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Clinical Perspective

The Application of Maternal Death Surveillance and Review in Acute Humanitarian Responses

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Sexual and reproductive health needs and rights continue to be not only unmet but actively deprioritized in humanitarian settings. This disproportionately exacerbates inequities in maternal and newborn health, leading to increased maternal morbidity and mortality. Poor maternal health outcomes often go unnoticed in emergency settings in which competing priorities mean that monitoring maternal morbidity and mortality is frequently excluded from the initial response. The World Health Organization's MPDSR (Maternal Perinatal Death Surveillance and Review) system is a widely accepted standard for monitoring maternal morbidity and mortality; however, it is not recommended for the acute phase—defined as the first 6 months—of a humanitarian crisis because of feasibility constraints. This highlights the need for adapted approaches for surveillance and response during acute humanitarian crises. As part of its focus on reproductive health in humanitarian settings, Médecins Sans Frontières adapted the MPDSR tool for Tigray, Ethiopia, in 2020 and has since implemented the tool in Sudan after war erupted in April 2023. Although doing so has involved challenges, the results have been instrumental in informing programming, even during complex emergencies. This clinical perspective describes the Médecins Sans Frontières experience implementing a R-MDSR (Rapid Maternal Death Surveillance and Review) system in Sudan during the early stages of the escalating 2023 crisis. This commentary offers a reflective and, at times, critical account of the implementation of R-MDSR and demonstrates the feasibility and role of the tool in driving timely, action-oriented interventions to improve maternal health in fragile and conflict-affected settings.

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Global maternal mortality remains unacceptably high. Low- and lower-middle–income countries account for 92% of maternal deaths, the majority of which are preventable.[1] Maternal mortality is further exacerbated by armed conflict and emergencies and by decreasing access to safe delivery, antenatal and postpartum services, and contraception and safe abortion care.[2–4] In addition, underlying gaps in sexual and reproductive health persist and are too frequently not addressed in humanitarian or emergency responses,[5,6] further contributing to poor maternal health outcomes in the most fragile of settings.

Maternal death surveillance and response have been a core component of high-quality data collection and quality improvement efforts, essential to respond

to the reproductive health needs in populations for nearly 2 decades.[7–9] The World Health Organization provides technical guidance and recommendations on MPDSR (Maternal and Perinatal Death Surveillance and Response), a quality improvement system to reduce preventable maternal deaths through continuous surveillance, analysis, and response.[10,11] Although this process is essential and has been scaled and implemented in many health systems around the world,[12] it is not designed for use during a humanitarian emergency response. Furthermore, the World Health Organization does not recommend using the MPDSR within the acute phase of a crisis, defined as the first 6 months.[10] Once the initial phase has stabilized, implementation of an MPDSR system may be considered. However, the complex nature of humanitarian emergencies, with new crises developing within protracted setting and ongoing violence, can make defining the end of an acute phase arbitrary or misleading. As a result, the application of the MPDSR in humanitarian settings has been inconsistent and challenging, even in protracted crises.[12,13] Existing guidance to adapt the tool for these contexts remains limited, based largely on a small number of programmatic experiences and stakeholder perspectives. This emphasizes the need for further research on the implementation of simplified, context-adapted tools.[14]

Médecins Sans Frontières is a humanitarian medical organization that provides care to people affected by crisis, conflict, natural disasters, and health care exclusion and operates in more than 75 countries. Médecins Sans Frontières has implemented maternal mortality reviews and supported MPDSR systems in longer-term, stabler contexts; however, this review and response system had previously been neglected in acute emergency responses. This commentary describes Médecins Sans Frontières's experience using an adapted MPDSR tool in Sudan during an ongoing humanitarian crisis.

DEVELOPMENT OF A RAPID MATERNAL DEATH SURVEILLANCE AND REVIEW TOOL

During the civil war in the Tigray region of Ethiopia in 2020–2022, Médecins Sans Frontières's emergency teams were hearing anecdotally of maternal deaths in the community, and it was clear that more information was needed to act in an effective and context-specific manner, not just in a blanket approach (eg, targeting postpartum hemorrhage).[15] Faced with such an alarming maternal health situation, teams were prompted to design and implement an adapted version of the MPDSR tool that was pragmatic and action oriented. Teams on the ground in Tigray, as well as emergency managers and sexual and reproductive health advisors, developed a rapid tool through a process that involved discussions with the Ministry of Health. This condensed version of MDSR was called R-MDSR (Rapid Maternal Death Surveillance and Response).[15]

The R-MDSR tool aims to quickly gather information that would specifically enable teams to do a root-cause analysis, guide context-specific interventions, and subsequently prioritize actions to improve quality of care in the acute phase of an emergency. Perinatal deaths were removed from the rapid tool in order to prioritize maternal deaths. Facility and community deaths could be recorded, as well as near misses and unconfirmed maternal deaths. The structure of the R-MDSR tool is divided into three parts: the record of the death or near miss (Fig. 1, Part A), a review and analysis to identify underlying causes (Fig. 1, part B), and identification of action points (Fig. 1, part C). The findings of Figure 1 (parts A–C) are transcribed into an Excel spreadsheet, with the goal to identify patterns, geolocations, and action points (the full tool can be accessed in prior publication by Black et al[15]).

