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Assessing the practice of Death Surveillance and Response for Maternal, Newborn and Child Health: A framework and application to a South African Health District

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Abstract

Objective: The development and application of a framework to assess the functioning and practices of maternal, perinatal, neonatal and child death surveillance and response (DSR) mechanisms at a health district level.

Design: A framework of elements covering analysis of causes of death, and processes of review and response was developed and applied to the smallest unit of coordination (sub-district) to evaluate DSR functioning. The evaluation design was a descriptive qualitative case study design, based on observations of DSR practices and interviews.

Setting: Rural South African health district (sub-districts and district office).

Participants: A purposive sample of frontline health managers and providers involved with maternal, neonatal and child DSR.

Primary outcome measures: Functioning and practices of maternal, perinatal, neonatal and child death surveillance and response.

Results: DSR mechanisms were integrated into the organizational routines of the district. Compulsory 24-hour death reporting and 48-hour review, Confidential Enquiry into Maternal Death and ongoing review and response mechanisms (Perinatal/Child Problem Identification Programme and a forum referred to as Monitoring and Response Unit) were among the forms of DSR identified. The functioning of DSR mechanisms varied across sub-districts and between forms of DSR. Some forms of DSR, notably those involving maternal deaths, with external reporting and accounting, were more likely to trigger fault-finding and sanctioning than other forms of DSR. The proposed framework provides an opportunity to systematically and holistically address the modifiable factors and proactively setting up evidence-based actions at provider, system and community levels to prevent future deaths.

Conclusions: This study provides an empirical example of the everyday practice of DSR mechanisms at a district level. It also puts forward a framework of elements and enabling organizational processes for the functioning of these mechanisms.

Strength and limitations

- This paper puts forward a framework of elements for evaluating the functioning of death surveillance and response (DSR) at the district level and evaluates the functioning of DSR mechanisms in a South African district using the framework.
- The key elements of the functioning are the use of **'no-name, no-blame', following a holistic approach to identify factors related to death, responsive capacity building and institutionalisation.**
- Leadership support, multidisciplinary team participation, and integrated care through better coordination between primary healthcare facilities, district hospitals, and district office, provide an enabling context for DSR processes to work effectively.
- For successful implementation of DSR processes, consideration should be on the contextual factors that make DSR effective from the frontline health professionals' perspective.
- **Applying the framework to one rural district might be a limitation to generalisability; however, the framework may be of value in similar settings.**

INTRODUCTION

The UN put accountability for maternal, newborn and child health (MNCH) on the global agenda, placing three interrelated accountability processes at the centre of its 'Global Accountability Framework', namely, monitoring, reviewing and response.[1] Death surveillance and response (DSR) is the means to translate these accountability processes across many health systems, aiming to improve the quality of maternal, neonatal and child health care, and eliminate preventable deaths.[2-5]

Death Surveillance and Response entails a continuous cycle of identification, notification and review of maternal or child deaths followed by actions toward improving the quality of care and preventing future deaths.[6] Its essence is, therefore, the capacity to record, review and respond to each death using affordable, effective and evidence-based actions linked to the findings.[5]

There is now a well-established tradition of DSR in Low- and Middle-Income Countries (LMICs), focusing primarily on maternal deaths.[2,4,6-10] In facilities and contexts where maternal deaths are relatively rare, maternal 'near-miss' cases are also being audited.[5] More recently, LMICs have begun including the review of perinatal and neonatal deaths into DSR systems, referred to as Maternal and Perinatal Death Surveillance and Response (MPDSR);[11-13] and in some instances, DSR extended to under-five deaths.[14-16]

In addition to facility-based processes, community-based DSR is recommended where a high proportion of deliveries (and deaths) occur outside of health facilities, and where community participation is crucial to implementing identified key actions.[5,11] In this regard, verbal and social autopsies have been developed as a participatory tool for community-based DSR, exploring clinical and social causes of death from the community perspective.[17-19]

DSR processes are typically defined nationally but implemented at facility level with support from and coordination by local or district teams.[20,21] Although there are no globally standardised approaches,[4] the literature points to several elements underpinning effective DSR processes. This includes the analysis of modifiable factors

involved, the tone of the review process and the range of participation elicited. The analysis of modifiable factors underlying maternal and child deaths can be attributed to the 'three delays' in care-seeking and utilisation: **(i) the delay in deciding to seek care early; (ii) the delay in reaching a health facility; (iii) the delay in providing or receiving adequate care at the facility.**[6,22-25]

In formulating a response, the literature on DSR recommends moving away from identifying and sanctioning individuals,[26] and towards the setting up of non-punitive 'no-blaming' approaches that foster collective and individual participation.[2,20] Such approaches are less likely to result in ignoring the incident or the temptation to defer responsibility onto others.[2,3,5]

DSR processes ideally involve a multidisciplinary team with the representation of a range of clinicians (nursing, medical and other professionals), managers and support staff (such as information officers). This brings together the array of provider knowledge and skills, together with commitments from managers to enhance ownership of the findings and turn recommendations into concrete actions.[2,5,6]

South Africa has a long-standing history, going back to the mid-1990s, of maternal, neonatal and child DSR that has become integrated into the routine functioning of frontline health services. DSR processes are linked to three ministerial committees established in 1998, namely the National Committee for Confidential Enquiry into Maternal Deaths (NCCEMD),[27] the National Perinatal and Neonatal Morbidity and Mortality Committee (NaPeMMCo);[28] and the Committee on Morbidity and Mortality in Children under 5 years (CoMMiC).[29] These committees function at national level with mandates exercised at local (health district) level through three of the DSR processes, namely, the Confidential Enquiry into Maternal Death (CEMD), the Perinatal Problem Identification Programmes (PPIP), and the Child under-five Problem Identification Programmes (CHIP). These mechanisms are situated in a dense and complex accountability ecosystem at the frontline of health provision.[30]

There have been significant reductions in maternal, neonatal and child mortality in South Africa over the last decade, attributed principally to the prevention and treatment of HIV.[31] However, despite a long history and institutionalised practice, there is little understanding of the role of DSR implementation and functioning in this

mortality reduction. Clear guidance on how best to assess this functioning is also lacking; one study showed no association between consistent auditing and perinatal mortality rates.[32]

Given the lack of standardisation and consensus on elements for assessing the functioning of DSR and the opportunity to assess district level experience in South Africa, this paper develops a framework to assess DSR functioning using the criteria drawn from the literature (Table 1) and based on field observations and interviews with frontline providers and managers. It then uses the framework to describe the forms and functioning of maternal, neonatal and child DSR mechanisms at district level in South Africa; and explores the context that makes them effective in the eyes of frontline managers and providers.

METHODOLOGY

Definitions

In this paper, the term Death Surveillance and Response (DSR) refers to all death reporting and review processes related to maternal and child health, even if they do not have all the ideal components. They include phenomena commonly reported in the literature such as Maternal Death Review (MDR) or Audit, Maternal Death Surveillance and Response (MDSR), Maternal and Perinatal Death Surveillance and Response (MPDSR), or surveillance and review of child deaths.

Conceptual framework

We combined the WHO Continuous Action Framework to eliminate preventable deaths,[6] the 'Three Delays' framework,[22] and other elements identified in the literature[2,4,6,20] to assess the DSR processes. These are outlined in Box 1 and Table 1. **The framework distinguishes between (i) the modifiable causes of death as per the three delays model; (ii) the surveillance process (what, how, who); and (iii) the types of responses triggered, whether proactive or reactive. These elements provide a holistic**

and comprehensive assessment of the various steps and processes involved in DSR. Given that mortality reductions require coordination across levels,[33] the framework adopts an area-based approach, using the most decentralised structures of in health systems coordination, notably the sub-district, as its unit of analysis.

Study design

We conducted a descriptive, exploratory qualitative case study of the forms and functioning of maternal, neonatal and child DSR processes applying the framework (Table 1).

Study Setting

The study was conducted in one of the three health districts in Mpumalanga Province situated in the north-east of South Africa. The District has a population of about 1.1 million, with the vast majority (61%) living in rural areas (Massyn et al., 2017). It contains one regional hospital, eight district hospitals, and 76 primary healthcare facilities, distributed among seven sub-districts.

The study district was targeted for health systems strengthening support because of high maternal and child mortality. [34] Intensified efforts were specifically made to strengthen DSR in the district over several years, building on long-standing processes (24-hour reporting, Confidential Enquiry into Maternal Death [CEMD], and Perinatal/Child Problem Identification Programmes [PPIP, CHIP]). Besides, DSR processes were accompanied by improved district clinical support with the introduction of district clinical specialist teams (DCST) and a new mechanism of coordination, referred to as the Monitoring and Response Unit (MRU). These initiatives were widely regarded as having impacted positively on maternal and child mortality in the District.[35]

Study sample and Data collection

The sub-districts were selected in a prior study as representing the range of buy-in to one particular DSR strategy.[33] We combined semi-structured interviews, non-

participant observation of meetings with a desk review of key documents as data sources for this study.

In-depth interviews

We conducted 45 in-depth, individual interviews with purposefully selected respondents among those involved with maternal, neonatal and child DSR from two of the seven sub-districts and the district office. Respondents were either members of the enquiry or audit team or participants in one of the death surveillance and response meetings (MRU, PPIP, CHIP). Participants consisted of district programme managers (N=10) and members of the district clinical specialist team (DCST) (N=3), hospital CEOs (N=2), hospital nursing managers (N=4), facility and hospital operational managers (professional nurses heading a ward in a hospital or managing a primary healthcare facility [N=5]), medical officers (N=7), professional nurses (N=3), allied health professionals (N=5), emergency service manager (N=1), and facility information managers (N=2). A semi-structured interview guide was developed and pre-tested.

Non-participant observation

From May 2018 to September 2019, for a total 59 days distributed over one to three weeks in each of the two sub-districts, we conducted non-participant field observations and interviews by engaging in various activities and meetings related to Maternal, Neonatal and Child DSR in which health system actors were actively engaged in. A structured observation sheet was designed for this purpose.[30] We observed the following meetings: PPIP and CHIP, MRU, morbidity and mortality, clinical audit, clinical governance and patient safety committee. We also reviewed the agendas and minutes of these meetings for additional information.

During this fieldwork, three maternal deaths occurred in the district and we were able to observe one formal district meeting and engage in informal discussions with district actors on the unfolding maternal death enquiry process.

Data management and analysis

Interview recordings were transcribed verbatim, and observation and reflection notes compiled. All data were coded using Atlas.ti version 8, and a thematic analysis was used to analyse the data.[36] Key themes were identified following both a deductive approach based on a preset list of themes from the criteria of DSR functioning and inductively wherever new insights were identified.[37] The themes were grouped into two categories, namely, 1) the forms and 2) the functioning of DSR. Finally, the findings were presented to respondents in various meetings or individual meetings to verify and validate the results.

Ethics considerations

This study was approved by the Biomedical Science Research Ethics Committee and the Provincial Health Research Committee. All interviews proceeded with signed informed consent.

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this study.

RESULTS

Forms of maternal, neonatal and child DSR mechanisms

Table 2 presents a summary of all maternal, neonatal and child DSR mechanisms observed in the district, their purpose and functioning, as well as their objectives. Five mechanisms were specific to MNCH (24-hour Reporting and 48-hour Review, CEMD, PPIP, CHIP, MRU). A**n additional two, which also dealt with maternal, neonatal and child deaths,** the Morbidity and Mortality, and Clinical Audit/Clinical Governance meetings, **were general facility-based morbidity and mortality and clinical audit/governance mechanisms.**

The following sections describe both the processes and actors involved in the implementation of these instruments specific to the maternal,

neonatal and child DSR strategies (their forms) and how actors perceived their implementation compared to elements articulated in our conceptual framework (their functioning).

a. Compulsory 24-hour reporting, 48-hour review

Any maternal, perinatal, neonatal or child death is mandatorily recorded at facility level where the death occurred and reported within 24 hours internally to the district office, and externally to the Department of Home Affairs for issuing of a death certificate. This is the standard operating procedure applied in all facilities in South Africa. In the study district, following the introduction of the MRU and the DCST, a district-level system was also established to review all maternal and under-5 child deaths within 48 hours, independent of other processes. This process of 24-hour recording and reporting and 48-hour case review was referred to as a 'real-time death reporting';[38] it allowed for actions to be taken as quickly as possible to address modifiable factors.

Following a maternal death, we observed the district MNCH programme manager and DCST members visiting the facility to conduct an audit and review the clinical management of the case, identify any gaps, and analyse the causes of deaths for discussion in subsequent enquiry processes. Opportunities for training and skills upgrading were identified. A report with recommendations was sent to the district manager who activated the confidential enquiry specific for maternal death events.

b. Confidential Enquiry into Maternal Death (CEMD)

The Confidential Enquiry into Maternal Death (CEMD) was introduced in South Africa in 1997 and involves a standardized process of reporting and auditing. Maternal deaths, in addition to being reported to the district and Home Affairs, are also reported to the provincial MNCH coordinator within 24 hours, who allocates a unique number. A copy of the patient folder and a completed Maternal Death Notification Form (MDNF) are included in the report and submitted to a team of provincial assessors (obstetrician, medical officer, midwife and anaesthetist). Assessors will go to the facility to enquire about the causes of death, as well as any avoidable or modifiable factors. The resulting annual and triennial reports and recommendations (not including detailed individual cases) are disseminated to Provincial and District

structures and academic institutions for collation with general recommendations for action, such as training on the Essential Steps in the Management of Obstetric Emergencies (ESMOE).[39-41]

In addition to the provincial assessors, actors involved in the CEMD at district and facility levels were observed to consist of: the district manager (or a representative), quality assurance manager, primary health care and hospital services manager, labour relations and corporate services, and a member of the DCST, the hospital chief executive officer, (CEO), the nursing service and clinical managers, as well as the specific health providers directly involved to explain or justify any decisions or actions taken that resulted in maternal death.

c. Ongoing Review and Response Structures

As indicated, several routine meeting structures are established for auditing and responding to maternal, perinatal/neonatal and child deaths (Table 2). From our observation, three of these meetings involving multidisciplinary actors were specific to MNCH, namely, the Perinatal Problem Identification Programme (PPIP), the under-five Child Problem Identification Programme (CHIP) and the Monitoring and Response Unit (MRU).

Perinatal/Child Problem Identification Programme (PPIP/CHIP)

From our observations, the PPIP/CHIP review meetings took place monthly at a facility level. The meeting consisted of systematically auditing the patient file related to death, comparing the management of the case against standard treatment protocols and guidelines. Through discussion, participants were able to identify gaps in clinical management, and set up improvement plans, including capacity-building needs. Preventive and early detection measures in PHC facilities were also identified.

The meetings were never used to point fingers, or name or blame providers involved in the management of the case. However, the respondents raised the possibility of sanction if at any stage gross negligence was documented.

> *'...We are taking every death very seriously. One death is too many deaths, we have to make sure that we follow up on our kids and also on our health care workers [at PHC] the entry point where the neonatal was first attended so that we can check on whether the child was attended according to protocol*

and if not then consequential management needs to be applied' [Hospital CEO].

A multidisciplinary team of actors attended the meetings: (i) from primary health care facilities: operational managers, nurses and data capturers; (ii) from the district hospital: doctors and nurses (mostly those involved in midwifery/obstetrics, gynaecology and paediatrics), ward operational managers, medical and nursing managers, hospital CEOs, as well as the information manager; (iii) from the district office: the DCST members and MNCH cluster programme managers. In most cases, the meeting was chaired by the clinical manager or the medical officer in charge of obstetrics and gynaecology, or by a nurse operational manager of the maternity ward.

Monitoring and Response Unit (MRU)

The MRU meetings were convened monthly at sub-district and bi-monthly at district level. From the guiding document, the MRU brings together a multidisciplinary team of actors, including managers (PHC, hospital), clinicians, information officers. The aim is to enhance the governance of MNCH by frontline managers and providers and to improve coordination between the various actors as well between levels of care. At district level, the meetings were chaired by the district manager or a representative, usually, the MCWH coordinator or the district quality assurance manager, while at sub-district level, the MRU meeting was chaired by the CEO of the district hospital or a representative. Participation was expanded to other stakeholders such as academic partners, NGOs and other government departments (notably the South African Social Security Agency) and community representatives to address the modifiable causes of maternal and child deaths.

The MRU reviewed performance indicators and identified follow-up on actions to address the modifiable causes of death, with particular emphasis placed on the 24-hour compulsory death reporting and 48-hour review process. The MRU emphasized the '4R's' approach i.e. 'Report, Review, Record, Respond' to a maternal or child death. A particular focus of the MRU was on responsiveness involving pro-active measures to addressing the identified modifiable factors through teamwork and skills building and the integration of the primary health care system in preventive actions at community level.

Functioning of maternal, neonatal and child DSR mechanisms

Table 3 presents an application of the framework and a descriptive summary of the functioning of each of the DSR mechanisms observed in practice. In this section, we report on the overall functioning of DSR, drawing across all the forms of DSR observed and the views expressed by the respondents about them. We present key themes that emerged as critical from the elements outlined in Table 1.

a. The 'no-name, no-blame' approach

From our observations and the respondents' views, the perinatal and child (PPIP/CHIP) and the MRU meetings promoted the 'no-name, no-blame' approach. The chairperson of the death review meeting ensured that confidentiality was maintained throughout and that no one was blamed for the occurrence of the adverse event. Otherwise, respondents noted that the meeting could be transformed into a '*punishment exercise*' that would discourage actors' participation:

> '*..The perinatal meeting itself is not making anybody accountable. The meeting itself is about discussing things, it is not to point to individuals, because it's going to be discouraging for the people [to attend] if it's a punishment exercise…'* [DCST].

This 'no-name, no-blame' approach fostered a high level of commitment to the review meetings that resulted in a common understanding of individual and system challenges faced. It also fostered mutual support when people were proactively working as a team.

> *'Before there was blaming, blaming, blaming […] No-one is blaming anyone anymore because we do understand the challenges, we are part of the system, we are in the [same] basket' [EMS manager].*

Policy documents formally claim that the CEMD also follows a 'no-name, no-blame' approach. However, based on interviews and observations in practice, the CEMD process in the study district was conducted and experienced very differently to the other DSR mechanisms. The CEMD process typically resulted in intense scrutiny of maternal death from higher-level management (national department of health), seeking to assign individual responsibility and frequently triggering reactive sanction and punitive action in the district, seeking to assign individual responsibility. Respondents reported suspensions, referrals to the labour office, litigations and court cases involving frontline professionals (Excerpt 1). These processes were managed

through quality assurance structures (e.g. adverse event committees) and were associated with a particular language of sanction – such as 'consequence management'.

> '*So the meetings that we usually have with the quality assurance and the maternity doctors and the sisters in charge […] those [meetings] push us to be more accountable […] it's not like the perinatal meeting, [where] we don't mention the doctors who did what, we just present the case. With those ones [quality assurance], it pushes you to be more accountable because the file is there, we all discuss what's in the file. So, whoever was the attending doctor is more accountable, feels more accountable*' [Medical officer].

b. *Following a holistic (three delays) approach to identifying and acting on modifiable factors*

Review meetings were observed to follow the 'three delays' approach to identifying factors (especially modifiable factors – Excerpt 1) associated with the occurrence of death events and to take collective responsibility and proactively set up key actions to prevent further events (Table 3). This analysis was enabled by the presence of stakeholders across levels - from primary health care facilities to district clinical specialist teams and programme managers.

c. *Integrating training and support from higher-level management*

One of the key moments of the review meetings was to identify the modifiable causes of death and translating them into training and learning opportunities for frontline managers and providers, as well as system improvement and community education. From our observation, the presence of senior managers from the district office, district hospital and other partners in the review meetings created a sense of trust and space for empowering providers with knowledge and tools for better performance. Nurses were able to present cases and engage in discussions with doctors. Whenever gaps were identified, a collective decision on key actions to prevent future events was taken with support from the management.

