follow up.
11. Ensure adequate human resources including consultants, medical officers, nursing and midwifery staff and other staff for smooth functioning of the health care institutions

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