In Tigray, Médecins Sans Frontières implemented the R-MDSR after the initial 6 months of conflict but during a prolonged period of a protracted emergency.[15] During the initial months of implementing R-MDSR in Tigray, severe antenatal anemia was identified as the leading cause of in-facility deaths. This resulted in strategic changes focusing on identification, treatment, and continued maternity care for women with severe anemia. In the first 3 months after these changes, more than 90 women were admitted to hospital with severe antenatal anemia; all received treatment and gave birth safely. The R-MDSR appeared to be effective at highlighting specific areas for intervention and assisting the team in adapting their response within the constraints of a humanitarian setting. However, the Tigray experience was limited, and these encouraging findings required further implementation of the tool to further assess its use in crisis response, especially the acute phase.

SUDAN CONTEXT

The recent and ongoing war in Sudan erupted in April 2023 and as of the end of 2025 has been described as the world's "most severe" humanitarian crisis,[16] with over 11.7 million forcibly displaced people as of January 2026.[17] In the years before the conflict, Sudan had made considerable progress in reducing maternal mortality, with a 60% decline in maternal mortality between 2009 and 2019 from 224 of 100,000 live

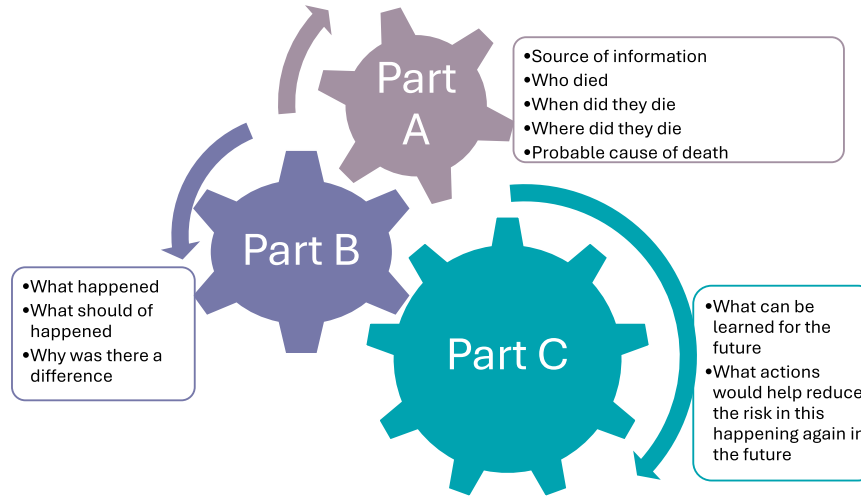

Fig. 1. Structure of the R-MDSR (Rapid Maternal Death Surveillance and Review) tool. The structure of the R-MDSR tool is divided into three parts: parts **A**, **B**, and **C**).
Charlton. R-MDSR Tool for Acute Humanitarian Responses. O&G Open 2026.

births to 90 of 100,000 live births, although significant regional variations persisted.[18] This decline in maternal mortality in Sudan corresponded to the establishment of national and state-level maternal death surveillance and review committees, a system that broke down with the start of the war.

The continuing conflict in Sudan is characterized by dynamic changes in context, multiple shifting front lines, destruction of health care facilities and essential infrastructure, and widespread and documented violence against civilians.[19] This conflict has affected all facets of health and well-being for the people in Sudan, and there have been disastrous consequences for maternal health.[20–22] In August 2025, more than 80% of health care facilities were either closed or barely functioning in the conflict-affected states.[23] In places where Médecins Sans Frontières was responding, a severe maternal health crisis emerged, with reports of pregnant individuals and newborns dying at alarming rates. Médecins Sans Frontières determined that to understand the context, the R-MDSR tool recently piloted in Ethiopia could assist operations and help ensure that interventions were tailored to community needs.