> *'The meeting is to highlight things, training, educational issues and to bring the people, the team together* [DCST].

Another perceived core value of the DSR process was learning from the death events to come up with quality improvement strategies to prevent similar events in the future.

> *'After we discuss we all come up with … if I can say, opinions of what actually transpired or what could have happened for this baby to demise and what we could have done differently to help the baby. Maybe for the other babies who are coming in the near future who present the same way, what can we change to be able to help them'* [Medical Officer].

The learning and training were extended to primary health care facilities; minutes of the meetings and reminders of the guidelines were circulated; and regular visits to facilities were conducted by the district team, reinforcing what was shared in the meetings and allowing those who were absent from the meeting to be capacitated with needed skills.

By bringing together district and sub-district actors, DSR meetings acted as a lever for more transparency between levels, in sharing frustrations and most especially the sharing of good practices.

> *'I can say that [DSR meeting] is strengthening the communication between the sub-districts and the district and because of that I don't see any problem that might hinder us to progress, because that is where we are sharing our frustrations and sharing our best practices*' [District programme manager].

The role of the DCST in providing clinical guidance, mentorship and in-service training was observed as key in addressing the modifiable factors related to provider gaps in clinical knowledge. DCST also played a role in enabling professional teamwork. In one instance, where a doctor was trying to dismiss a nurse's opinion and impose his view during discussions, the DCST intervened and emphasized that everyone's opinion counted.

d. Bringing together a multidisciplinary team of actors

As indicated, DSR meetings were intended to be driven by a multidisciplinary team of actors including medical, nursing and other professionals, and across levels (community, PHC and hospital).

In one particular sub-district, where the organizational culture and the leadership style of senior managers promoted collaboration between primary health care facilities and hospital, the process of DSR was functioning effectively.

> '*...we only receive the mother during the process of giving birth, and when the woman is now complicated with pre-eclampsia of which I think that this would have been prevented at the first place; so we are involving the primary health care level to come to the perinatal meetings so that they can hear exactly about the progress of the woman because, for us, as a hospital, we do not have the liberty of starting the woman on antenatal care, whereas the PHC are the ones who might have been able to pick up on some problems during the antenatal period. So, for them being involved in these perinatal meetings is quite vital [...] not coming is also is a transgression on its own'* [Hospital CEO].

Also important was the presence of key champions amongst middle managers and medical and nursing clinicians who created and nurtured a community of practice for sharing knowledge and learning.

In one sub-district, participants expressed excitement at attending meetings, and the venues were sometimes overflowing with participants.

> *'[I]: So why do you think that meeting is taken seriously?*
>
> *[R]: It's the commitment of the medical managers, the commitment of the managers and also the operational managers in maternity wards and the doctors* [Manager, DO].

At these meetings, each step taken in the care pathway (from PHC to the referral hospital) was carefully scrutinized and improvement plans with timelines, monitoring and a responsible person were developed:

> '*Because when you put those quality [measures] you start from your ward, ...you put as well the responsible people because when you put some measures*

you need to monitor, to come and see if it's working. And you need to give the timeline… you monitor if it's going well, you sustain, if there is something you need to review or if it's not going well' [Clinical manager].

Where identified modifiable factors leading to maternal, perinatal, neonatal or child death were related to the patient or community, hospital board chairpersons were contacted to facilitate the dialogues within the community and identify key actions together with the community leaders to address the identified problem. However, the community was not usually implicated directly in DSR processes.

This degree of functioning was not universal, and there was variation across facilities and sub-districts in the levels of team involvement, particularly of staff from PHC facilities and hospital actors. In instances where doctors and nurses, managers and providers, or PHC facilities and hospitals were not working as a solidified team, accountability mechanisms were flawed resulting in poor referral systems, 'blame games' and the deferring of responsibility in case of death events.

e. DSR process institutionalized

Even if functioning at different levels, DSR processes in this district were anchored into routines in all facilities, with standardised agendas and supportive supervision from the DCST and the MNCH district programme coordinators. The DSR was perceived to contribute to improving the quality of care and outcomes in facilities:

'I think the perinatal meetings are there and they are there forever. It's like an auditing process, it's impossible to run maternity service without this [perinatal meeting]' [DCST].

The perceived benefit and value of DSR processes, particularly the review and response meetings, were repeatedly emphasized by the respondents as a motivation to highlight DSR processes as an integrated part of the core activities addressing maternal and child mortality in the district.

DISCUSSION

While WHO guidelines outline the necessary steps in conducting death surveillance and response,[6] there is little holistic guidance on how this is to be achieved in health systems. By collating elements from the literature into a conceptual framework it was possible to explore the factors enabling or constraining DSR functioning in one district. This framework may be of value in other similar settings.

Maternal, neonatal and child DSR is well established in the South African district health system. Across the five forms of DSR directly related to maternal and child deaths in the study district, we found a range of practice as per the framework. The process in most instances followed the 'no-name, no-blame' approach as stipulated in the guiding documents. There was also holistic approaches to identifying causes of death, efforts to integrate training and support from higher levels, facilitation of multi-disciplinary teams, and elements of institutionalisation of DSR in the district.

In certain instances, however, the no-name no-blame approach was contradicted by an organisational culture of blaming and punishment following events of maternal death. Here the emphasis was on identifying and sanctioning the persons responsible for death incidents and on curbing the institutional ramifications of the incident, instead of using it as an organisational learning event to prevent further incidents.[42] Such blame cultures in a healthcare organisation can be a source of an increased number of medical errors.[43]

Death events, particularly maternal deaths, are considered to be a barometer of a health system's performance. In this regard, DSR processes can be constrained by the fear of revealing malpractice and poor health system performance, and DSR processes can become politicized and maternal deaths under-reported by bureaucrats unwilling to disclose system failures.[44] In our study setting, DSR processes were facilitated by a high-level political commitment from the national government to compulsory and transparent reporting and reviewing of all cases of

maternal or child deaths and implementation of measures to avoid future deaths from identified modifiable factors.

In this study, 'no name, no blame' approaches were observed to facilitate the active participation of various actors, especially those directly linked to death incidents and the possibility of embracing responsibility for the incident.[45] Thus, DSR processes can create a sense of interpersonal trust and trust in the health care organization, key for generating learning and improvement. In contrast, as noted in Kenya, the lack of trust, the fear of blame or individualised disciplinary action conditioned frontline professionals to be reluctant in disclosing data on maternal death.[17]

As proposed by Deis *et al.*[46] DSR meetings can be transformed into instruments of system improvement using a systematic approach that incorporates the 'three delays' model for action including the providers, the health system and the communities in identifying and addressing modifiable factors related to death events. This means that DSR processes should not only seek to identify and correct frontline providers' and managers' practices but also health system and structural factors at the community level,[20] A holistic approach was made possible through the use of standardised protocols and guidelines for DSR that integrated reporting and feedback mechanisms.[42]

Another important element of successful DSR observed was the inclusion and engagement of a multidisciplinary team of actors from various professional backgrounds and managers. This created a space to address not only health system-related problems[46] but also problems related to social structural factors (e.g. social exclusion, poverty). Where these functioned effectively, DSR platforms intersected individual and collective competency and responsibility for MNCH, enabling a community of practice that recognised the contribution and value of all levels, from PHC facilities to district hospitals actors. Furthermore, inclusion of various stakeholders into DSR processes can also facilitate social autopsies given that some maternal and child deaths occur outside of health facilities. Similarly, a study in four Sub-Saharan African

countries reported interdisciplinary teamwork with good communication amongst staff and active participation of staff as enablers of the DSR process.[47] **In contrast, where actors from PHC facilities and hospitals, or when doctors and nurses, managers and providers, are disconnected, it resulted in a poor referral process, blame games and deferring of responsibility or avoidance of accountability. Melberg *et al.*[44] referred to a 'defensive referral' as a result of fear of being blamed for maternal death incident.**

When encouraged by leadership support, DSR processes can become a platform for common learning, knowledge sharing and quality improvement.[48] Effective DSR system, according to Kerber *et al.* [49] needs engaged leadership and use of guidelines and protocols that ensure the complete cycle of the audit system.[50]

This study was conducted in one district at a particular moment in time. While the forms of DSR are likely to be repeated elsewhere, the study findings related to the functioning of DSR are not generalisable given the management investments made. However, the findings have analytical relevance in illuminating DSR in best-case scenarios and the triangulated nature of the data provide confidence in the data collected.

CONCLUSION

The success of DSR processes resides in the intersection of many contextual factors such as the commitment of a multidisciplinary team of actors and support from district managers, the integration of primary healthcare and district hospitals, and the establishment of a space for mutual trust and learning anchored within the organisational culture of health facilities. A holistic approach is essential to address the modifiable factors identified, translate them into long-term organisational learning opportunities, and set up evidence-based 'real-time' cost-effective response. This requires building human resources capabilities at all levels, fostering a no-sanctioning atmosphere, a sound learning culture, a monitoring and supervision system, a high-level political commitment, in addition to establishing clear communication channels between actors.

List of abbreviations

CEO: Chief Executive Officer

CEMD: Confidential Enquiry into Maternal Deaths

CHIP: Child under-five Problem Identification Programme

DCST: District Clinical Specialist Team

DSR: Death surveillance and response

MNCH: Maternal, Newborn and Child Health

PPIP: Perinatal Problem Identification Programme

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Box 1: WHO's Four components of continuous action in Maternal Death Surveillance and Response (MDSR) system [6]	
Identify and notify deaths	Identification and notification on an ongoing basis: Identification of suspected maternal deaths in facilities (maternity and other wards), followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.
Review maternal deaths	Review of maternal deaths by local maternal death review committees: Examination of medical and non-medical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.
Analyse and make recommendations	Analysis and interpretation of aggregated findings from reviews: Reviews are made at the district level and reported to the national level; priority recommendations for national action are made based on the aggregated data.
Respond and monitor response	Respond and monitor response: Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that the recommended actions are being adequately implemented.

Excerpt 1 (From DSR meeting and discussion with respondents)

Case one: A pregnant patient who had never attended antenatal care session presented to the hospital with severe complications and subsequently died. The main modifiable factor identified was the delay in deciding and seeking care.

Case two: A young primigravida who was followed up since the early stage of the pregnancy, but because of a failure to treat high blood pressure, she died. The modifiable factor identified was the delay in receiving adequate care.

Case 3: The patient was referred to a higher level hospital for a complication during labour, but the ambulance was delayed resulting in the death of the patient while still at the first level hospital. The modifiable factors identified were the lack of an effective referral system, adequate equipment and trained human resources.

Case 4: In a 'backstreet abortion', a patient was given misoprostol, used for medical termination of pregnancy. She developed complications and sought care at the hospital but could not be saved. One of the modifiable factors was that safe termination of pregnancy services were not sufficiently accessible.

Table 1: Framework for the functioning of Maternal, Neonatal and Child Death Surveillance and Response

I. Following a holistic approach to identifying modifiable causes			
'Three Delays'*	1st Delay in Deciding and seeking Care	2nd Delay in identifying and reaching a Health Facility	3rd Delay in receiving adequate appropriate care
II. Surveillance process (What and How?)**			
Elements of effective Maternal, Neonatal and Child Death Surveillance and Response**	1. Continuous action (full cycle) integrating death auditing, review, communication and feedback mechanism (identify and notify; review, analyse and make recommendations; respond and monitor response)		
	2. Using cost-effective and evidence-based actions		
	3. Confidentiality (no naming), No-blaming, non-punitive tone of the process		
	4. Integrating learning and response from DSR into continuing professional development, quality improvement, health system strengthening, and community education		
	5. Institutional support culture at all levels of the health system (management)		
	Actors participation (Who?)***		
	6. Driven by multidisciplinary teams (clinical, support, managerial)		
	7. Integration across levels from PHC facilities to hospitals, districts and higher levels		
	8. Involvement and commitment of the managers to act on the findings		
	9. Community participation in review and response (social and verbal autopsy)		
III. Actions (Pro-active & Reactive)			
▪ ***Provider level***	Capacity Building, In-service Training		
▪ ***System level***	Health System Improvement, Provision of resources		
▪ ***Community level***	Community Education		

References: ***23; ****2,4-6*

Table 2. Death Surveillance and Response Mechanisms – Purpose, Functioning and Target

Observed Mechanisms	Purpose	Frequency	Target				Participants
			Maternal	Perinatal	Neonatal	Child<5	
24-hour Reporting, 48-hour Review	Specific to MNCH; Compulsory Death notification	Linked to death event	✓	✓	✓	✓	Facility; Patient Safety Committee (Sub-district and District)
Confidential Enquiry into Maternal Death (CEMD)	Specific to MNCH; Quality assurance; Compliance	Linked to death event	✓				National, Province, District, Hospital
Perinatal Problem Identification Programme (PPIP)	Specific to MNCH; Clinical; Includes perinatal and maternal death audit; Quality assurance	Monthly	✓	✓	✓		District, Hospital, PHC facilities
Child under-5 Problem Identification Programme (CHIP)	Specific to MNCH; Clinical; Audit; Quality assurance	Monthly				✓	District, Hospital, PHC facilities
Monitoring & Response Unit (MRU)	Specific to MNCH; Managerial; Multidisciplinary	Monthly/Bi-monthly	✓	✓	✓	✓	District, Hospital, PHC facilities
Morbidity & Mortality	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	Hospital
Clinical Audit/Clinical Governance	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	District, Hospital, PHC facilities

Table 3: Functioning of DSR Mechanism in practice and compared to elements from the literature

	Death Surveillance and Response Mechanisms					
	24-hour Reporting, 48-hour Review	**Confidential Enquiry into Maternal Death (CEMD)**	**Perinatal/Child under-5 Problem Identification Programme (PPIP/CHIP)**	**Monitoring & Response Unit (MRU)**	**Morbidity & Mortality**	**Clinical Audit/Clinical Governance**
Functioning in practice (What/How?)	Reporting and Auditing	Naming; Obligation to inform and explain actions and decision taken;	No-naming, No-blaming;	No-naming, No-blaming,	No-naming, No-blaming, Auditing and Quality Assurance	No-naming, No-blaming, Auditing and Quality Assurance
Actors involved (Who?)	National, Province, District, Hospital	Facility (PHC, Hospital)	Clinical (District, Hospital, PHC)	Managers, clinical and non-clinical (District, Hospital, PHC)	Clinical (Hospital)	Clinical (District, Hospital, PHC)
Actions (Pro-active & Reactive)		Reactive; Possibility of imposing sanction; Targeting individual; institutional training	Proactive; Taking collective responsibility; Capacity building; system improvement	Proactive; Taking collective responsibility, In-service training; system improvement and community education	Proactive; In-service training	Proactive, In-service training

Matching to the elements for the functioning of DSR mechanisms	**1.** Following a holistic approach to identifying modifiable causes	x		x	x		
	2. Continuous action (Death auditing, review, communication, and feedback)	x	x	x	x	x	x
	3. Using cost-effective and evidence-based actions	x		x	x	x	x
	4. Confidentiality (no naming), No-blaming, non-punitive tone of the process	x	x	x	x	x	x
	5. Integrating learning and response, quality improvement, health system strengthening, and community education			x	x		
	6. Institutional support culture at all levels of the health system	x	x	x	x	x	x
	7. Multidisciplinary teams			x	x		
	8. Integration across levels of care			x	x		x
	9. Involvement and commitment of the managers to act on the findings			x	x		
	10. Community participation in review and response						

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Assessing the practice of Death Surveillance and Response for Maternal, Newborn and Child Health: A framework and application to a South African Health District

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Keywords: Accountability; Death Surveillance and Response; Maternal, newborn and child health; Framework; District health system; Qualitative study

Abstract

Objective: The development and application of a framework to assess the functioning and practices of maternal, perinatal, neonatal and child death surveillance and response (DSR) mechanisms at a health district level.

Design: A framework of elements covering analysis of causes of death, and processes of review and response was developed and applied to the smallest unit of coordination (sub-district) to evaluate DSR functioning. The evaluation design was a descriptive qualitative case study design, based on observations of DSR practices and interviews.

Setting: Rural South African health district (sub-districts and district office).

Participants: A purposive sample of 45 frontline health managers and providers involved with maternal, neonatal and child DSR.

Primary outcome measures: Functioning and practices of maternal, perinatal, neonatal and child death surveillance and response.

Results: DSR mechanisms were integrated into the organizational routines of the district. Compulsory 24-hour death reporting and 48-hour review, Confidential Enquiry into Maternal Death and ongoing review and response mechanisms (Perinatal/Child Problem Identification Programme and a forum referred to as Monitoring and Response Unit) were among the forms of DSR identified. The functioning of DSR mechanisms varied across sub-districts and between forms of DSR. Some forms of DSR, notably those involving maternal deaths, with external reporting and accounting, were more likely to trigger fault-finding and sanctioning than other forms of DSR, which were more proactive in supporting evidence-based actions at provider, system and community levels to prevent future deaths.

Conclusions: This study provides an empirical example of the everyday practice of DSR mechanisms at a district level. It also puts forward a framework of elements and enabling organizational processes for the functioning of these mechanisms that may be of value in similar settings elsewhere.

Strength and limitations

- This paper puts forward a framework of elements for evaluating the functioning of maternal, newborn and child (MNC) death surveillance and response (DSR) at the district level.
- The functioning of DSR mechanisms in a South African district that had benefitted from DSR strengthening interventions was evaluated using the framework.
- Field observations of MNC DSR processes and interviews with frontline providers and managers were conducted.
- **The framework was applied to one rural district that had developed functioning DSR practices and the findings may have limited generalisability;**
- **However, the framework and appraisal methods may be of value in similar settings elsewhere.**

INTRODUCTION

The United Nations (UN) put accountability for maternal, newborn and child health (MNCH) on the global agenda, placing three interrelated accountability processes at the centre of its 'Global Accountability Framework', namely, monitoring, reviewing and response.[1] Death surveillance and response (DSR) has become the means to operationalise these accountability processes across many health systems, aiming to improve the quality of maternal, neonatal and child health care, and eliminate preventable deaths.[2-5]

Death Surveillance and Response entails a continuous cycle of identification, notification and review of maternal or child deaths followed by action to improve the quality of care and prevent future deaths.[6] Its essence is, therefore, the capacity to record, review and respond to each death using affordable, effective and evidence-based actions linked to the findings.[5]

There is now a well-established tradition of DSR in Low- and Middle-Income Countries (LMICs), focusing primarily on maternal deaths.[2,4,6-10] In facilities and contexts where maternal deaths are relatively rare, maternal 'near-miss' cases are also being audited.[5] More recently, LMICs have begun including the review of perinatal and neonatal deaths into DSR systems, referred to as Maternal and Perinatal Death Surveillance and Response (MPDSR);[11-13] and in some settings, DSR extends to under-five deaths.[14-16]

In addition to facility-based processes, community-based DSR is recommended where a high proportion of deliveries (and deaths) occur outside of health facilities, and where community participation is crucial to implementing identified key actions.[5,11] In this regard, verbal and social autopsies have been developed as a participatory tool for community-based DSR, exploring clinical and social causes of death from a community perspective.[17-19]

DSR processes are typically defined nationally but implemented at facility level with support from and coordination by local or district teams.[20,21] Although there are no globally standardised approaches,[4] the literature points to several elements

underpinning effective DSR processes, encompassing analysis of modifiable factors involved, the tone of the review process and the range of participants involved.