EXPERIENCE WITH THE RAPID MATERNAL DEATH SURVEILLANCE AND RESPONSE TOOL IN SUDAN

In 2023, Médecins Sans Frontières implemented the R-MDSR within the first 6 months of the crisis in Sudan, marking the first time the tool was used in the first phase of a crisis. The first application was from July to December 2023 in east Sudan, where the strain on the health care facilities resulting from displacement pressures was immense. The population had at least doubled in the first months of the conflict, reflecting people who had fled conflict in other states. The women's hospital, the obstetric referral hospital for the surrounding states, was overwhelmed. Médecins Sans Frontières was stretched for resources at the time, experiencing significant challenges in bringing supply and staff into the country while also managing various other interventions in the state. Given these constraints, it was imperative that any additional or new interventions be focused and effective to justify them among the many other competing priorities.

To kick start the intervention, the team discussed with the women's hospital management the intention of surveillance using the R-MDSR tool and reviewed a sample of 25 maternal deaths that occurred in July–August 2023, 15 with medical files. Patient details were anonymized and documented in the tool to elicit common themes such as the cause of mortality or geo-origin of the patient. A basic root-cause analysis was conducted, and a pattern was noted. It was evident that regardless of diagnosis, many deaths occurred in the hospital emergency room. Deaths that occurred after admission to other departments also had a common theme of misdiagnosis or lack of medication availability in the emergency room, hindering timely case management. These findings then guided and informed an intervention targeted at improving quality of care in the emergency room. Médecins Sans Frontières teams worked with the hospital management to introduce a maternity triage system and to ensure availability of medications for emergency cases. The physical space was rehabilitated and equipped with monitors and oxygen; staff was also trained on the triage system and management of emergencies. Further mortalities were entered in the tool

throughout the intervention, as well as rumored deaths from the community, either from verbal reports from hospital management or through review of the medical file. The surveillance and analysis of mortalities enabled Médecins Sans Frontières to implement actions that were specific to that facility rather than taking a broad approach, which would have been infeasible because of the extreme and widespread nature of the crisis and aforementioned challenges with human resources and securing supplies. At the end of 2023, the armed group in control of the city changed, and Médecins Sans Frontières no longer had access to work in this hospital. It was therefore difficult to properly evaluate the longer-term effect of the actions taken on quality of care; however, the last data collected in November 2023 reflected a significant decrease in maternal mortalities that month without a decrease in overall number of births.

Médecins Sans Frontières subsequently used the R-MDSR in two other locations, both in South Darfur. Although not deployed within the first 6 months of the conflict, the R-MDSR was used within the first 6 months of Médecins Sans Frontières gaining access to the region and restarting activities in the region. In these instances, building on lessons learned from eastern Sudan, the tool was implemented in both hospitals and camps for internally displaced people in collaboration with the Ministry of Health and other local partners. Use of the tool, in combination with focus group discussions at the community level, ensured that facility and community deaths and rumored deaths were captured, providing a more complete understanding of the gaps in care and the underlying causes of maternal death.

The findings of the initial review with the R-MDSR tool exposed a maternal health situation that was dire, alarming, and largely undocumented. From January to August 2024, 114 maternal deaths were reported to have occurred in community and facilities; in the two hospitals supported by Médecins Sans Frontières, there were 46 maternal deaths.[24] The subsequent analysis of the deaths through the R-MDSR tool identified the leading cause of hospital-related death to be sepsis.[24] As a result and in conjunction with Ministry of Health, focus was placed on the improvement of infection prevention and control measures, sterilization processes, and the rehabilitation of the hospital structure, water, and sanitation systems.

Beyond providing understanding into sepsis-related deaths, analysis of the deaths through the use of the R-MDSR showed that the majority of deaths occurred very soon after arrival in the facility: 78% within the first 24 hour and 20% within 4 hours of reaching the facility.[24] This indicated that apart from actions in the facility, interventions were urgently needed beyond the scope of the hospital. The findings, along with focus group discussions on maternal health in the surrounding camps for internally displaced people, provided the rationale for Médecins Sans Frontières to support community-led interventions to address maternal morbidity and mortality. Subsequently, in collaboration with other local and international organizations, free referral and transport options were established, and the concept of women's health clinics in the internally displaced people camps was born. These clinics have since grown and expanded over the course of the protracted crisis, providing critical antenatal, intrapartum, and postpartum care, as well as contraception services and care for survivors of sexual violence within the internally displaced people camps.

The R-MDSR tool has also been incorporated into bimonthly interdisciplinary meetings of physicians, nurses, and administrators from Médecins Sans Frontières and the Ministry of Health in one of the hospitals supported by Médecins Sans Frontières. The tool has been used to inform ongoing process improvement initiatives such as conducting training for staff on management of postpartum hemorrhage and sepsis. This collaboration has been facilitated through a comanagement structure with the hospital director, obstetrics and gynecology consultants and residents, as well as nursing and midwifery colleagues. The findings were also used in global advocacy by Médecins Sans Frontières to increase funding and access to the region and to call for an end of the conflict.

CONCLUSION AND NEXT STEPS

The R-MDSR tool has demonstrated that its implementation in complex contexts such as Sudan is feasible and adds to the prior learnings from Ethiopia, where the tool identified severe antenatal anemia as the leading cause of facility-based maternal mortality.[15] The implementation of R-MDSR in Médecins Sans Frontières emergency projects in Sudan provided teams with a pragmatic tool that yielded findings that shifted the focus of intervention in Médecins Sans Frontières's reproductive health programs to be context specific. In eastern Sudan, the common theme in many deaths was patient experience in the emergency room. Working with hospital staff to implement a triage system, improving timely diagnosis and ensuring medical supply to treat emergency cases, became the focus of the intervention. In South Darfur, sepsis

was found to be a leading cause of death, leading the team to expand the area of focus beyond the maternity ward to the operating theater and recovery ward. When reviewing both the community and the facility deaths, we understood that many deaths were attributable to delayed access to care within the local community and in the internally displaced people camps, where there were no functioning health structures. This in turn shifted Médecins Sans Frontières's approach to support local organizations to provide maternal and reproductive health services at the community level, a focus that would not normally have been a priority in the initial humanitarian response.

Using this rapid tool in emergencies has not been without challenges and ongoing learning. Perhaps the most significant challenge was competing priorities. Focus is often on medical needs that are most obvious, eg, emergency trauma care in conflict settings, treatment and prevention responses during outbreaks, and responding to needs created by displacement during climate events and conflict. Implementing maternal death surveillance and response as soon as is feasible is paramount to monitor the consequences of a crisis on reproductive health. However, it can easily be sidelined. Despite progress in Sudan, there are locations where teams have had missed opportunities to implement the tool and, after implementation, the review process, particularly the monitoring and evaluation of actions, has not been sustained.

Arguably the most important component for the sustainability of maternal death surveillance and response cycles is the collaboration with Ministry of Health and communities. Ministries of health face the same challenges as Médecins Sans Frontières: overwhelming needs, competing priorities, supply and human resource challenges, and, in many contexts, deprioritization of sexual and reproductive health care, particularly during emergencies. The default of Médecins Sans Frontières is often to act alone in the implementation and initial actions, which was the case in eastern Sudan, where, although hospital management was informed about findings, the surveillance and analysis were done by Médecins Sans Frontières. This was a missed opportunity, and it would have been wiser to ensure a collaborative approach. The teams in Darfur tried to focus on such a collaborative approach; however, adapting the tool further to fit the Ministry of Health's previously used MPDSR tool could have strengthened implementation further. In Darfur, community focus group discussions were included in the initial phase; however, continuing to integrate community voices and perspectives into the surveillance and response, through ongoing focus group discussions or as part of review committees, has been more challenging. This is an area for future implementation research. The unpredictability and instability of emergency settings also pose a significant challenge for the sustainability of maternal death surveillance and responses as the context changes. In eastern Sudan in 2023, the hospital became nonfunctional, and Médecins Sans Frontières discontinued activities in the area. This resulted in an inability for Médecins Sans Frontières to be able to evaluate the use of the tool and to monitor the effects of the actions taken over a longer time frame. This challenge is applicable not only in conflict settings but in any setting where humanitarian access is not guaranteed.

Within Médecins Sans Frontières, the R-MDSR has become an essential tool to shift and focus priorities within an emergency humanitarian response. However, further research and ongoing monitoring and evaluation support for the maternal death surveillance tool are needed. Research on causal links between the action items generated with the tool, implementation of related interventions, and outcomes is also much needed. However, this would require quantitative analysis over longer time frames, which can also be difficult to achieve during a humanitarian crisis. Finally, further understanding of the sustainability of using the R-MDSR tool in partnership with local actors during an emergency response, and specifically on the acceptance of recommendations, should be prioritized.

At strategic levels, excess maternal mortality is often hidden and must be recognized as unacceptable in emergency settings. Regardless of what medical programs are implemented in such contexts, commitment to reproductive health must be a cornerstone.[25] Maternal health is an indicator of the health of a society[8]; therefore, clinicians and staff, managers and coordinators, and people within an organization on the front line of emergencies must take responsibility to champion this change and to prioritize maternal health in emergency responses. Acknowledging that maternal mortality during an emergency has far-reaching consequences for children, families, and societies and committing to change are crucial steps to take. Using the R-MDSR tool is feasible and can be important to ensure that maternal health is seen and prioritized during an acute emergency.

> "Whose faces are behind the numbers? What were their stories? What were their dreams? They left behind children and families. They also left behind clues as to why their lives ended early"–stated in 2001[7]

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