The analysis of modifiable factors underlying maternal and child deaths has been codified into the 'three delays' model of care-seeking and utilisation: **(i) the delay in deciding to seek care early; (ii) the delay in reaching a health facility; (iii) the delay in providing or receiving adequate care at the facility.**[6,22-25]

In formulating a response, the literature on DSR recommends moving away from identifying and sanctioning individuals,[26] and towards the setting up of non-punitive 'no-blaming' approaches that foster collective and individual participation.[2,20] Such approaches are less likely to result in ignoring the incident or the temptation to defer responsibility onto others.[2,3,5]

DSR processes ideally involve a multidisciplinary team with the representation of a range of clinicians (nursing, medical and other professionals), managers and support staff (such as information officers). This brings together the array of provider knowledge and skills, together with commitments from managers to enhance ownership of the findings and turn recommendations into concrete actions.[2,5,6]

South Africa has a long-standing history, going back to the mid-1990s, of maternal, neonatal and child DSR that has become integrated into the routine functioning of frontline health services. DSR processes are linked to three ministerial committees established in 1998, namely the National Committee for Confidential Enquiry into Maternal Deaths (NCCEMD),[27] the National Perinatal and Neonatal Morbidity and Mortality Committee (NaPeMMCo);[28] and the Committee on Morbidity and Mortality in Children under 5 years (CoMMiC).[29] These committees function at national level with mandates exercised at local (health district) level through three of the DSR processes, namely, the Confidential Enquiry into Maternal Death (CEMD), the Perinatal Problem Identification Programmes (PPIP), and the Child under-five Problem Identification Programmes (CHIP). These mechanisms are situated in a dense and complex accountability ecosystem at the frontline of health provision.[30]

There have been significant reductions in maternal, neonatal and child mortality in South Africa over the last decade, attributed principally to the prevention and treatment of HIV.[31] However, despite a long history and institutionalised practice,

there is little understanding of the role of DSR implementation and functioning in this mortality reduction. Clear guidance on how best to assess this functioning is also lacking; one study showed no association between consistent auditing and perinatal mortality rates.[32]

Given the lack of standardisation and consensus on elements for assessing the functioning of DSR and the opportunity to assess district level experience in South Africa, this paper develops a framework to assess DSR functioning using the criteria drawn from the literature (Table 1) and based on field observations and interviews with frontline providers and managers. It then uses the framework to describe the forms and functioning of maternal, neonatal and child DSR mechanisms at district level in South Africa; and explores the context that makes them effective in the eyes of frontline managers and providers.

This paper seeks to answer the following question: How can the forms and functioning of accountability mechanisms for maternal, neonatal and child heath be holistically assessed at district level in South Africa?

Table 1: Framework for the functioning of Maternal, Neonatal and Child Death Surveillance and Response

I. Following a holistic approach to identifying modifiable causes			
'Three Delays'*	1st Delay in Deciding and seeking Care	2nd Delay in identifying and reaching a Health Facility	3rd Delay in receiving adequate appropriate care
II. Surveillance process (What and How?)**			
Elements of effective Maternal, Neonatal and Child Death Surveillance and Response**	1. Continuous action (full cycle) integrating death auditing, review, communication and feedback mechanism (identify and notify; review, analyse and make recommendations; respond and monitor response)		
	2. Using cost-effective and evidence-based actions		
	3. Confidentiality (no naming), No-blaming, non-punitive tone of the process		
	4. Integrating learning and response from DSR into continuing professional development, quality improvement, health system strengthening, and community education		
	5. Institutional support culture at all levels of the health system (management)		
	Actors participation (Who?)***		
	6. Driven by multidisciplinary teams (clinical, support, managerial)		
	7. Integration across levels from PHC facilities to hospitals, districts and higher levels		
	8. Involvement and commitment of the managers to act on the findings		
	9. Community participation in review and response (social and verbal autopsy)		
III. Actions (Pro-active & Reactive)			
▪ ***Provider level***	Capacity Building, In-service Training		
▪ ***System level***	Health System Improvement, Provision of resources		
▪ ***Community level***	Community Education		

References: *[23]; **[2,4-6]; ***[6,33]

METHODOLOGY

Definitions

In this paper, the term Death Surveillance and Response (DSR) refers to all death reporting and review processes related to maternal and child health, even if they do not have all the ideal components of DSR. They include phenomena commonly reported in the literature such as Maternal Death Review (MDR) or Audit, Maternal Death Surveillance and Response (MDSR), Maternal and Perinatal Death Surveillance and Response (MPDSR), or surveillance and review of child deaths.

Conceptual framework

We conducted a search of the literature using the above terms and consulted with experts in the field to identify the elements of well-functioning DSR. On the basis of these, a conceptual framework was developed. We combined the WHO Continuous Action Framework to eliminate preventable deaths,[6] the 'Three Delays' framework,[22] and other elements identified in the literature[2,4,6,20] to assess the DSR processes. These are outlined in Box 1 and Table 1. **The framework distinguishes between (i) the modifiable causes of death as per the three delays model; (ii) the surveillance process (what, how, who); and (iii) the types of responses triggered, whether proactive or reactive. These elements provide a holistic and comprehensive assessment of the various steps and processes involved in DSR. Given that mortality reductions require coordination across levels,[34] the framework adopts an area-based approach, using the most decentralised structures of in health systems coordination, notably the sub-district, as its unit of analysis.**

Box 1: WHO's Four components of continuous action in Maternal Death Surveillance and Response (MDSR) system

Identify and notify deaths	Identification and notification on an ongoing basis: Identification of suspected maternal deaths in facilities (maternity and other wards), followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.
Review maternal deaths	Review of maternal deaths by local maternal death review committees: Examination of medical and non-medical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.
Analyse and make recommendations	Analysis and interpretation of aggregated findings from reviews: Reviews are made at the district level and reported to the national level; priority recommendations for national action are made based on the aggregated data.
Respond and monitor response	Respond and monitor response: Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that the recommended actions are being adequately implemented.

Study design

We conducted a descriptive, exploratory qualitative case study of the forms and functioning of maternal, neonatal and child DSR processes applying the framework (Table 1).

Study Setting

The study was conducted in one of the three health districts in Mpumalanga Province situated in the north-east of South Africa. The District has a population of about 1.1 million, with the vast majority (61%) living in rural areas (Massyn et al., 2017). It contains one regional hospital, eight district hospitals, and 76 primary healthcare facilities, distributed among seven sub-districts.

The study district was targeted for health systems strengthening support because of high maternal and child mortality.[35] Intensified efforts were specifically made to

strengthen DSR in the district over several years, building on long-standing processes (24-hour reporting, Confidential Enquiry into Maternal Death [CEMD], and Perinatal/Child Problem Identification Programmes [PPIP, CHIP]). Besides these, DSR processes were accompanied by improved district clinical support with the introduction of district clinical specialist teams (DCST) and a new mechanism of coordination, referred to as the Monitoring and Response Unit (MRU). These initiatives were widely regarded as having impacted positively on maternal and child mortality in the District.[36] In these respects, therefore, the District could be regarded as having relatively well-functioning DSR at the time of the research. Although not nationally representative, it was nevertheless well suited for the qualitative exploration of criteria in a DSR assessment framework.

Study sample and Data collection

The sub-districts were selected in a prior study as representing the range of buy-in to one particular DSR strategy.[34] We combined semi-structured in-depth interviews, non-participant observation of meetings with a desk review of key documents as data sources for this study.

Semi-structured in-depth interviews

We conducted 45 semi-structured in-depth, individual interviews with purposefully selected respondents among those involved with maternal, neonatal and child DSR from two of the seven sub-districts and the district office. Respondents were either members of the enquiry or audit team or participants in one of the death surveillance and response meetings (MRU, PPIP, CHIP). Participants consisted of district programme managers (N=10) and members of the district clinical specialist team (DCST) (N=3), hospital hospital chief executive officer (CEOs) [N=2], hospital nursing managers (N=4), facility and hospital operational managers (professional nurses heading a ward in a hospital or managing a primary healthcare facility [N=5]), medical officers (N=7), professional nurses (N=3), allied health professionals (N=5), emergency service manager (N=1), and facility information managers (N=2). A semi-structured interview guide was developed and pre-tested (Supplementary Appendix File 1).

Interviews were conducted by the first author as part of a wider study. To ensure privacy and confidentiality, interviews were held in the respondent's office or in the boardroom outside the meeting time. With respondents' signed consent and permission, the interviews were audiotaped and transcribed verbatim. The interviewer took notes during and after the interview and summarised the interview on a pre-designed coversheet.[30] All audio files and transcripts were reviewed by the authors to ensure quality.

Non-participant observation

From May 2018 to September 2019, for a total 59 days distributed over one to three weeks in each of the two sub-districts, we conducted non-participant field observations by engaging in various activities and meetings related to Maternal, Neonatal and Child DSR in which health system actors were actively engaged in. A structured observation sheet was designed for this purpose.[30] We observed the following meetings: PPIP and CHIP, MRU, morbidity and mortality, clinical audit, clinical governance and patient safety committee. During a meeting, apart from the general observation schedule, we specifically observed the structure of the meeting, standard agenda, actors involved, presentation and discussion of cases, decision process, and related actions (capacity building, provision of resources or community engagement). Discussions of cases focused on the identification of causes of death based on the 'three delays' approach. We also reviewed the agendas and minutes of these meetings.

During this fieldwork, three maternal deaths occurred in the district and we were able to observe one formal district meeting and engage in informal discussions with district actors on the unfolding maternal death enquiry process linked to these three deaths.

Data management and analysis

Interview recordings were transcribed verbatim, and observation and reflection notes compiled by the first author (PhD student). All data were coded using Atlas.ti version 8, and a thematic analysis was used to analyse the data.[37] Key themes were identified following both a deductive approach based on a preset list of themes from the criteria of DSR functioning and inductively wherever new insights were identified.[38] Details of the analysis process are reported in Mukinda, Van Belle, Schneider [39] The themes were

grouped into two main categories, namely, 1) the forms and 2) the functioning of DSR. Finally, the findings were presented to respondents in various meetings or individual meetings to verify and validate the results.

Positionality, reflexivity and ethics considerations

Interviews and participant observation can face ethical challenges given the sensitive nature of a research topic that can potentially expose hidden realities.[40] The conduct of this study was facilitated by our previous engagements in the study setting, and subsequently as part of the first author's PhD study. These involved a period of immersion and observation, which allowed for the building of trust with participants, and to be able to contextualise and interpret the interviews and observations. To minimise descriptive and interpretive biases, regular feedback and discussion of the findings were conducted during follow-up meetings in the district; and iterative processes engaged between the first author (PhD student) and the co-authors (PhD supervisors) involving continuous questioning of the understanding of data and reviewing of findings.

This study was approved by the Biomedical Science Research Ethics Committee and the Provincial Health Research Committee. All interviews proceeded with signed informed consent.

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this study.

RESULTS

Forms of maternal, neonatal and child DSR mechanisms

Table 2 presents a summary of all maternal, neonatal and child DSR mechanisms observed in the district, their purpose and functioning, as well as their objectives. Five mechanisms were specific to MNCH (24-hour Reporting and 48-hour Review, CEMD, PPIP, CHIP, MRU). A**n additional two,**

which also dealt with maternal, neonatal and child deaths, the Morbidity and Mortality, and Clinical Audit/Clinical Governance meetings, **were general facility-based morbidity and mortality and clinical audit/governance mechanisms.**

The following sections describe both the processes and actors involved in the implementation of the instruments specific to the maternal, neonatal and child DSR strategies (their forms) and how actors perceived their implementation compared to elements articulated in our conceptual framework (their functioning).

Table 2. Death Surveillance and Response Mechanisms – Purpose, Frequency and Target

Observed Mechanisms	Purpose	Frequency	Target				Participants
			Maternal	Perinatal	Neonatal	Child<5	
24-hour Reporting, 48-hour Review	Specific to MNCH; Compulsory Death notification	Linked to death event	✓	✓	✓	✓	Facility; Patient Safety Committee (Sub-district and District)
Confidential Enquiry into Maternal Death (CEMD)	Specific to MNCH; Quality assurance; Compliance	Linked to death event	✓				National, Province, District, Hospital
Perinatal Problem Identification Programme (PPIP)	Specific to MNCH; Clinical; Includes perinatal and maternal death audit; Quality assurance	Monthly	✓	✓	✓		District, Hospital, PHC facilities
Child under-5 Problem Identification Programme (CHIP)	Specific to MNCH; Clinical; Audit; Quality assurance	Monthly				✓	District, Hospital, PHC facilities
Monitoring & Response Unit (MRU)	Specific to MNCH; Managerial; Multidisciplinary	Monthly/Bi-monthly	✓	✓	✓	✓	District, Hospital, PHC facilities
Morbidity & Mortality	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	Hospital
Clinical Audit/Clinical Governance	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	District, Hospital, PHC facilities

a. Compulsory 24-hour reporting, 48-hour review

Any maternal, perinatal, neonatal or child death is mandatorily recorded at facility level where the death occurred and reported within 24 hours internally to the district office, and externally to the Department of Home Affairs for issuing of a death certificate. This is the standard operating procedure applied in all facilities in South Africa. In the study district, following the introduction of the MRU and the DCST, a district-level system was also established to review all maternal and under-5 child deaths within 48 hours, independent of other processes. This process of 24-hour recording and reporting and 48-hour case review was referred to as a 'real-time death reporting';[41] it allowed for actions to be taken as quickly as possible to address modifiable factors, such as correcting a skills or staffing gap, provision of resources, or community education.

Following a maternal death, we observed the district MNCH programme manager and DCST members visiting the facility to conduct an audit and review the clinical management of the case, identify any gaps, and analyse the causes of deaths for discussion in subsequent enquiry processes. Opportunities for training and skills upgrading were identified. A report with recommendations was sent to the district manager who activated the confidential enquiry specific for maternal death events.

b. Confidential Enquiry into Maternal Death (CEMD)

The Confidential Enquiry into Maternal Death (CEMD) was introduced in South Africa in 1997 and involves a standardized process of reporting and auditing. Maternal deaths, in addition to being reported to the district and Home Affairs, are also reported to the provincial MNCH coordinator within 24 hours, who allocates a unique number. A copy of the patient folder and a completed Maternal Death Notification Form (MDNF) are included in the report and submitted to a team of provincial assessors (obstetrician, medical officer, midwife and anaesthetist). Assessors will go to the facility to enquire about the causes of death, as well as any avoidable or modifiable factors. The resulting annual and triennial reports and recommendations (not including detailed individual cases) are disseminated to Provincial and District structures and academic institutions for collation with general recommendations for action, such as training on the Essential Steps in the Management of Obstetric Emergencies (ESMOE).[42-44]

In addition to the provincial assessors, actors involved in the CEMD at district and facility levels were observed to consist of: the district manager (or a representative), quality assurance manager, primary health care and hospital services manager, labour relations and corporate services, and a member of the DCST, the hospital chief executive officer, (CEO), the nursing service and clinical managers, as well as the specific health providers directly involved to explain or justify any decisions or actions taken that resulted in maternal death.

c. Ongoing Review and Response Structures

As indicated, several routine meeting structures are established for auditing and responding to maternal, perinatal/neonatal and child deaths (Table 2). From our observation, three of these meetings involving multidisciplinary actors were specific to MNCH, namely, the Perinatal Problem Identification Programme (PPIP), the under-five Child Problem Identification Programme (CHIP) and the Monitoring and Response Unit (MRU). Strong involvement of a facilitator from the National Department of Health was observed as one of the enabling factors of these meetings, a factor unique to the study setting.

Perinatal/Child Problem Identification Programme (PPIP/CHIP)

From our observations, the PPIP/CHIP review meetings took place monthly at a facility level. The meeting consisted of systematically auditing the patient file related to death, comparing the management of the case against standard treatment protocols and guidelines. Through discussion, participants were able to identify gaps in clinical management, and set up improvement plans, including capacity-building needs. Preventive and early detection measures in PHC facilities were also identified.

In complying with the DSR guideline, the meetings were never used to point fingers, or name or blame providers involved in the management of the case. However, the respondents raised the possibility of sanction if at any stage gross negligence was documented.

> *'...We are taking every death very seriously. One death is too many deaths, we have to make sure that we follow up on our kids and also on our health care workers [at PHC] the entry point where the neonatal was first attended so that we can check on whether the child was attended according to protocol*

and if not then consequential management needs to be applied' [Hospital CEO].

A multidisciplinary team of actors attended the meetings: (i) from primary health care facilities: operational managers, nurses and data capturers; (ii) from the district hospital: doctors and nurses (mostly those involved in midwifery/obstetrics, gynaecology and paediatrics), ward operational managers, medical and nursing managers, hospital CEOs, as well as the information manager; (iii) from the district office: the DCST members and MNCH cluster programme managers. In most cases, the meeting was chaired by the clinical manager or the medical officer in charge of obstetrics and gynaecology, or by a nurse operational manager of the maternity ward.

Monitoring and Response Unit (MRU)

The MRU meetings were convened monthly at sub-district and bi-monthly at district level. From the guiding document, the MRU brings together a multidisciplinary team of actors, including managers (PHC, hospital), clinicians, information officers. The aim is to enhance the governance of MNCH by frontline managers and providers and to improve coordination between the various actors as well between levels of care. At district level, the meetings were chaired by the district manager or a representative, usually, the MCWH coordinator or the district quality assurance manager, while at sub-district level, the MRU meeting was chaired by the CEO of the district hospital or a representative. Participation was expanded to other stakeholders such as academic partners, NGOs and other government departments (notably the South African Social Security Agency) and community representatives to address the modifiable causes of maternal and child deaths.

The MRU reviewed performance indicators and identified follow-up on actions to address the modifiable causes of death, with particular emphasis placed on the 24-hour compulsory death reporting and 48-hour review process. The MRU emphasized the '4R's' approach i.e. 'Report, Review, Record, Respond' to a maternal or child death. A particular focus of the MRU was on responsiveness involving pro-active measures to addressing the identified modifiable factors through teamwork and skills building and the integration of the primary health care system in preventive actions at community level.

Functioning of maternal, neonatal and child DSR mechanisms

Tables 3a and b presents an application of the framework and a descriptive summary of the functioning of each of the DSR mechanisms observed in practice. In this section, we report on the overall functioning of DSR, drawing across all the forms of DSR observed and the views expressed by the respondents about them. We present key themes that emerged as critical from the elements outlined in Table 1.

a. The 'no-name, no-blame' approach

From our observations and the respondents' views, the perinatal and child (PPIP/CHIP) and the MRU meetings promoted the 'no-name, no-blame' approach. The chairperson of the death review meeting ensured that confidentiality was maintained throughout and that no one was blamed for the occurrence of the adverse event. Otherwise, respondents noted that the meeting could be transformed into a '*punishment exercise*' that would discourage actors' participation:

> '*..The perinatal meeting itself is not making anybody accountable. The meeting itself is about discussing things, it is not to point to individuals, because it's going to be discouraging for the people [to attend] if it's a punishment exercise…'* [DCST].

This 'no-name, no-blame' approach fostered a high level of commitment to the review meetings that resulted in a common understanding of individual and system challenges faced. It also fostered mutual support when people were proactively working as a team.

> *'Before there was blaming, blaming, blaming […] No-one is blaming anyone anymore because we do understand the challenges, we are part of the system, we are in the [same] basket' [EMS manager].*

Policy documents formally claim that the CEMD also follows a 'no-name, no-blame' approach. However, based on interviews and observations in practice, the CEMD process in the study district was conducted and experienced very differently to the other DSR mechanisms. The CEMD process typically resulted in intense scrutiny of maternal death from higher-level management (national department of health), seeking to assign individual responsibility and frequently triggering reactive sanction and punitive action in the district. Respondents reported suspensions, referrals to the labour office, litigations and court cases involving frontline professionals (Excerpt 1).

This was one of the constraining factors of DSR functioning. These processes were managed through quality assurance structures (e.g. adverse event committees) and were associated with a particular language of sanction – such as 'consequence management'.

> '*So the meetings that we usually have with the quality assurance and the maternity doctors and the sisters in charge […] those [meetings] push us to be more accountable […] it's not like the perinatal meeting, [where] we don't mention the doctors who did what, we just present the case. With those ones [quality assurance], it pushes you to be more accountable because the file is there, we all discuss what's in the file. So, whoever was the attending doctor is more accountable, feels more accountable*' [Medical officer].

Excerpt 1 (From DSR meeting and discussion with respondents)*

Case 1: A pregnant patient who had never attended antenatal care presented to the hospital with severe complications and subsequently died. The main modifiable factor identified was the delay in deciding and seeking care.

Case 2: A young primigravida who was followed up since the early stage of the pregnancy, but died because of a failure to treat her high blood pressure. The modifiable factor identified was the delay in receiving adequate care.

Case 3: The patient was referred to a higher level hospital for a complication during labour, but the ambulance was delayed resulting in the death of the patient while still at the first level hospital. The modifiable factors identified were the lack of an effective referral system, adequate equipment and trained human resources.

Case 4: In a 'backstreet abortion', a patient was given misoprostol, used for medical termination of pregnancy. She developed complications and sought care at the hospital but could not be saved. One of the modifiable factors was that safe termination of pregnancy services were not sufficiently accessible.

*The 'three delays' approach was applied in the discussion of death cases to identify the modifiable factors associated with death events including patient or community factors (Case 1), the provider (Case 2) or the system (Cases 3 and 4).

b. Following a holistic (three delays) approach to identifying and acting on modifiable factors

Review meetings were observed to follow the 'three delays' approach to identifying factors (especially modifiable factors – Excerpt 1) associated with the occurrence of death events and to take collective responsibility and proactively set up key actions to prevent further events (Tables 3a and b). However, as depicted in Table 3b, some DSR mechanisms do not follow the 'three delays. This analysis was enabled by the presence of stakeholders across levels - from primary health care facilities to district clinical specialist teams and programme managers. Because of the managerial orientation of MRU, the three delays mostly focused on the system factors for action, while PPIP/CHIP meetings were mostly clinically oriented to providers and, to some extent, patient's factors. In both cases, any matters related to community engagement were discussed with the board chairpersons to liaise with the community leadership.

Table 3a: Summary of the functioning of DSR Mechanism in practice

	Death Surveillance and Response Mechanisms					
	24-hour Reporting, 48-hour Review	**Confidential Enquiry into Maternal Death (CEMD)**	**Perinatal/Child under-5 Problem Identification Programme (PPIP/CHIP)**	**Monitoring & Response Unit (MRU)**	**Morbidity & Mortality**	**Clinical Audit/Clinical Governance**
Functioning in practice (What/How?)	Reporting and Auditing	Naming; Obligation to inform and explain actions and decision taken;	No-naming, No-blaming;	No-naming, No-blaming,	No-naming, No-blaming, Auditing and Quality Assurance	No-naming, No-blaming, Auditing and Quality Assurance
Actors involved (Who?)	National, Province, District, Hospital	Facility (PHC, Hospital)	Clinical (District, Hospital, PHC)	Managers, clinical and non-clinical (District, Hospital, PHC)	Clinical (Hospital)	Clinical (District, Hospital, PHC)
Actions (Pro-active & Reactive)		Reactive; Possibility of imposing sanction; Targeting individual; institutional training	Proactive; Taking collective responsibility; Capacity building; system improvement	Proactive; Taking collective responsibility, In-service training; system improvement and community education	Proactive; In-service training	Proactive, In-service training

Table 3b: Functioning of DSR Mechanism compared to elements from the literature

		Death Surveillance and Response Mechanisms					
		24-hour Reporting, 48-hour Review	**Confidential Enquiry into Maternal Death (CEMD)**	**Perinatal/Child under-5 Problem Identification Programme (PPIP/CHIP)**	**Monitoring & Response Unit (MRU)**	**Morbidity & Mortality**	**Clinical Audit/ Clinical Governance**
Matching to the elements for the functioning of DSR mechanisms	**I. Following a holistic approach to identifying modifiable causes**	✓		✓	✓		
	II. Surveillance process (What and How?)						
	1. Continuous action (Death auditing, review, communication, and feedback)	✓	✓	✓	✓	✓	✓
	2. Using cost-effective and evidence-based actions	✓		✓	✓	✓	✓
	3. Confidentiality (no naming), No-blaming, non-punitive tone of the process	✓	✓	✓	✓	✓	✓
	4. Integrating learning and response, quality improvement, health system strengthening, and community education			✓	✓		
	5. Institutional support culture at all levels of the health system	✓	✓	✓	✓	✓	✓
	Actors (Who?)						
	6. Multidisciplinary teams			✓	✓		
	7. Integration across levels of care			✓	✓		✓
	8. Involvement and commitment of the managers to act on the findings			✓	✓		

	9. Community participation in review and response						
	III. Actions (Pro-active & Reactive)						
	▪ ***Provider level***	✓	✓	✓	✓	✓	✓
	▪ ***System level***		✓	✓	✓		
	▪ ***Community level***				✓		

Note: The tick (✓) implies that the element of the functioning was observed for the selected mechanism

c. *Integrating training and support from higher-level management*

One of the key moments of the review meetings was to identify the modifiable causes of death and translating them into training and learning opportunities for frontline managers and providers, as well as system improvement and community education. From our observation, the presence of senior managers from the district office, district hospital and other partners in the review meetings created a sense of trust and space for empowering providers with knowledge and tools for better performance. Nurses were able to present cases and engage in discussions with doctors. Whenever gaps were identified, a collective decision on key actions to prevent future events was taken with support from the management.

> *'The meeting is to highlight things, training, educational issues and to bring the people, the team together* [DCST].

Another perceived core value of the DSR process was learning from the death events to come up with quality improvement strategies to prevent similar events in the future.

> *'After we discuss we all come up with ... if I can say, opinions of what actually transpired or what could have happened for this baby to demise and what we could have done differently to help the baby. Maybe for the other babies who are coming in the near future who present the same way, what can we change to be able to help them'* [Medical Officer].

The learning and training were extended to primary health care facilities; minutes of the meetings and reminders of the guidelines were circulated; and regular visits to facilities were conducted by the district team, reinforcing what was shared in the meetings and allowing those who were absent from the meeting to be capacitated with needed skills.

By bringing together district and sub-district actors, DSR meetings acted as a lever for more transparency between levels, in sharing frustrations and most especially the sharing of good practices.

> *'I can say that [DSR meeting] is strengthening the communication between the sub-districts and the district and because of that I don't see any problem*

that might hinder us to progress, because that is where we are sharing our frustrations and sharing our best practices' [District programme manager].

The role of the DCST in providing clinical guidance, mentorship and in-service training was observed as key in addressing the modifiable factors related to provider gaps in clinical knowledge. DCST also played a role in enabling professional teamwork. In one instance, where a doctor was trying to dismiss a nurse's opinion and impose his view during discussions, the DCST intervened and emphasized that everyone's opinion counted.

d. Bringing together a multidisciplinary team of actors

As indicated, DSR meetings were intended to be driven by a multidisciplinary team of actors including medical, nursing and other professionals, and across levels (community, PHC and hospital).

This was achieved in one particular sub-district, where the organizational culture and the leadership style of senior managers promoted collaboration between primary health care facilities and hospital.

'*…we only receive the mother during the process of giving birth, and when the woman is now complicated with pre-eclampsia of which I think that this would have been prevented at the first place; so we are involving the primary health care level to come to the perinatal meetings so that they can hear exactly about the progress of the woman because, for us, as a hospital, we do not have the liberty of starting the woman on antenatal care, whereas the PHC are the ones who might have been able to pick up on some problems during the antenatal period. So, for them being involved in these perinatal meetings is quite vital […] not coming is also is a transgression on its own'* [Hospital CEO].

Also important was the presence of key champions amongst middle managers and medical and nursing clinicians who created and nurtured a community of practice for sharing knowledge and learning.

In one sub-district, participants expressed excitement at attending meetings, and the venues were sometimes overflowing with participants.

'[I]: So why do you think that meeting is taken seriously?

[R]: It's the commitment of the medical managers, the commitment of the managers and also the operational managers in maternity wards and the doctors [Manager, DO].

At these meetings, each step taken in the care pathway (from PHC to the referral hospital) was carefully scrutinized and improvement plans with timelines, monitoring and a responsible person were developed:

'*Because when you put those quality [measures] you start from your ward, …you put as well the responsible people because when you put some measures you need to monitor, to come and see if it's working. And you need to give the timeline… you monitor if it's going well, you sustain, if there is something you need to review or if it's not going well'* [Clinical manager].

Where identified modifiable factors were related to the patient or community, hospital board chairpersons were contacted to facilitate the dialogues within the community and identify key actions together with the community leaders to address the identified problem. However, the community was not usually implicated directly in DSR processes.

It is important to note that this degree of functioning was not universal, and there was variation across facilities and sub-districts in the levels of team involvement, particularly of staff from PHC facilities and hospital actors. In instances where doctors and nurses, managers and providers, or PHC facilities and hospitals were not working as a solidified team, accountability mechanisms were flawed resulting in poor referral systems, 'blame games' and the deferring of responsibility in case of death events.

e. DSR process institutionalized

DSR processes in this district were anchored into routines in all facilities, with standardised agendas and supportive supervision from the DCST and the MNCH district programme coordinators. The DSR processes were perceived not only to contribute to improving the quality of care and outcomes in facilities…

> *'I think the perinatal meetings are there and they are there forever. It's like an auditing process, it's impossible to run maternity service without this [perinatal meeting]' [DCST].*

...but also to facilitate the integration of people and services

> *'When we started MRU [...] we were blaming each other, but the more we discussed and saw how it fits, we feel now the problem is not within us, [but] with our resources [...] Now we feel we are part of the institution; before [MRU] we felt that EMS was not part of the hospital [EMS].*

The perceived benefit and value of DSR processes, particularly the review and response meetings, were repeatedly emphasized by the respondents as a motivation to continue with and integrate them into the core activities of maternal and child in the district.

However, institutionalising appropriate DSR processes across all levels of the District was not an easy or completed task. DSR processes faced challenges at an individual level (blaming, sanctioning), institutional or service level (shortage of skilled personnel), or system levels (ineffective referral system). We also observed variations in the level of support and involvement of local leadership and primary healthcare facilities in DSR processes.

DISCUSSION

While WHO guidelines outline the necessary steps in conducting death surveillance and response,[6] there is little holistic guidance on how this is to be achieved in health systems. By collating elements from the literature into a conceptual framework it was possible to explore the factors enabling or constraining DSR functioning in one district. This framework may be of value in other similar settings. It can be used by researchers or health service managers to explore the functioning of the DSR system, diagnose challenges and promote an inclusive organisational culture of holistic scrutiny into the causes of death.

Maternal, neonatal and child DSR is well established in the South African district health system. Across the five forms of DSR directly related to maternal and child deaths in the study district, we found a range of

practices. The process in most instances followed the 'no-name, no-blame' approach as stipulated in the guiding documents. There was also holistic approaches to identifying causes of death, efforts to integrate training and support from higher levels, facilitation of multi-disciplinary teams, and elements of institutionalisation of DSR in the district. The latter requires a systemic supportive environment and organisational culture at all levels that are linked to annual planning and budgeting to support the implementation of actions.[45] In these regards, the study District had clearly benefitted from the DSR system strengthening interventions implemented over a number of years.

In certain instances, however, the no-name no-blame approach was contradicted by an organisational culture of blaming and punishment, particularly following maternal deaths. Here the emphasis was on identifying and sanctioning the persons responsible for death incidents and on curbing the institutional ramifications of the incident, instead of using it as an organisational learning event to prevent further incidents.[46] However, this level of scrutiny was not observed in instances of perinatal deaths, showing the difference between maternal and perinatal DSR processes. Such blame cultures in a healthcare organisation can be a source of an increased number of medical errors.[47]

Death events, particularly maternal deaths, are considered to be a barometer of a health system's performance. In this regard, DSR processes can be constrained by the fear of revealing malpractice and poor health system performance, and DSR processes can become politicized and maternal deaths under-reported by bureaucrats unwilling to disclose system failures.[48] In our study setting, DSR processes were facilitated by a high-level political commitment from the national government to compulsory and transparent reporting and reviewing of all cases of maternal or child deaths and implementation of measures to avoid future deaths from identified modifiable factors.

In this study, 'no name, no blame' approaches were observed to facilitate the active participation of various actors, especially those directly linked

to death incidents and the possibility of embracing responsibility for the incident.[49] Thus, DSR processes can create a sense of interpersonal trust and trust in the health care organization, key for generating learning and improvement. In contrast, as noted in Kenya, the lack of trust, the fear of blame or individualised disciplinary action conditioned frontline professionals to be reluctant in disclosing data on maternal death.[17]

As proposed by Deis *et al.*[50] DSR meetings can be transformed into instruments of system improvement using a systematic approach that incorporates the 'three delays' model for action including the providers, the health system and the communities in identifying and addressing modifiable factors related to death events. This means that DSR processes should not only seek to identify and correct frontline providers' and managers' practices but also health system and structural factors at the community level,[20] A holistic approach was made possible through the use of standardised protocols and guidelines for DSR that integrated reporting and feedback mechanisms.[46]

Another important element of successful DSR observed was the inclusion and engagement of a multidisciplinary team of actors from various professional backgrounds and managers. This created a space to address not only health system-related problems[50] but also problems related to social structural factors (e.g. social exclusion, poverty). Where these functioned effectively, DSR platforms intersected individual and collective competency and responsibility for MNCH, enabling a community of practice that recognised the contribution and value of all levels, from PHC facilities to district hospitals actors. Furthermore, the inclusion of various stakeholders into DSR processes can also facilitate social autopsies given that some maternal and child deaths occur outside of health facilities. Similarly, a study in four Sub-Saharan African countries reported interdisciplinary teamwork with good communication amongst staff and active participation of staff as enablers of the DSR process.[51] **In contrast, where actors from PHC facilities and hospitals, or when doctors and nurses, managers and providers were disconnected, it resulted in a poor referral process, blame games and deferring of responsibility or**

avoidance of accountability. Melberg *et al.*[48] referred to a 'defensive referral' as a result of fear of being blamed for maternal death incident.

When encouraged by leadership support, DSR processes can become a platform for common learning, knowledge sharing and quality improvement.[45] Effective DSR system, according to Kerber *et al.* [52] needs engaged leadership and use of guidelines and protocols that ensure the complete cycle of the audit system.[53]

Limitations

The statements of lived experiences of DSR processes and resulting accountability mechanisms by the respondents could have been what they thought to be the right answer reflecting a social desirability bias in their responses. Being observed, respondents could have behaved differently ('Hawthorne effect'). We did indeed observe instances of where the absence of the national facilitator led to a slackening of meeting processes. **Furthermore, respondents' self-reports and accounts could have led to an overstatement of phenomena. We sought to minimise these biases by prolonged immersion in the field and supplementing formal interviews with observations and informal conversations.[30,54]**

This study was conducted in one district at a particular moment in time. While the forms of DSR are likely to be repeated elsewhere, the study findings related to the functioning of DSR are not generalisable given the management investments made. However, the findings have analytical relevance in illuminating DSR in best-case scenarios and the triangulated nature of the data provide confidence in the data collected.

CONCLUSION

The success of DSR processes resides in the intersection of many contextual factors such as the commitment of a multidisciplinary team of actors and support from district managers, the integration of primary healthcare and district hospitals, and the

establishment of a space for mutual trust and learning anchored within the organisational culture of health facilities. A holistic approach is essential to address the modifiable factors identified, translate them into long-term organisational learning opportunities, and set up evidence-based, 'real-time' responses.

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Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

Interview Guide – Accountability – Review meetings	
A. ACCOUNTABILITY	
Introduction	▪ Can you tell me about your current position/role in the (district) health system? *Probes: For how long have you been in that position?*
Accountability definition	▪ Could you describe to me what accountability means to you? *Probes: What does it make you think of accountability? What does it mean 'being accountable to?'* *How* would *you relate your definition of accountability to MNCH?*
Challenges	Can you share some of the challenges that you face while performing your tasks as a health professional (or mid-level manager) within your district? *Probes: Health Systems challenges/Challenges related to clients & Community/Personal challenges*
- **Line/forms,** - **Guidelines** - **Enablers** - **Barriers** - **Complaints**	▪ In your working area, to whom do you think you are accountable and why? *Probes:* - *Tell me about the reporting structure with regard to your role in the health systems?* - *To/from whom do you report/receive order/provide information/provide technical support/training/supervision* ▪ Are there any accountability guidelines/framework from the DOH that you are using? [*If yes, please describe*] ▪ What are the enabling and limitation factors of the current accountability processes? ▪ Does the District/Sub-district/Hospital/PHC Management Team have a mechanism in place to handle clients' complaints? How does it work? ▪ Can you describe how voice of the vulnerable (and of the community) is being represented within the Health System/clinic committee/ Hospital Board?
Team	▪ What's your experience/perception regarding teamwork and accountability for MNCH? *Probes:* - *Can you tell me about the team members/actors involved in the accountability processes for MNCH (Probe: Level)* - *How will you characterise the attitude and commitment of teamwork regarding MNCH* - *What's your beliefs regarding MNCH and the value of accountability*

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	▪ How do you perceive the performance of the team with regard to MNCH? *Probes:* - *Do you share the same goals? How do you set up these goals [decision making process]* - *Can you comment on the level of participation and collaboration work environment?* - *How do you monitor group accountability for MNCH*
Adverse events	▪ How do you perceive a case of adverse event (e.g. maternal or child death) as a team and/or individual? *Probes:* - *Please elaborate* - *How is the climate within your team when it comes to adverse event?* ▪ When you have to justify/explain/answer on an adverse event, how do you perceive the role of team members (peers)?
	▪ How would you characterise the role of the investigation team regarding an adverse event? [Team: DCST, Province, or other] *Probes:* - *Does the investigation result in sanctions and/or learning? [Please elaborate]* - *If learning, how often does the training happen? By Whom?* - *How do you identify areas for improvement [beside when an adverse event occurs]?*
Improvement	▪ If you are given all the means to improve accountability, how would you go for it and what would you prioritize? ▪ In your view, what can be done regarding accountability to improve MNCH outcomes?
B. DEATH REVIEW MEETINGS	
Actors/Who?	▪ Can you please describe who attends the meeting? *Probe:* - *Who are the actors from district office, hospital, PHC? Doctors vs Nurses and/or others?*
Meeting	▪ How would you describe the structure of the meeting? *Probe:* - *Who chairs, the agenda, how long, frequency, participation/engagement?* - *What are the drivers/facilitators/barriers to this [name] meeting and related processes?*

Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

	- *What, from your perspective, is the difference between MRU, PPIP/CHIP and other review meetings [name]?*
Decision process	▪ How would you describe the decision process during the [name] meeting? *Probes:* - *What happens? What do you discuss? How do the discussions of the meetings lead to decision or [positive] results (for actions)?*
Dealing with adverse events (deaths)	▪ How do you deal with adverse events e.g. maternal or child death? *Probes:* - *Can you describe the situation of maternal, neonatal and child death (mortality) in this area since you started in your position?* - *Can you share from your experience an example of an adverse event (maternal or child death) and how was the process of enquiry?* - *How do you see the problem of death in terms of accountability?* - *Do you have/know any policy/guideline for dealing with death event?*
	▪ How do you see the role of the [name] meeting as a structure that is facilitating/supporting accountability processes for MNCH? *Probes:*
	▪ How would you describe the role of communities in addressing MNCH problems? ▪ How would you describe the role and level of engagement of PHC facilities? *Probes:* - *Referral processes* - *Role of Provincial and National department of Health*
Actions/Outcomes	▪ What from your perspective are some of the key actions and outcomes on MNCH as a result of the [name] meeting? *Probes:* - *How sustainable are these actions? [Please elaborate]*
Conclusion	- Remind Ethics and right to withdraw from the study at any time - Thanking the informant

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	Pg 1, L1-3
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	Pg 2, L1-28
Introduction	
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Pg 4, L1 - Pg6, L2
Purpose or research question - Purpose of the study and specific objectives or questions	Pg 6, L3-13
Methods	
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	Pg 8, L1-pg9 L5
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	Pg12, L4-15
Context - Setting/site and salient contextual factors; rationale**	Pg 9, L6-pg10 L11
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	Pg10, L12-pg11, L7
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	Pg12, L17-22; Pg31, L11-15
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	Pg10, L14-pg11 L21

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Pg10, L28-30 Pg11 L12-13
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Pg11, L25-pg12, L3
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Pg11, L25-pg12, L3
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Pg12, L6-15

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pg12, L24-pg27, L18
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Pg12, L24-pg27, L18

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pg27, L19-pg29, L30
Limitations - Trustworthiness and limitations of findings	Pg30, L1-16

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Pg30, L29
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Pg31, L1-6

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

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The practice of Death Surveillance and Response for Maternal, Newborn and Child Health: A framework and application to a South African Health District

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Abstract

Objective: To assess the functioning of maternal, perinatal, neonatal and child death surveillance and response (DSR) mechanisms at a health district level.

Design: A framework of elements covering analysis of causes of death, and processes of review and response was developed and applied to the smallest unit of coordination (sub-district) to evaluate DSR functioning. The evaluation design was a descriptive qualitative case study, based on observations of DSR practices and interviews.

Setting: Rural South African health district (sub-districts and district office).

Participants: A purposive sample of 45 frontline health managers and providers involved with maternal, perinatal, neonatal and child DSR. The DSR mechanisms reviewed included a system of real-time death reporting (24 hours) and review (48 hours), a nationally mandated Confidential Enquiry into Maternal Death and regular facility and sub-district mortality audit and response processes.

Primary outcome measures: Functioning of maternal, perinatal, neonatal and child death surveillance and response.

Results: While DSR mechanisms were integrated into the organizational routines of the district, their functioning varied across sub-districts and between forms of DSR. Some forms of DSR, notably those involving maternal deaths, with external reporting and accounting, were more likely to trigger reactive fault-finding and sanctioning than other forms, which were more proactive in supporting evidence-based actions at provider and system level, and to a limited extent in communities, in order to prevent future deaths.

Conclusions: This study provides an empirical example of the everyday practice of DSR mechanisms at a district level. It assesses such practice based on a framework of elements and enabling organizational processes that may be of value in similar settings elsewhere.

Strength and limitations

- This paper puts forward a framework of elements for evaluating the functioning of maternal, newborn and child (MNC) death surveillance and response (DSR) at the district level.
- The functioning of DSR mechanisms in a South African district that had benefitted from DSR strengthening interventions was evaluated using the framework.
- Field observations of MNC DSR processes and interviews with frontline providers and managers were conducted.
- **The framework was applied to one rural district that had developed functioning DSR practices and the findings may have limited generalisability;**
- **However, the framework and appraisal methods may be of value in similar settings elsewhere.**

INTRODUCTION

The United Nations (UN) put accountability for maternal, newborn and child health (MNCH) on the global agenda, placing three interrelated accountability processes at the centre of its 'Global Accountability Framework', namely, monitoring, reviewing and response.[1] Death surveillance and response (DSR) has become one of the means to operationalise these accountability processes in many health systems, with the view to improving the quality of maternal, neonatal and child health care, and eliminate preventable deaths.[2-5]

Death Surveillance and Response entails a continuous cycle of identification, notification and review of deaths followed by action to improve the quality of care and prevent future deaths.[6] Its essence is, therefore, the capacity to record, review and respond to each death using affordable, effective and evidence-based actions linked to the findings.[5]

There is now a well-established tradition of DSR in Low- and Middle-Income Countries (LMICs), focusing primarily on maternal deaths.[2,4,6-10] In facilities and contexts where maternal deaths are relatively rare, maternal 'near-miss' cases may also be audited.[5] More recently, LMICs have begun including the review of perinatal and neonatal deaths into DSR systems, referred to as Maternal and Perinatal Death Surveillance and Response (MPDSR);[11-13] and in some settings, DSR extends to under-five deaths.[14-16]

In addition to facility-based processes, community-based DSR is recommended where a high proportion of deliveries (and deaths) occur outside of health facilities, and where community participation is crucial to implementing identified key actions.[5,11] In this regard, verbal and social autopsies have been developed as a participatory tool for community-based DSR, exploring clinical and social causes of death from a community perspective.[17-19]

DSR processes are typically defined nationally but implemented at facility level with support from and coordination by local or district teams.[20,21] Although there are no globally standardised approaches,[4] the literature points to several elements

underpinning effective DSR processes, encompassing analysis of modifiable factors involved, the tone of the review process and the range of participants involved.

The analysis of modifiable factors underlying maternal and child deaths has been codified into the 'three delays' model of care-seeking and utilisation: **(i) the delay in deciding to seek care early; (ii) the delay in reaching a health facility; (iii) the delay in providing or receiving adequate care at the facility.**[6,22-25]

In formulating a response, the literature on DSR recommends moving away from identifying and sanctioning individuals,[26] and towards the setting up of non-punitive 'no-blaming' approaches that foster collective and individual participation.[2,20] Such approaches are less likely to result in ignoring the incident or the temptation to defer responsibility onto others.[2,3,5]

DSR processes ideally involve a multidisciplinary team with the representation of a range of clinicians (nursing, medical and other professionals), managers and support staff (such as information officers). This brings together the array of provider knowledge and skills, together with commitments from managers to enhance ownership of the findings and turn recommendations into concrete actions.[2,5,6]

South Africa has a long-standing history, going back to the mid-1990s, of maternal, newborn and child DSR that has become integrated into the routine functioning of frontline health services. DSR processes are linked to three ministerial committees established in 1998, namely the National Committee for Confidential Enquiry into Maternal Deaths (NCCEMD),[27] the National Perinatal and Neonatal Morbidity and Mortality Committee (NaPeMMCo);[28] and the Committee on Morbidity and Mortality in Children under 5 years (CoMMiC).[29] These committees function at national level with mandates exercised at local (health district) level through three of the DSR processes, namely, the Confidential Enquiry into Maternal Death (CEMD), the Perinatal Problem Identification Programmes (PPIP), and the Child under-five Problem Identification Programmes (CHIP). These mechanisms are situated in a dense and complex accountability ecosystem at the frontline of health provision.[30]

There have been significant reductions in maternal, neonatal and child mortality in South Africa over the last decade, attributed principally to the prevention and treatment of HIV.[31] However, despite a long history and institutionalised practice,

there is little understanding of the role of DSR implementation and functioning in this mortality reduction. Clear guidance on how best to assess this functioning is also lacking; one study showed no association between consistent auditing and perinatal mortality rates.[32]

Given the lack of standardisation and consensus on elements for assessing the functioning of DSR, this paper proposes an assessment framework using criteria drawn from the literature and then applies the framework to evaluate existing maternal, peri/neonatal and child DSR mechanisms in one South African district.

This paper thus seeks to answer the following question: Based on a comprehensive assessment framework, how functional are the district's DSR mechanisms?

METHODOLOGY

Definitions

In this paper, the term Death Surveillance and Response (DSR) refers to all death reporting and review processes related to maternal and child health, even if they do not have all the ideal components of DSR. They include phenomena commonly reported in the literature such as Maternal Death Review (MDR) or Audit, Maternal Death Surveillance and Response (MDSR), Maternal and Perinatal Death Surveillance and Response (MPDSR), or surveillance and review of child deaths.

Conceptual framework

A framework to assess the functioning of DSR mechanisms was developed using criteria drawn from the literature and supplemented by field observations and interviews with frontline providers and managers.

We conducted a search of the literature using the above terms and consulted with experts in the field to identify the elements of well-functioning DSR. On the basis of these, a conceptual framework was developed. We combined the WHO Continuous Action Framework to

eliminate preventable deaths,[6] the 'Three Delays' framework,[22] and other elements identified in the literature[2,4,6,20] to assess the DSR processes. These are outlined in Box 1 and Table 1. **The framework distinguishes between (i) the surveillance process (what, how, who); (ii) the identification of modifiable causes of death and investigation as per the three delays model; and (iii) the types of responses (actions) triggered, whether proactive or reactive. These elements provide a holistic and comprehensive assessment of the various steps and processes involved in DSR. Given that mortality reductions require coordination across levels,[33] the framework adopts an area-based approach, using the most decentralised structures of in health systems coordination, notably the sub-district, as its unit of analysis.**

Box 1: WHO's Four components of continuous action in Maternal Death Surveillance and Response (MDSR) system	
Identify and notify deaths	Identification and notification on an ongoing basis: Identification of suspected maternal deaths in facilities (maternity and other wards), followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.
Review maternal deaths	Review of maternal deaths by local maternal death review committees: Examination of medical and non-medical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.
Analyse and make recommendations	Analysis and interpretation of aggregated findings from reviews: Reviews are made at the district level and reported to the national level; priority recommendations for national action are made based on the aggregated data.
Respond and monitor response	Respond and monitor response: Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that the recommended actions are being adequately implemented.

Table 1: Framework for the functioning of Maternal, Neonatal and Child Death Surveillance and Response

I.	**Surveillance process (What and How?)****		
Elements of effective Maternal, Neonatal and Child Death Surveillance and Response**	1. Continuous surveillance (full cycle) integrating death auditing, review, communication and feedback mechanism (identify and notify; review, analyse and make recommendations; respond and monitor response)		
	2. Recommending cost-effective and evidence-based practices		
	3. 'No naming, no blaming' (confidentiality, non-punitive tone of the process)		
	4. Integrating learning and response from DSR into continuing professional development, quality improvement, health system strengthening, and community education		
	5. Institutional support culture at all levels of the health system (management)		
	Actor participation (Who?)***		
	6. Driven by multidisciplinary teams (clinical, support, managerial)		
	7. Integration across levels from PHC facilities to hospitals, districts and higher levels		
	8. Involvement and commitment of the managers to act on the findings		
	9. Community participation in review and response (social and verbal autopsy)		
II.	**Following a holistic approach to identifying modifiable causes**		
'Three Delays'*	1st Delay in Deciding and seeking Care	2nd Delay in identifying and reaching a Health Facility	3rd Delay in receiving adequate appropriate care
III.	**Actions (Pro-active & Reactive)**		
▪ ***Provider level***	Capacity Building, In-service Training		
▪ ***System level***	Health System Improvement, Provision of resources		
▪ ***Community level***	Community Education		

References: ***23; ****2,4-6; *****6,34**

Study design

We conducted a descriptive, exploratory qualitative case study of the forms and functioning of maternal, neonatal and child DSR processes applying the framework (Table 1).

Study Setting

The study was conducted in one of the three health districts in Mpumalanga Province situated in the north-east of South Africa. The District has a population of about 1.1 million, with the vast majority (61%) living in rural areas (Massyn et al., 2017). It contains one regional hospital, eight district hospitals, and 76 primary healthcare facilities, distributed among seven sub-districts.

The study district was targeted for health systems strengthening support because of high maternal and child mortality.[35] Intensified efforts were specifically made to strengthen DSR in the district over several years, building on long-standing processes (24-hour reporting, Confidential Enquiry into Maternal Death [CEMD], and Perinatal/Child Problem Identification Programmes [PPIP, CHIP]). Besides these, DSR processes were accompanied by improved district clinical support with the introduction of district clinical specialist teams (DCST) and a new mechanism of coordination, referred to as the Monitoring and Response Unit (MRU). These initiatives were widely regarded as having impacted positively on maternal and child mortality in the District.[36] In these respects, therefore, the District could be regarded as having relatively well-functioning DSR at the time of the research. Although not nationally representative, it was nevertheless well suited for the qualitative exploration of functioning using a DSR assessment framework.

The framework was applied to maternal, peri/neonatal and child DSR mechanisms observed in the district, summarised in Table 2 and described in the next section. Five mechanisms were specific to MNCH (24-hour Reporting and 48-hour Review, CEMD, PPIP, CHIP, MRU). A**n additional two, which also dealt with maternal, neonatal and child deaths,** the Morbidity and Mortality, and Clinical Audit/Clinical Governance meetings, **were general facility-based morbidity and mortality and clinical audit/governance mechanisms.**

Table 2. Death Surveillance and Response Mechanisms – Purpose, Frequency and Target

Observed Mechanisms	Purpose	Frequency	Target				Participants
			Maternal	Perinatal	Neonatal	Child<5	
24-hour Reporting, 48-hour Review	Specific to MNCH; Compulsory Death notification	Linked to death event	✓	✓	✓	✓	Facility; Patient Safety Committee (Sub-district and District)
Confidential Enquiry into Maternal Death (CEMD)	Specific to MNCH; Quality assurance; Compliance	Linked to death event	✓				National, Province, District, Hospital
Perinatal Problem Identification Programme (PPIP)	Specific to MNCH; Clinical; Includes perinatal and maternal death audit; Quality assurance	Monthly	✓	✓	✓		District, Hospital, PHC facilities
Child under-5 Problem Identification Programme (CHIP)	Specific to MNCH; Clinical; Audit; Quality assurance	Monthly				✓	District, Hospital, PHC facilities
Monitoring & Response Unit (MRU)	Specific to MNCH; Managerial; Multidisciplinary	Monthly/Bi-monthly	✓	✓	✓	✓	District, Hospital, PHC facilities
Morbidity & Mortality	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	Hospital
Clinical Audit/Clinical Governance	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	District, Hospital, PHC facilities

Maternal, neonatal and child DSR mechanisms in the study setting

This section briefly describes DSR mechanisms that are specific to maternal, neonatal and child health.

a. Compulsory 24-hour reporting, 48-hour review

Any maternal, perinatal, neonatal or child death is mandatorily recorded at the facility where the death occurred and reported within 24 hours internally to the district office, and externally to the Department of Home Affairs for issuing of a death certificate. This is the standard operating procedure applied in all facilities in South Africa. In the study district, following the introduction of the MRU and the DCST, a district-level system was also established to review all maternal and under-5 child deaths within 48 hours, independent of other processes. This process of 24-hour recording and reporting and 48-hour case review was referred to as 'real-time death reporting';[37] and its purpose was to enable actions to be taken as quickly as possible to address modifiable factors, such as correcting a skills or staffing gap, provision of resources, or community education.

b. Confidential Enquiry into Maternal Death (CEMD)

The Confidential Enquiry into Maternal Death (CEMD) was introduced in South Africa in 1997 and involves a standardized process of reporting and auditing. Maternal deaths, in addition to being reported to the district and Home Affairs, are also reported to the provincial MNCH coordinator within 24 hours, who allocates a unique number. A copy of the patient folder and a completed Maternal Death Notification Form (MDNF) are included in the report and submitted to a team of provincial assessors (obstetrician, medical officer, midwife and anaesthetist). Assessors will go to the facility to enquire about the causes of death, as well as any avoidable or modifiable factors. The resulting annual and triennial reports and recommendations (without details on individual cases) are disseminated to Provincial and District structures and academic institutions for collation with general recommendations for action, such as training on the Essential Steps in the Management of Obstetric Emergencies (ESMOE).[38-40]

c. Ongoing Review and Response Structures

As indicated, several routine meeting structures are established for auditing and responding to maternal, perinatal/neonatal and child deaths (Table 2).

- *Perinatal/Child Problem Identification Programme (PPIP/CHIP)*

The PPIP/CHIP review meetings take place monthly at facility level. The meeting consists of systematically auditing the patient file related to death, comparing the management of the case against standard treatment protocols and guidelines. Through discussion, participants identify gaps in clinical management and modifiable factors related to the caregiver, provider or system, and set up improvement plans, including capacity-building needs for the provider team. Data are entered into a specifically designed software package. The meetings observed were chaired by the clinical manager or the medical officer in charge of obstetrics and gynaecology, or by a nurse operational manager of the maternity ward.

- *Monitoring and Response Unit (MRU)*

The MRU brings together a team of actors, including managers (PHC, hospital), clinicians, information officers at sub-district and district levels, associated with the system of local, real-time death reporting referred to above. The aim is to enhance the governance of MNCH and to improve area-based coordination between the various actors and levels of care. MRU meetings are intended to be convened monthly at sub-district and bi-monthly at district level. At district level, the meetings observed were chaired by the district manager or a representative, usually, the MNCH coordinator or the district quality assurance manager, while at sub-district level, the MRU meeting was chaired by the CEO of the district hospital or a representative.

Study sample and Data collection

The sub-districts were purposefully selected in a prior study as representing the range of buy-in to one particular DSR strategy (MRU);[33] the implementation of DSR mechanisms in these sub-districts was also perceived by district managers as representative of what was happening in the district as a whole. We combined semi-structured interviews, non-participant observation of meetings with a desk review of key documents as data sources for this study.

Semi-structured interviews

We conducted 45 semi-structured, individual interviews with purposefully selected respondents among those involved with maternal, neonatal and child DSR from two of the seven sub-districts and the district office. Respondents were either members of the enquiry or audit team or participants in one of the death surveillance and response meetings (MRU, PPIP, CHIP). Participants consisted of district programme managers (N=10) and members of the district clinical specialist team (DCST) (N=3), hospital hospital chief executive officer (CEOs) [N=2], hospital nursing managers (N=4), facility and hospital operational managers (professional nurses heading a ward in a hospital or managing a primary healthcare facility [N=5]), medical officers (N=7), professional nurses (N=3), allied health professionals (N=5), emergency service manager (N=1), and facility information managers (N=2). A semi-structured interview guide was developed and pre-tested (Supplementary Appendix File 1).

Interviews were conducted by the first author as part of a wider study. To ensure privacy and confidentiality, interviews were held in the respondent's office or in the boardroom outside the meeting time. With respondents' signed consent and permission, the interviews were audiotaped and transcribed verbatim. The interviewer took notes during and after the interview and summarised the interview on a pre-designed coversheet.[30] All audio files and transcripts were reviewed by the authors to ensure quality.

Non-participant observation

From May 2018 to September 2019, for a total 59 days distributed over one to three weeks in each of the two sub-districts, we conducted non-participant field observations by engaging in various activities and meetings related to maternal, peri/neonatal and child DSR in which health system actors were actively engaged. A structured observation sheet was designed for this purpose.[30] We observed the following meetings: PPIP and CHIP, MRU, morbidity and mortality, clinical audit, clinical governance and patient safety committee. During a meeting, apart from the general observation schedule, we specifically observed the structure of the meeting, standard agenda, actors involved, presentation and discussion of cases, decision process, and related actions (capacity building, provision of resources or community engagement). We also reviewed the agendas and minutes of these meetings.

During this fieldwork, three maternal deaths occurred in the district and we were able to observe one formal district meeting and engage in informal discussions with district actors on the unfolding maternal death enquiry process linked to these three deaths.

Data management and analysis

Interview recordings were transcribed verbatim, and observation and reflection notes compiled by the first author (PhD student). All data were coded using Atlas.ti version 8, and a thematic analysis was used to analyse the data.[41] Key themes were identified following both a deductive approach based on a preset list of themes from the criteria of DSR functioning and inductively wherever new insights were identified.[42] Details of the analysis process are reported elsewhere. [43] The themes were grouped into two main categories, namely, 1) the forms and 2) the functioning of DSR. Finally, the findings were presented to respondents in various meetings or individual meetings to verify and validate the results.

Positionality, reflexivity and ethics considerations

Interviews and participant observation can face ethical challenges given the sensitive nature of a research topic that can potentially expose hidden realities.[44] The conduct of this study was facilitated by our previous engagements in the study setting, and subsequently as part of the first author's PhD study. These involved a period of immersion and observation, which allowed for the building of trust with participants, and to be able to contextualise and interpret the interviews and observations. To minimise descriptive and interpretive biases, regular feedback and discussion of the findings were conducted during follow-up meetings in the district; and iterative processes engaged between the first author (PhD student) and the co-authors (PhD supervisors) involving continuous questioning of the understanding of data and reviewing of findings.

This study was approved by the Biomedical Science Research Ethics Committee and the Provincial Health Research Committee. All interviews proceeded with signed informed consent.

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this study.

RESULTS

Functioning of maternal, neonatal and child DSR mechanisms

Tables 3a and b presents an application of the framework and a descriptive summary of the functioning of each of the DSR mechanisms observed in practice. We report on the overall functioning of DSR, drawing across all the forms of DSR observed and the views expressed by the respondents about them. We present key themes that emerged as critical from the elements outlined in Table 1.

a. Surveillance and reporting process

- *Continuous surveillance cycle and evidence-based practices*

All DSR mechanisms followed a structured approach to death surveillance and response, integrating recording and reporting of death, reviewing and classifying causes and making recommendations for actions based on established guidelines for MNCH. The MRU was most explicit in emphasising the completion of the surveillance cycle in its '4R's' approach i.e. 'Report, Review, Record, Respond' to a maternal or child death.

- *The 'no-name, no-blame' approach*

From our observations and the respondents' views, the perinatal and child (PPIP/CHIP) and the MRU meetings were the most likely to promote the 'no-name, no-blame' approach. The chairperson of the meeting ensured that confidentiality was maintained throughout and that no one was blamed for the occurrence of the adverse event. Otherwise, respondents noted that the meeting could be transformed into a '*punishment exercise*' that would discourage actors' participation:

> '*..The perinatal meeting itself is not making anybody accountable. The meeting itself is about discussing things, it is not to point to individuals, because it's going to be discouraging for the people [to attend] if it's a punishment exercise…'* [DCST].

This 'no-name, no-blame' approach fostered a high level of commitment to the review meetings that resulted in a common understanding of individual and system

challenges faced. It also fostered mutual support when people were proactively working as a team.

> *'Before there was blaming, blaming, blaming [...] No-one is blaming anyone anymore because we do understand the challenges, we are part of the system, we are in the [same] basket' [EMS manager].*

Even though the meetings were never used to point fingers, or name or blame providers involved in the management of the case, the respondents raised the possibility of sanction if at any stage gross negligence was documented.

> *'...We are taking every death very seriously. One death is too many deaths, we have to make sure that we follow up on our kids and also on our health care workers [at PHC] the entry point where the neonatal was first attended so that we can check on whether the child was attended according to protocol and if not then consequential management needs to be applied' [Hospital CEO].*

Policy documents formally claim that the CEMD also follows a 'no-name, no-blame' approach. However, based on interviews and observations in practice, the CEMD process in the study district was conducted and experienced very differently to the other DSR mechanisms. The CEMD process typically resulted in intense scrutiny of maternal death from higher-level management within the district and beyond, seeking to assign individual responsibility and frequently triggering reactive sanction and punitive action. Respondents reported suspensions, referrals to the labour office, litigations and court cases involving frontline professionals. This was one of the constraining factors of DSR functioning. These CEMD processes were managed through quality assurance structures (e.g. adverse event committees) and were associated with a particular language of sanction – such as 'consequence management'.

> '*So the meetings that we usually have with the quality assurance and the maternity doctors and the sisters in charge [...] those [meetings] push us to be more accountable [...] it's not like the perinatal meeting, [where] we don't mention the doctors who did what, we just present the case. With those ones [quality assurance], it pushes you to be more accountable because the file is there, we all discuss what's in the file. So, whoever was the attending doctor is more accountable, feels more accountable*' [Medical officer].

Table 3a: Summary of the functioning of DSR Mechanism in practice

	Death Surveillance and Response Mechanisms					
	24-hour Reporting, 48-hour Review	**Confidential Enquiry into Maternal Death (CEMD)**	**Perinatal/Child under-5 Problem Identification Programme (PPIP/CHIP)**	**Monitoring & Response Unit (MRU)**	**Morbidity & Mortality**	**Clinical Audit/Clinical Governance**
Functioning in practice (What/How?)	Reporting and Auditing	Naming; Obligation to inform and explain actions and decision taken;	'No naming, no blaming'	'No naming, no blaming'	'No naming, no blaming', Auditing and Quality Assurance	'No naming, no blaming', Auditing and Quality Assurance
Actors involved (Who?)	National, Province, District, Hospital	Facility (PHC, Hospital)	Clinical (District, Hospital, PHC)	Managers, clinical and non-clinical (District, Hospital, PHC)	Clinical (Hospital)	Clinical (District, Hospital, PHC)
Actions (Pro-active & Reactive)		Reactive; Possibility of imposing sanction; Targeting individual; institutional training	Proactive; Taking collective responsibility; Capacity building; system improvement	Proactive; Taking collective responsibility, In-service training; system improvement and community education	Proactive; In-service training	Proactive, In-service training

Table 3b: Functioning of DSR Mechanism compared to elements from the literature

		Death Surveillance and Response Mechanisms					
		24-hour Reporting, 48-hour Review	**Confidential Enquiry into Maternal Death (CEMD)**	**Perinatal/Child under-5 Problem Identification Programme (PPIP/CHIP)**	**Monitoring & Response Unit (MRU)**	**Morbidity & Mortality**	**Clinical Audit/ Clinical Governance**
Matching to the elements for the functioning of DSR mechanisms	**I. Surveillance process (What and How?)**						
	1. Continuous surveillance (Death auditing, review, communication, and feedback)	✓	✓	✓	✓	✓	✓
	2. Using cost-effective and evidence-based practices	✓		✓	✓	✓	✓
	3. No naming, No-blaming (Confidentiality, non-punitive tone of the process)	✓		✓	✓	✓	✓
	4. Integrating learning and response, quality improvement, health system strengthening, and community education			✓	✓		
	5. Institutional support culture at all levels of the health system	✓	✓	✓	✓	✓	✓
	Actors (Who?)						
	6. Multidisciplinary teams			✓	✓		
	7. Integration across levels of care			✓	✓		✓
	8. Involvement and commitment of the managers to act on the findings			✓	✓		
	9. Community participation in review and response						

II. Following a holistic approach to identifying modifiable causes						
	✓		✓	✓		
III. Actions (Pro-active & Reactive)						
▪ ***Provider level***	✓	✓	✓	✓	✓	✓
▪ ***System level***		✓	✓	✓		
▪ ***Community level***				✓		

Note: The tick (✓) implies that the element of the functioning was observed for the selected mechanism

- *Integrating learning and institutional support from higher-level management*

The DCST played a key role in providing clinical guidance, mentorship and in-service training related to modifiable factors identified in the DSR. The involvement of a facilitator from the National Department of Health was also observed as one of the enabling factors in mobilizing higher level management support, a factor unique to the study setting. By bringing together district and sub-district actors, DSR meetings acted as a lever for more transparency between levels, in sharing frustrations and most especially the sharing of good practices.

> *'I can say that [DSR meeting] is strengthening the communication between the sub-districts and the district and because of that I don't see any problem that might hinder us to progress, because that is where we are sharing our frustrations and sharing our best practices*' [District programme manager].

Also important was the presence and commitment of key champions amongst middle managers and medical and nursing clinicians who created and nurtured a community of practice for sharing knowledge and learning.

In one sub-district, participants expressed excitement at attending meetings, and the venues were sometimes overflowing with participants.

> *'[I]: So why do you think that meeting is taken seriously?*
>
> *[R]: It's the commitment of the medical managers, the commitment of the managers and also the operational managers in maternity wards and the doctors* [Manager, DO].

At these meetings, each step taken in the care pathway (from PHC to the referral hospital) was carefully scrutinized and improvement plans with timelines, monitoring and a responsible person were developed, facilitated by the involvement and commitment of the managers in the meeting:

> '*Because when you put those quality [measures] you start from your ward, …you put as well the responsible people because when you put some measures you need to monitor, to come and see if it's working. And you need to give the timeline… you monitor if it's going well, you sustain, if there is something you need to review or if it's not going well'* [Clinical manager].

One of the key moments of the review meetings was to identify the modifiable causes of death and translating them into training and learning opportunities for frontline managers and providers, as well as system improvement and community education. The regular presence of DCST and programme managers in the review meetings created a sense of trust and space for empowering providers with knowledge and tools for better performance. Nurses were able to present cases and engage in discussions with doctors. In one instance, where a doctor was trying to dismiss a nurse's opinion and impose his view during discussions, the DCST intervened and emphasized that everyone's opinion counted..

> *'The meeting is to highlight things, training, educational issues and to bring the people, the team together* [DCST].

Another perceived core value of the DSR process was learning from the death events to come up with quality improvement strategies to prevent similar events in the future.

> *'After we discuss we all come up with ... if I can say, opinions of what actually transpired or what could have happened for this baby to demise and what we could have done differently to help the baby. Maybe for the other babies who are coming in the near future who present the same way, what can we change to be able to help them'* [Medical Officer].

The learning and training were extended to primary health care facilities; minutes of the meetings and reminders of the guidelines were circulated; and regular visits to facilities were conducted by the district team, reinforcing what was shared in the meetings and allowing those who were absent from the meeting to be capacitated with needed skills.

- *DSR process institutionalized*

DSR processes in this district were anchored into routines in all facilities, with standardised agendas and supportive supervision from the DCST and the MNCH district programme coordinators. The DSR processes were perceived not only to contribute to improving the quality of care and outcomes in facilities...

> *'I think the perinatal meetings are there and they are there forever. It's like an auditing process, it's impossible to run maternity service without this [perinatal meeting]' [DCST].*

...but also to facilitate the integration of people and services

> *'When we started MRU [...] we were blaming each other, but the more we discussed and saw how it fits, we feel now the problem is not within us, [but] with our resources [...] Now we feel we are part of the institution; before [MRU] we felt that EMS was not part of the hospital [EMS].*

The perceived benefit and value of DSR processes, particularly the review and response meetings, were repeatedly emphasized by the respondents as a motivation to continue with and integrate them into the core activities of maternal and child in the district.

However, institutionalising appropriate DSR processes across all levels of the District was not an easy or completed task. DSR processes faced challenges at an individual level (blaming, sanctioning), institutional or service level (shortage of skilled personnel), or system levels (ineffective referral system). We also observed variations in the level of support and involvement of local leadership and primary healthcare facilities in DSR processes.

- *Actors: Bringing together a multidisciplinary team of actors across levels*

As indicated, DSR mechanisms were intended to be driven by a multidisciplinary team of actors including medical, nursing and other professionals, and across levels (community, PHC and hospital). Indeed, a wide variety of actors participated in DSR processes, most prominently in the case of the CEMD, where in addition to the provincial assessors, the following actors from district and facility levels were involved: the district manager (or a representative), quality assurance manager, primary health care and hospital services manager, labour relations and corporate services, a member of the DCST, the hospital chief executive officer, (CEO), the nursing service and clinical managers, as well as the specific health providers directly involved in the maternal death.

Participants in the PPIP/CHIP review meetings tended to be hospital based clinicians with the support of district clinicians and, at times, primary health care managers; while the MRU meeting sought to expand participation to other stakeholders such as academic partners, non-governmental organisations, other government departments (notably the South African Social Security Agency) and community representatives.

In one particular sub-district, the organizational culture and the leadership style of senior managers promoted collaboration between primary health care facilities and hospitals in DSR.

> '*…we only receive the mother during the process of giving birth, and when the woman is now complicated with pre-eclampsia of which I think that this would have been prevented at the first place; so we are involving the primary health care level to come to the perinatal meetings so that they can hear exactly about the progress of the woman because, for us, as a hospital, we do not have the liberty of starting the woman on antenatal care, whereas the PHC are the ones who might have been able to pick up on some problems during the antenatal period. So, for them being involved in these perinatal meetings is quite vital […] not coming is also is a transgression on its own'* [Hospital CEO].

In this sub-district, where identified modifiable factors were related to the patient or community, hospital board chairpersons were contacted to facilitate the dialogues within the community and identify key actions together with the community leaders to address the identified problem. However, the community was not usually implicated directly in DSR processes.

It is important to note that this degree of functioning was not universal, and there was variation across facilities and sub-districts in the levels of team involvement, particularly of staff from PHC facilities and hospital actors. In instances where doctors and nurses, managers and providers, or PHC facilities and hospitals were not working as a solidified team, accountability mechanisms were flawed resulting in poor referral systems, 'blame games' and the deferring of responsibility in case of death events.

b. Following a holistic (three delays) approach to identifying and acting on modifiable factors

Review meetings were observed to follow the 'three delays' approach to identifying factors (especially modifiable factors – Excerpt 1) associated with the occurrence of death events and to take collective responsibility and proactively set up key actions to prevent further events (Tables 3a and b). This was enabled by the presence of

stakeholders across levels - from primary health care facilities to district clinical specialist teams and programme managers. Because of the managerial orientation of MRU, the three delays mostly focused on the system factors for action, while PPIP/CHIP meetings were clinically oriented towards provider and, to some extent, patient factors. In both cases, any matters related to community engagement were discussed with the board chairpersons to liaise with the community leadership.

Excerpt 1 (From DSR meeting and discussion with respondents)*

Case 1: A pregnant patient who had never attended antenatal care presented to the hospital with severe complications and subsequently died. The main modifiable factor identified was the delay in deciding and seeking care.

Case 2: A young primigravida who was followed up since the early stage of the pregnancy, but died because of a failure to treat her high blood pressure. The modifiable factor identified was the delay in receiving adequate care.

Case 3: The patient was referred to a higher level hospital for a complication during labour, but the ambulance was delayed resulting in the death of the patient while still at the first level hospital. The modifiable factors identified were the lack of an effective referral system, adequate equipment and trained human resources.

Case 4: In a 'backstreet abortion', a patient was given misoprostol, used for medical termination of pregnancy. She developed complications and sought care at the hospital but could not be saved. One of the modifiable factors was that safe termination of pregnancy services were not sufficiently accessible.

*The 'three delays' approach was applied in the discussion of death cases to identify the modifiable factors associated with death events including patient or community factors (Case 1), the provider (Case 2) or the system (Cases 3 and 4).

c. *Implementation of actions*

Following the three delays model, the identified actions targeted the community (community education facilitated by the hospital board chairpersons and community leaders); the system (provision of resources); or the providers (skills building). Actions toward community were limited and only addressed by one DSR mechanism (MRU).

We observed evidence of implementation of actions recommended from DSR processes which were perceived to result in improved MNCH outcomes. For instance, during the study period outreach training in surgical skills (caesarean section and anaesthesia) was organized by a provincial team of specialists; DCST members were actively involved in organising training and mentoring programmes; and the district paediatrician supported facilities to set up and ensure availability and functioning of the Continuous Positive Airway Pressure (CPAP) therapy machines for neonatal care.

DISCUSSION

While WHO guidelines outline the necessary steps in conducting death surveillance and response,[6] there is little holistic guidance on how this is to be achieved in health systems. By collating elements from the literature into a conceptual framework it was possible to explore the factors enabling or constraining DSR functioning in one district. This framework may be of value in other similar settings. It can be used by researchers or health service managers to explore the functioning of the DSR system, diagnose challenges and promote an inclusive organisational culture of holistic scrutiny into the causes of death.

Maternal, neonatal and child DSR is well established in the South African district health system. Across the five forms of DSR directly related to maternal and child deaths in the study district, we found a range of practices. The surveillance process routinely emphasized on the '4R's' ('Report, Review, Record, Respond'). In most instances, the process followed the 'No name, no blame' approach as stipulated in the guiding documents. There were also holistic approaches to identifying causes of death, efforts to integrate training and support from higher levels, facilitation of multi-disciplinary teams, and elements of institutionalisation of DSR in the district. The latter requires a systemic supportive environment and organisational culture at all levels that are linked to annual planning and budgeting to support the implementation of evidence-based actions.[45] In these regards, the study District had

clearly benefitted from the DSR system strengthening interventions implemented over a number of years.

In certain instances, however, the "no name, no blame" approach was contradicted by an organisational culture of blame and punishment, particularly following maternal deaths. Here the emphasis was on identifying and sanctioning the persons responsible for death incidents and on curbing the institutional ramifications of the incident, instead of using it as an organisational learning event to prevent further incidents.[46] However, this level of scrutiny was not observed in instances of perinatal deaths, showing the difference between maternal and perinatal DSR processes. Such blame cultures in a healthcare organisation can be a source of an increased number of medical errors.[47]

Death events, particularly maternal deaths, are considered to be a barometer of a health system's performance. In this regard, DSR processes can be constrained by the fear of revealing malpractice and poor health system performance, and DSR processes can become politicized and maternal deaths under-reported by bureaucrats unwilling to disclose system failures.[48] In our study setting, DSR processes were facilitated by a high-level political commitment from the national government to compulsory and transparent reporting and reviewing of all cases of maternal or child deaths and implementation of measures to avoid future deaths from identified modifiable factors.

In this study, 'no name, no blame' approaches were observed to facilitate the active participation of various actors, especially those directly linked to death incidents and the possibility of embracing responsibility for the incident.[49] Thus, DSR processes can create a sense of interpersonal trust and trust in the health care organization, key for generating learning and improvement. In contrast, as noted in Kenya, the lack of trust, the fear of blame or individualised disciplinary action conditioned frontline professionals to be reluctant in disclosing data on maternal death.[17]

As proposed by Deis *et al.*[50] DSR meetings can be transformed into instruments of system improvement using a systematic approach that incorporates the 'three delays' model for action including the providers, the health system and the communities in identifying and addressing modifiable factors related to death events. This means that DSR processes should not only seek to identify and correct frontline providers' and managers' practices but also health system and structural factors at the community level,[20] A holistic approach was made possible through the use of standardised protocols and guidelines for DSR that integrated reporting and feedback mechanisms.[46]

Another important element of successful DSR observed was the inclusion and engagement of a multidisciplinary team of actors from various professional backgrounds and managers. This created a space to address not only health system-related problems[50] but also problems related to social structural factors (e.g. social exclusion, poverty). Where these functioned effectively, DSR platforms intersected individual and collective competency and responsibility for MNCH, enabling a community of practice that recognised the contribution and value of all levels, from PHC facilities to district hospitals actors. Furthermore, the inclusion of various stakeholders into DSR processes can also facilitate social autopsies given that some maternal and child deaths occur outside of health facilities. Similarly, a study in four Sub-Saharan African countries reported interdisciplinary teamwork with good communication amongst staff and active participation of staff as enablers of the DSR process.[51] **In contrast, where actors from PHC facilities and hospitals, or when doctors and nurses, managers and providers were disconnected, it resulted in a poor referral process, blame games and deferring of responsibility or avoidance of accountability. Melberg *et al.*[48] referred to a 'defensive referral' as a result of fear of being blamed for maternal death incident.**

When encouraged by leadership support, DSR processes can become a platform for common learning, knowledge sharing and quality improvement.[45] Effective DSR system, according to Kerber *et al.* [52] needs

engaged leadership and use of guidelines and protocols that ensure the complete cycle of the audit system.[53]

Finally, DSR processes were able to systematically and proactively identify and plan actions based on the framework. Though tracking implementation of these actions can be limited in scope, this study nevertheless presented evidence of responsive action implemented as part of DSR.

Limitations

The statements of lived experiences of DSR processes by the respondents could have been what they thought to be the right answer reflecting a social desirability bias in their responses. Being observed, respondents could have behaved differently ('Hawthorne effect'). We did indeed observe instances of where the absence of the national facilitator led to a slackening of meeting processes. **Furthermore, respondents' self-reports and accounts could have led to an overstatement of phenomena. We sought to minimise these biases by prolonged immersion in the field and supplementing formal interviews with observations and informal conversations.[30,54]**

This study was conducted in one district at a particular moment in time. While the forms of DSR are likely to be repeated elsewhere, the study findings related to the functioning of DSR are not generalisable given the management investments made. However, the findings have analytical relevance in illuminating DSR in best-case scenarios and the triangulated nature of the data provide confidence in the data collected.

CONCLUSION

The success of DSR processes resides in the intersection of many contextual factors such as the commitment of a multidisciplinary team of actors and support from district managers, the integration of primary healthcare and district hospitals, and the establishment of a space for mutual trust and learning anchored within the organisational culture of health facilities. A holistic approach is essential to address

the modifiable factors identified, translate them into long-term organisational learning opportunities, and set up evidence-based, 'real-time' responses.

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Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

Interview Guide – Accountability – Review meetings	
A. ACCOUNTABILITY	
Introduction	▪ Can you tell me about your current position/role in the (district) health system? *Probes: For how long have you been in that position?*
Accountability definition	▪ Could you describe to me what accountability means to you? *Probes: What does it make you think of accountability? What does it mean 'being accountable to?'* *How* would *you relate your definition of accountability to MNCH?*
Challenges	Can you share some of the challenges that you face while performing your tasks as a health professional (or mid-level manager) within your district? *Probes: Health Systems challenges/Challenges related to clients & Community/Personal challenges*
- **Line/forms,** - **Guidelines** - **Enablers** - **Barriers** - **Complaints**	▪ In your working area, to whom do you think you are accountable and why? *Probes:* - *Tell me about the reporting structure with regard to your role in the health systems?* - *To/from whom do you report/receive order/provide information/provide technical support/training/supervision* ▪ Are there any accountability guidelines/framework from the DOH that you are using? [*If yes, please describe*] ▪ What are the enabling and limitation factors of the current accountability processes? ▪ Does the District/Sub-district/Hospital/PHC Management Team have a mechanism in place to handle clients' complaints? How does it work? ▪ Can you describe how voice of the vulnerable (and of the community) is being represented within the Health System/clinic committee/ Hospital Board?
Team	▪ What's your experience/perception regarding teamwork and accountability for MNCH? *Probes:* - *Can you tell me about the team members/actors involved in the accountability processes for MNCH (Probe: Level)* - *How will you characterise the attitude and commitment of teamwork regarding MNCH* - *What's your beliefs regarding MNCH and the value of accountability*

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	▪ How do you perceive the performance of the team with regard to MNCH? *Probes:* - *Do you share the same goals? How do you set up these goals [decision making process]* - *Can you comment on the level of participation and collaboration work environment?* - *How do you monitor group accountability for MNCH*
Adverse events	▪ How do you perceive a case of adverse event (e.g. maternal or child death) as a team and/or individual? *Probes:* - *Please elaborate* - *How is the climate within your team when it comes to adverse event?* ▪ When you have to justify/explain/answer on an adverse event, how do you perceive the role of team members (peers)?
	▪ How would you characterise the role of the investigation team regarding an adverse event? [Team: DCST, Province, or other] *Probes:* - *Does the investigation result in sanctions and/or learning? [Please elaborate]* - *If learning, how often does the training happen? By Whom?* - *How do you identify areas for improvement [beside when an adverse event occurs]?*
Improvement	▪ If you are given all the means to improve accountability, how would you go for it and what would you prioritize? ▪ In your view, what can be done regarding accountability to improve MNCH outcomes?
B. DEATH REVIEW MEETINGS	
Actors/Who?	▪ Can you please describe who attends the meeting? *Probe:* - *Who are the actors from district office, hospital, PHC? Doctors vs Nurses and/or others?*
Meeting	▪ How would you describe the structure of the meeting? *Probe:* - *Who chairs, the agenda, how long, frequency, participation/engagement?* - *What are the drivers/facilitators/barriers to this [name] meeting and related processes?*

Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

	- *What, from your perspective, is the difference between MRU, PPIP/CHIP and other review meetings [name]?*
Decision process	▪ How would you describe the decision process during the [name] meeting? *Probes:* - *What happens? What do you discuss? How do the discussions of the meetings lead to decision or [positive] results (for actions)?*
Dealing with adverse events (deaths)	▪ How do you deal with adverse events e.g. maternal or child death? *Probes:* - *Can you describe the situation of maternal, neonatal and child death (mortality) in this area since you started in your position?* - *Can you share from your experience an example of an adverse event (maternal or child death) and how was the process of enquiry?* - *How do you see the problem of death in terms of accountability?* - *Do you have/know any policy/guideline for dealing with death event?*
	▪ How do you see the role of the [name] meeting as a structure that is facilitating/supporting accountability processes for MNCH? *Probes:*
	▪ How would you describe the role of communities in addressing MNCH problems? ▪ How would you describe the role and level of engagement of PHC facilities? *Probes:* - *Referral processes* - *Role of Provincial and National department of Health*
Actions/Outcomes	▪ What from your perspective are some of the key actions and outcomes on MNCH as a result of the [name] meeting? *Probes:* - *How sustainable are these actions? [Please elaborate]*
Conclusion	- Remind Ethics and right to withdraw from the study at any time - Thanking the informant

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	Pg 1, L1-3
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	Pg 2, L1-28
Introduction	
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Pg 4, L1 - Pg6, L2
Purpose or research question - Purpose of the study and specific objectives or questions	Pg 6, L3-13
Methods	
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	Pg 8, L1-pg9 L5
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	Pg12, L4-15
Context - Setting/site and salient contextual factors; rationale**	Pg 9, L6-pg10 L11
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	Pg10, L12-pg11, L7
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	Pg12, L17-22; Pg31, L11-15
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	Pg10, L14-pg11 L21

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Pg10, L28-30 Pg11 L12-13
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Pg11, L25-pg12, L3
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Pg11, L25-pg12, L3
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Pg12, L6-15

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pg12, L24-pg27, L18
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Pg12, L24-pg27, L18

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pg27, L19-pg29, L30
Limitations - Trustworthiness and limitations of findings	Pg30, L1-16

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Pg30, L29
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Pg31, L1-6

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
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The practice of Death Surveillance and Response for Maternal, Newborn and Child Health: A framework and application to a South African Health District

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Keywords: Accountability; Death Surveillance and Response; Maternal, newborn and child health; Framework; District health system; Qualitative study

Abstract

Objective: To assess the functioning of maternal, perinatal, neonatal and child death surveillance and response (DSR) mechanisms at a health district level.

Design: A framework of elements covering analysis of causes of death, and processes of review and response was developed and applied to the smallest unit of coordination (sub-district) to evaluate DSR functioning. The evaluation design was a descriptive qualitative case study, based on observations of DSR practices and interviews.

Setting: Rural South African health district (sub-districts and district office).

Participants: A purposive sample of 45 frontline health managers and providers involved with maternal, perinatal, neonatal and child DSR. The DSR mechanisms reviewed included a system of real-time death reporting (24 hours) and review (48 hours), a nationally mandated Confidential Enquiry into Maternal Death and regular facility and sub-district mortality audit and response processes.

Primary outcome measures: Functioning of maternal, perinatal, neonatal and child death surveillance and response.

Results: While DSR mechanisms were integrated into the organizational routines of the district, their functioning varied across sub-districts and between forms of DSR. Some forms of DSR, notably those involving maternal deaths, with external reporting and accounting, were more likely to trigger reactive fault-finding and sanctioning than other forms, which were more proactive in supporting evidence-based actions at provider and system level, and to a limited extent in communities, in order to prevent future deaths.

Conclusions: This study provides an empirical example of the everyday practice of DSR mechanisms at a district level. It assesses such practice based on a framework of elements and enabling organizational processes that may be of value in similar settings elsewhere.

Strength and limitations

- This paper puts forward a framework of elements for evaluating the functioning of maternal, newborn and child (MNC) death surveillance and response (DSR) at the district level.
- The functioning of DSR mechanisms in a South African district that had benefitted from DSR strengthening interventions was evaluated using the framework.
- Field observations of MNC DSR processes and interviews with frontline providers and managers were conducted.
- **The framework was applied to one rural district that had developed functioning DSR practices; it needs to be further tested and validated in other contexts.**
- **The framework and appraisal methods may be of value in similar settings elsewhere.**

INTRODUCTION

The United Nations (UN) put accountability for maternal, newborn and child health (MNCH) on the global agenda, placing three interrelated accountability processes at the centre of its 'Global Accountability Framework', namely, monitoring, reviewing and response.[1] Death surveillance and response (DSR) has become one of the means to operationalise these accountability processes in many health systems, with the view to improving the quality of maternal, neonatal and child health care, and eliminate preventable deaths.[2-5]

Death Surveillance and Response entails a continuous cycle of identification, notification and review of deaths followed by action to improve the quality of care and prevent future deaths.[6] Its essence is, therefore, the capacity to record, review and respond to each death using affordable, effective and evidence-based actions linked to the findings.[5]

There is now a well-established tradition of DSR in Low- and Middle-Income Countries (LMICs), focusing primarily on maternal deaths.[2,4,6-10] In facilities and contexts where maternal deaths are relatively rare, maternal 'near-miss' cases may also be audited.[5] More recently, LMICs have begun including the review of perinatal and neonatal deaths into DSR systems, referred to as Maternal and Perinatal Death Surveillance and Response (MPDSR);[11-13] and in some settings, DSR extends to under-five deaths.[14-16]

In addition to facility-based processes, community-based DSR is recommended where a high proportion of deliveries (and deaths) occur outside of health facilities, and where community participation is crucial to implementing identified key actions.[5,11] In this regard, verbal and social autopsies have been developed as a participatory tool for community-based DSR, exploring clinical and social causes of death from a community perspective.[17-19]

DSR processes are typically defined nationally but implemented at facility level with support from and coordination by local or district teams.[20,21] Although there are no globally standardised approaches,[4] the literature points to several elements

underpinning effective DSR processes, encompassing analysis of modifiable factors involved, the tone of the review process and the range of participants involved.

The analysis of modifiable factors underlying maternal and child deaths has been codified into the 'three delays' model of care-seeking and utilisation: **(i) the delay in deciding to seek care early; (ii) the delay in reaching a health facility; (iii) the delay in providing or receiving adequate care at the facility.**[6,22-25]

In formulating a response, the literature on DSR recommends moving away from identifying and sanctioning individuals,[26] and towards the setting up of non-punitive 'no-blaming' approaches that foster collective and individual participation.[2,20] Such approaches are less likely to result in ignoring the incident or the temptation to defer responsibility onto others.[2,3,5]

DSR processes ideally involve a multidisciplinary team with the representation of a range of clinicians (nursing, medical and other professionals), managers and support staff (such as information officers). This brings together the array of provider knowledge and skills, together with commitments from managers to enhance ownership of the findings and turn recommendations into concrete actions.[2,5,6]

South Africa has a long-standing history, going back to the mid-1990s, of maternal, newborn and child DSR that has become integrated into the routine functioning of frontline health services. DSR processes are linked to three ministerial committees established in 1998, namely the National Committee for Confidential Enquiry into Maternal Deaths (NCCEMD),[27] the National Perinatal and Neonatal Morbidity and Mortality Committee (NaPeMMCo);[28] and the Committee on Morbidity and Mortality in Children under 5 years (CoMMiC).[29] These committees function at national level with mandates exercised at local (health district) level through three of the DSR processes, namely, the Confidential Enquiry into Maternal Death (CEMD), the Perinatal Problem Identification Programmes (PPIP), and the Child under-five Problem Identification Programmes (CHIP). These mechanisms are situated in a dense and complex accountability ecosystem at the frontline of health provision.[30]

There have been significant reductions in maternal, neonatal and child mortality in South Africa over the last decade, attributed principally to the prevention and treatment of HIV.[31] However, despite a long history and institutionalised practice,

there is little understanding of the role of DSR implementation and functioning in this mortality reduction. Clear guidance on how best to assess this functioning is also lacking; one study showed no association between consistent auditing and perinatal mortality rates.[32]

Given the lack of standardisation and consensus on elements for assessing the functioning of DSR, this paper proposes an assessment framework using criteria drawn from the literature and then applies the framework to evaluate existing maternal, peri/neonatal and child DSR mechanisms in one South African district.

This paper thus seeks to answer the following question: Based on a comprehensive assessment framework, how functional are the district's DSR mechanisms?

METHODOLOGY

Definitions

In this paper, the term Death Surveillance and Response (DSR) refers to all death reporting and review processes related to maternal and child health, even if they do not have all the ideal components of DSR. They include phenomena commonly reported in the literature such as Maternal Death Review (MDR) or Audit, Maternal Death Surveillance and Response (MDSR), Maternal and Perinatal Death Surveillance and Response (MPDSR), or surveillance and review of child deaths.

Conceptual framework

A framework to assess the functioning of DSR mechanisms was developed using criteria drawn from the literature and supplemented by field observations and interviews with frontline providers and managers.

We conducted a search of the literature using the above terms and consulted with experts in the field to identify the elements of well-functioning DSR. On the basis of these, a conceptual framework was developed. We combined the WHO Continuous Action Framework to

eliminate preventable deaths,[6] the 'Three Delays' framework,[22] and other elements identified in the literature[2,4,6,20] to assess the DSR processes. These are outlined in Box 1 and Table 1. **The framework distinguishes between (i) the surveillance process (what, how, who); (ii) the identification of modifiable causes of death and investigation as per the three delays model; and (iii) the types of responses (actions) triggered, whether proactive or reactive. These elements provide a holistic and comprehensive assessment of the various steps and processes involved in DSR. Given that mortality reductions require coordination across levels,[33] the framework adopts an area-based approach, using the most decentralised structures of in health systems coordination, notably the sub-district, as its unit of analysis.**

Box 1: WHO's Four components of continuous action in Maternal Death Surveillance and Response (MDSR) system	
Identify and notify deaths	Identification and notification on an ongoing basis: Identification of suspected maternal deaths in facilities (maternity and other wards), followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.
Review maternal deaths	Review of maternal deaths by local maternal death review committees: Examination of medical and non-medical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.
Analyse and make recommendations	Analysis and interpretation of aggregated findings from reviews: Reviews are made at the district level and reported to the national level; priority recommendations for national action are made based on the aggregated data.
Respond and monitor response	Respond and monitor response: Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that the recommended actions are being adequately implemented.

Table 1: Framework for the functioning of Maternal, Neonatal and Child Death Surveillance and Response

I.	**Surveillance process (What and How?)****		
Elements of effective Maternal, Neonatal and Child Death Surveillance and Response**	1. Continuous surveillance (full cycle) integrating death auditing, review, communication and feedback mechanism (identify and notify; review, analyse and make recommendations; respond and monitor response)		
	2. Recommending cost-effective and evidence-based practices		
	3. 'No naming, no blaming' (confidentiality, non-punitive tone of the process)		
	4. Integrating learning and response from DSR into continuing professional development, quality improvement, health system strengthening, and community education		
	5. Institutional support culture at all levels of the health system (management)		
	Actor participation (Who?)***		
	6. Driven by multidisciplinary teams (clinical, support, managerial)		
	7. Integration across levels from PHC facilities to hospitals, districts and higher levels		
	8. Involvement and commitment of the managers to act on the findings		
	9. Community participation in review and response (social and verbal autopsy)		
II.	**Following a holistic approach to identifying modifiable causes**		
'Three Delays'*	1st Delay in Deciding and seeking Care	2nd Delay in identifying and reaching a Health Facility	3rd Delay in receiving adequate appropriate care
III.	**Actions (Pro-active & Reactive)**		
▪ ***Provider level***	Capacity Building, In-service Training		
▪ ***System level***	Health System Improvement, Provision of resources		
▪ ***Community level***	Community Education		

References: ***23; ****2,4-6; *****6,34**

Study design

We conducted a descriptive, exploratory qualitative case study of the forms and functioning of maternal, neonatal and child DSR processes applying the framework (Table 1).

Study Setting

The study was conducted in one of the three health districts in Mpumalanga Province situated in the north-east of South Africa. The District has a population of about 1.1 million, with the vast majority (61%) living in rural areas (Massyn et al., 2017). It contains one regional hospital, eight district hospitals, and 76 primary healthcare facilities, distributed among seven sub-districts.

The study district was targeted for health systems strengthening support because of high maternal and child mortality.[35] Intensified efforts were specifically made to strengthen DSR in the district over several years, building on long-standing processes (24-hour reporting, Confidential Enquiry into Maternal Death [CEMD], and Perinatal/Child Problem Identification Programmes [PPIP, CHIP]). Besides these, DSR processes were accompanied by improved district clinical support with the introduction of district clinical specialist teams (DCST) and a new mechanism of coordination, referred to as the Monitoring and Response Unit (MRU). These initiatives were widely regarded as having impacted positively on maternal and child mortality in the District.[36] In these respects, therefore, the District could be regarded as having relatively well-functioning DSR at the time of the research. Although not nationally representative, it was nevertheless well suited for the qualitative exploration of functioning using a DSR assessment framework.

The framework was applied to maternal, peri/neonatal and child DSR mechanisms observed in the district, summarised in Table 2 and described in the next section. Five mechanisms were specific to MNCH (24-hour Reporting and 48-hour Review, CEMD, PPIP, CHIP, MRU). A**n additional two, which also dealt with maternal, neonatal and child deaths,** the Morbidity and Mortality, and Clinical Audit/Clinical Governance meetings, **were general facility-based morbidity and mortality and clinical audit/governance mechanisms.**

Table 2. Death Surveillance and Response Mechanisms – Purpose, Frequency and Target

Observed Mechanisms	Purpose	Frequency	Target				Participants
			Maternal	Perinatal	Neonatal	Child<5	
24-hour Reporting, 48-hour Review	Specific to MNCH; Compulsory Death notification	Linked to death event	✓	✓	✓	✓	Facility; Patient Safety Committee (Sub-district and District)
Confidential Enquiry into Maternal Death (CEMD)	Specific to MNCH; Quality assurance; Compliance	Linked to death event	✓				National, Province, District, Hospital
Perinatal Problem Identification Programme (PPIP)	Specific to MNCH; Clinical; Includes perinatal and maternal death audit; Quality assurance	Monthly	✓	✓	✓		District, Hospital, PHC facilities
Child under-5 Problem Identification Programme (CHIP)	Specific to MNCH; Clinical; Audit; Quality assurance	Monthly				✓	District, Hospital, PHC facilities
Monitoring & Response Unit (MRU)	Specific to MNCH; Managerial; Multidisciplinary	Monthly/Bi-monthly	✓	✓	✓	✓	District, Hospital, PHC facilities
Morbidity & Mortality	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	Hospital
Clinical Audit/Clinical Governance	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	District, Hospital, PHC facilities

Maternal, neonatal and child DSR mechanisms in the study setting

This section briefly describes DSR mechanisms that are specific to maternal, neonatal and child health.

a. Compulsory 24-hour reporting, 48-hour review

Any maternal, perinatal, neonatal or child death is mandatorily recorded at the facility where the death occurred and reported within 24 hours internally to the district office, and externally to the Department of Home Affairs for issuing of a death certificate. This is the standard operating procedure applied in all facilities in South Africa. In the study district, following the introduction of the MRU and the DCST, a district-level system was also established to review all maternal and under-5 child deaths within 48 hours, independent of other processes. This process of 24-hour recording and reporting and 48-hour case review was referred to as 'real-time death reporting';[37] and its purpose was to enable actions to be taken as quickly as possible to address modifiable factors, such as correcting a skills or staffing gap, provision of resources, or community education.

b. Confidential Enquiry into Maternal Death (CEMD)

The Confidential Enquiry into Maternal Death (CEMD) was introduced in South Africa in 1997 and involves a standardized process of reporting and auditing. Maternal deaths, in addition to being reported to the district and Home Affairs, are also reported to the provincial MNCH coordinator within 24 hours, who allocates a unique number. A copy of the patient folder and a completed Maternal Death Notification Form (MDNF) are included in the report and submitted to a team of provincial assessors (obstetrician, medical officer, midwife and anaesthetist). Assessors will go to the facility to enquire about the causes of death, as well as any avoidable or modifiable factors. The resulting annual and triennial reports and recommendations (without details on individual cases) are disseminated to Provincial and District structures and academic institutions for collation with general recommendations for action, such as training on the Essential Steps in the Management of Obstetric Emergencies (ESMOE).[38-40]

c. Ongoing Review and Response Structures

As indicated, several routine meeting structures are established for auditing and responding to maternal, perinatal/neonatal and child deaths (Table 2).

- *Perinatal/Child Problem Identification Programme (PPIP/CHIP)*

The PPIP/CHIP review meetings take place monthly at facility level. The meeting consists of systematically auditing the patient file related to death, comparing the management of the case against standard treatment protocols and guidelines. Through discussion, participants identify gaps in clinical management and modifiable factors related to the caregiver, provider or system, and set up improvement plans, including capacity-building needs for the provider team. Data are entered into a specifically designed software package. The meetings observed were chaired by the clinical manager or the medical officer in charge of obstetrics and gynaecology, or by a nurse operational manager of the maternity ward.

- *Monitoring and Response Unit (MRU)*

The MRU brings together a team of actors, including managers (PHC, hospital), clinicians, information officers at sub-district and district levels, associated with the system of local, real-time death reporting referred to above. The aim is to enhance the governance of MNCH and to improve area-based coordination between the various actors and levels of care. MRU meetings are intended to be convened monthly at sub-district and bi-monthly at district level. At district level, the meetings observed were chaired by the district manager or a representative, usually, the MNCH coordinator or the district quality assurance manager, while at sub-district level, the MRU meeting was chaired by the CEO of the district hospital or a representative.

Study sample and Data collection

The sub-districts were purposefully selected in a prior study as representing the range of buy-in to one particular DSR strategy (MRU);[33] the implementation of DSR mechanisms in these sub-districts was also perceived by district managers as representative of what was happening in the district as a whole. We combined semi-structured interviews, non-participant observation of meetings with a desk review of key documents as data sources for this study.

Semi-structured interviews

We conducted 45 semi-structured, individual interviews with purposefully selected respondents among those involved with maternal, neonatal and child DSR from two of the seven sub-districts and the district office. Respondents were either members of the enquiry or audit team or participants in one of the death surveillance and response meetings (MRU, PPIP, CHIP). Participants consisted of district programme managers (N=10) and members of the district clinical specialist team (DCST) (N=3), hospital hospital chief executive officer (CEOs) [N=2], hospital nursing managers (N=4), facility and hospital operational managers (professional nurses heading a ward in a hospital or managing a primary healthcare facility [N=5]), medical officers (N=7), professional nurses (N=3), allied health professionals (N=5), emergency service manager (N=1), and facility information managers (N=2). A semi-structured interview guide was developed and pre-tested (Supplementary Appendix File 1).

Interviews were conducted by the first author as part of a wider study. To ensure privacy and confidentiality, interviews were held in the respondent's office or in the boardroom outside the meeting time. With respondents' signed consent and permission, the interviews were audiotaped and transcribed verbatim. The interviewer took notes during and after the interview and summarised the interview on a pre-designed coversheet.[30] All audio files and transcripts were reviewed by the authors to ensure quality.

Non-participant observation

From May 2018 to September 2019, for a total 59 days distributed over one to three weeks in each of the two sub-districts, we conducted non-participant field observations by engaging in various activities and meetings related to maternal, peri/neonatal and child DSR in which health system actors were actively engaged. A structured observation sheet was designed for this purpose.[30] We observed the following meetings: PPIP and CHIP, MRU, morbidity and mortality, clinical audit, clinical governance and patient safety committee. During a meeting, apart from the general observation schedule, we specifically observed the structure of the meeting, standard agenda, actors involved, presentation and discussion of cases, decision process, and related actions (capacity building, provision of resources or community engagement). We also reviewed the agendas and minutes of these meetings.

During this fieldwork, three maternal deaths occurred in the district and we were able to observe one formal district meeting and engage in informal discussions with district actors on the unfolding maternal death enquiry process linked to these three deaths.

Data management and analysis

Interview recordings were transcribed verbatim, and observation and reflection notes compiled by the first author (PhD student). All data were coded using Atlas.ti version 8, and a thematic analysis was used to analyse the data.[41] Key themes were identified following both a deductive approach based on a preset list of themes from the criteria of DSR functioning and inductively wherever new insights were identified.[42] Details of the analysis process are reported elsewhere. [43] The themes were grouped into two main categories, namely, 1) the forms and 2) the functioning of DSR. Finally, the findings were presented to respondents in various meetings or individual meetings to verify and validate the results.

Positionality, reflexivity and ethics considerations

Interviews and participant observation can face ethical challenges given the sensitive nature of a research topic that can potentially expose hidden realities.[44] The conduct of this study was facilitated by our previous engagements in the study setting, and subsequently as part of the first author's PhD study. These involved a period of immersion and observation, which allowed for the building of trust with participants, and to be able to contextualise and interpret the interviews and observations. To minimise descriptive and interpretive biases, regular feedback and discussion of the findings were conducted during follow-up meetings in the district; and iterative processes engaged between the first author (PhD student) and the co-authors (PhD supervisors) involving continuous questioning of the understanding of data and reviewing of findings.

This study was approved by the Biomedical Science Research Ethics Committee and the Provincial Health Research Committee. All interviews proceeded with signed informed consent.

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this study.

RESULTS

Functioning of maternal, neonatal and child DSR mechanisms

Tables 3a and b presents an application of the framework and a descriptive summary of the functioning of each of the DSR mechanisms observed in practice. We report on the overall functioning of DSR, drawing across all the forms of DSR observed and the views expressed by the respondents about them. We present key themes that emerged as critical from the elements outlined in Table 1.

a. Surveillance and reporting process

- *Continuous surveillance cycle and evidence-based practices*

All DSR mechanisms followed a structured approach to death surveillance and response, integrating recording and reporting of death, reviewing and classifying causes and making recommendations for actions based on established guidelines for MNCH. The MRU was most explicit in emphasising the completion of the surveillance cycle in its '4R's' approach i.e. 'Report, Review, Record, Respond' to a maternal or child death.

- *The 'no-name, no-blame' approach*

From our observations and the respondents' views, the perinatal and child (PPIP/CHIP) and the MRU meetings were the most likely to promote the 'no-name, no-blame' approach. The chairperson of the meeting ensured that confidentiality was maintained throughout and that no one was blamed for the occurrence of the adverse event. Otherwise, respondents noted that the meeting could be transformed into a '*punishment exercise*' that would discourage actors' participation:

> '*..The perinatal meeting itself is not making anybody accountable. The meeting itself is about discussing things, it is not to point to individuals, because it's going to be discouraging for the people [to attend] if it's a punishment exercise…'* [DCST].

This 'no-name, no-blame' approach fostered a high level of commitment to the review meetings that resulted in a common understanding of individual and system

challenges faced. It also fostered mutual support when people were proactively working as a team.

> *'Before there was blaming, blaming, blaming [...] No-one is blaming anyone anymore because we do understand the challenges, we are part of the system, we are in the [same] basket' [EMS manager].*

Even though the meetings were never used to point fingers, or name or blame providers involved in the management of the case, the respondents raised the possibility of sanction if at any stage gross negligence was documented.

> *'...We are taking every death very seriously. One death is too many deaths, we have to make sure that we follow up on our kids and also on our health care workers [at PHC] the entry point where the neonatal was first attended so that we can check on whether the child was attended according to protocol and if not then consequential management needs to be applied' [Hospital CEO].*

Policy documents formally claim that the CEMD also follows a 'no-name, no-blame' approach. However, based on interviews and observations in practice, the CEMD process in the study district was conducted and experienced very differently to the other DSR mechanisms. The CEMD process typically resulted in intense scrutiny of maternal death from higher-level management within the district and beyond, seeking to assign individual responsibility and frequently triggering reactive sanction and punitive action. Respondents reported suspensions, referrals to the labour office, litigations and court cases involving frontline professionals. This was one of the constraining factors of DSR functioning. These CEMD processes were managed through quality assurance structures (e.g. adverse event committees) and were associated with a particular language of sanction – such as 'consequence management'.

> '*So the meetings that we usually have with the quality assurance and the maternity doctors and the sisters in charge [...] those [meetings] push us to be more accountable [...] it's not like the perinatal meeting, [where] we don't mention the doctors who did what, we just present the case. With those ones [quality assurance], it pushes you to be more accountable because the file is there, we all discuss what's in the file. So, whoever was the attending doctor is more accountable, feels more accountable*' [Medical officer].

Table 3a: Summary of the functioning of DSR Mechanism in practice

	Death Surveillance and Response Mechanisms					
	24-hour Reporting, 48-hour Review	**Confidential Enquiry into Maternal Death (CEMD)**	**Perinatal/Child under-5 Problem Identification Programme (PPIP/CHIP)**	**Monitoring & Response Unit (MRU)**	**Morbidity & Mortality**	**Clinical Audit/Clinical Governance**
Functioning in practice (What/How?)	Reporting and Auditing	Naming; Obligation to inform and explain actions and decision taken;	'No naming, no blaming'	'No naming, no blaming'	'No naming, no blaming', Auditing and Quality Assurance	'No naming, no blaming', Auditing and Quality Assurance
Actors involved (Who?)	National, Province, District, Hospital	Facility (PHC, Hospital)	Clinical (District, Hospital, PHC)	Managers, clinical and non-clinical (District, Hospital, PHC)	Clinical (Hospital)	Clinical (District, Hospital, PHC)
Actions (Pro-active & Reactive)		Reactive; Possibility of imposing sanction; Targeting individual; institutional training	Proactive; Taking collective responsibility; Capacity building; system improvement	Proactive; Taking collective responsibility, In-service training; system improvement and community education	Proactive; In-service training	Proactive, In-service training

Table 3b: Functioning of DSR Mechanism compared to elements from the literature

		Death Surveillance and Response Mechanisms					
		24-hour Reporting, 48-hour Review	**Confidential Enquiry into Maternal Death (CEMD)**	**Perinatal/Child under-5 Problem Identification Programme (PPIP/CHIP)**	**Monitoring & Response Unit (MRU)**	**Morbidity & Mortality**	**Clinical Audit/ Clinical Governance**
Matching to the elements for the functioning of DSR mechanisms	**I. Surveillance process (What and How?)**						
	1. Continuous surveillance (Death auditing, review, communication, and feedback)	✓	✓	✓	✓	✓	✓
	2. Using cost-effective and evidence-based practices	✓		✓	✓	✓	✓
	3. No naming, No-blaming (Confidentiality, non-punitive tone of the process)	✓		✓	✓	✓	✓
	4. Integrating learning and response, quality improvement, health system strengthening, and community education			✓	✓		
	5. Institutional support culture at all levels of the health system	✓	✓	✓	✓	✓	✓
	Actors (Who?)						
	6. Multidisciplinary teams			✓	✓		
	7. Integration across levels of care			✓	✓		✓
	8. Involvement and commitment of the managers to act on the findings			✓	✓		
	9. Community participation in review and response						

II. Following a holistic approach to identifying modifiable causes						
	✓		✓	✓		
III. Actions (Pro-active & Reactive)						
▪ ***Provider level***	✓	✓	✓	✓	✓	✓
▪ ***System level***		✓	✓	✓		
▪ ***Community level***				✓		

Note: The tick (✓) implies that the element of the functioning was observed for the selected mechanism

- *Integrating learning and institutional support from higher-level management*

The DCST played a key role in providing clinical guidance, mentorship and in-service training related to modifiable factors identified in the DSR. The involvement of a facilitator from the National Department of Health was also observed as one of the enabling factors in mobilizing higher level management support, a factor unique to the study setting. By bringing together district and sub-district actors, DSR meetings acted as a lever for more transparency between levels, in sharing frustrations and most especially the sharing of good practices.

> *'I can say that [DSR meeting] is strengthening the communication between the sub-districts and the district and because of that I don't see any problem that might hinder us to progress, because that is where we are sharing our frustrations and sharing our best practices*' [District programme manager].

Also important was the presence and commitment of key champions amongst middle managers and medical and nursing clinicians who created and nurtured a community of practice for sharing knowledge and learning.

In one sub-district, participants expressed excitement at attending meetings, and the venues were sometimes overflowing with participants.

> *'[I]: So why do you think that meeting is taken seriously?*
>
> *[R]: It's the commitment of the medical managers, the commitment of the managers and also the operational managers in maternity wards and the doctors* [Manager, DO].

At these meetings, each step taken in the care pathway (from PHC to the referral hospital) was carefully scrutinized and improvement plans with timelines, monitoring and a responsible person were developed, facilitated by the involvement and commitment of the managers in the meeting:

> '*Because when you put those quality [measures] you start from your ward, …you put as well the responsible people because when you put some measures you need to monitor, to come and see if it's working. And you need to give the timeline… you monitor if it's going well, you sustain, if there is something you need to review or if it's not going well'* [Clinical manager].

One of the key moments of the review meetings was to identify the modifiable causes of death and translating them into training and learning opportunities for frontline managers and providers, as well as system improvement and community education. The regular presence of DCST and programme managers in the review meetings created a sense of trust and space for empowering providers with knowledge and tools for better performance. Nurses were able to present cases and engage in discussions with doctors. In one instance, where a doctor was trying to dismiss a nurse's opinion and impose his view during discussions, the DCST intervened and emphasized that everyone's opinion counted..

> *'The meeting is to highlight things, training, educational issues and to bring the people, the team together* [DCST].

Another perceived core value of the DSR process was learning from the death events to come up with quality improvement strategies to prevent similar events in the future.

> *'After we discuss we all come up with ... if I can say, opinions of what actually transpired or what could have happened for this baby to demise and what we could have done differently to help the baby. Maybe for the other babies who are coming in the near future who present the same way, what can we change to be able to help them'* [Medical Officer].

The learning and training were extended to primary health care facilities; minutes of the meetings and reminders of the guidelines were circulated; and regular visits to facilities were conducted by the district team, reinforcing what was shared in the meetings and allowing those who were absent from the meeting to be capacitated with needed skills.

- *DSR process institutionalized*

DSR processes in this district were anchored into routines in all facilities, with standardised agendas and supportive supervision from the DCST and the MNCH district programme coordinators. The DSR processes were perceived not only to contribute to improving the quality of care and outcomes in facilities...

> *'I think the perinatal meetings are there and they are there forever. It's like an auditing process, it's impossible to run maternity service without this [perinatal meeting]' [DCST].*

...but also to facilitate the integration of people and services

> *'When we started MRU [...] we were blaming each other, but the more we discussed and saw how it fits, we feel now the problem is not within us, [but] with our resources [...] Now we feel we are part of the institution; before [MRU] we felt that EMS was not part of the hospital [EMS].*

The perceived benefit and value of DSR processes, particularly the review and response meetings, were repeatedly emphasized by the respondents as a motivation to continue with and integrate them into the core activities of maternal and child in the district.

However, institutionalising appropriate DSR processes across all levels of the District was not an easy or completed task. DSR processes faced challenges at an individual level (blaming, sanctioning), institutional or service level (shortage of skilled personnel), or system levels (ineffective referral system). We also observed variations in the level of support and involvement of local leadership and primary healthcare facilities in DSR processes.

- *Actors: Bringing together a multidisciplinary team of actors across levels*

As indicated, DSR mechanisms were intended to be driven by a multidisciplinary team of actors including medical, nursing and other professionals, and across levels (community, PHC and hospital). Indeed, a wide variety of actors participated in DSR processes, most prominently in the case of the CEMD, where in addition to the provincial assessors, the following actors from district and facility levels were involved: the district manager (or a representative), quality assurance manager, primary health care and hospital services manager, labour relations and corporate services, a member of the DCST, the hospital chief executive officer, (CEO), the nursing service and clinical managers, as well as the specific health providers directly involved in the maternal death.

Participants in the PPIP/CHIP review meetings tended to be hospital based clinicians with the support of district clinicians and, at times, primary health care managers; while the MRU meeting sought to expand participation to other stakeholders such as academic partners, non-governmental organisations, other government departments (notably the South African Social Security Agency) and community representatives.

In one particular sub-district, the organizational culture and the leadership style of senior managers promoted collaboration between primary health care facilities and hospitals in DSR.

> '*…we only receive the mother during the process of giving birth, and when the woman is now complicated with pre-eclampsia of which I think that this would have been prevented at the first place; so we are involving the primary health care level to come to the perinatal meetings so that they can hear exactly about the progress of the woman because, for us, as a hospital, we do not have the liberty of starting the woman on antenatal care, whereas the PHC are the ones who might have been able to pick up on some problems during the antenatal period. So, for them being involved in these perinatal meetings is quite vital […] not coming is also is a transgression on its own'* [Hospital CEO].

In this sub-district, where identified modifiable factors were related to the patient or community, hospital board chairpersons were contacted to facilitate the dialogues within the community and identify key actions together with the community leaders to address the identified problem. However, the community was not usually implicated directly in DSR processes.

It is important to note that this degree of functioning was not universal, and there was variation across facilities and sub-districts in the levels of team involvement, particularly of staff from PHC facilities and hospital actors. In instances where doctors and nurses, managers and providers, or PHC facilities and hospitals were not working as a solidified team, accountability mechanisms were flawed resulting in poor referral systems, 'blame games' and the deferring of responsibility in case of death events.

b. Following a holistic (three delays) approach to identifying and acting on modifiable factors

Review meetings were observed to follow the 'three delays' approach to identifying factors (especially modifiable factors – Excerpt 1) associated with the occurrence of death events and to take collective responsibility and proactively set up key actions to prevent further events (Tables 3a and b). This was enabled by the presence of

stakeholders across levels - from primary health care facilities to district clinical specialist teams and programme managers. Because of the managerial orientation of MRU, the three delays mostly focused on the system factors for action, while PPIP/CHIP meetings were clinically oriented towards provider and, to some extent, patient factors. In both cases, any matters related to community engagement were discussed with the board chairpersons to liaise with the community leadership.

Excerpt 1 (From DSR meeting and discussion with respondents)*

Case 1: A pregnant patient who had never attended antenatal care presented to the hospital with severe complications and subsequently died. The main modifiable factor identified was the delay in deciding and seeking care.

Case 2: A young primigravida who was followed up since the early stage of the pregnancy, but died because of a failure to treat her high blood pressure. The modifiable factor identified was the delay in receiving adequate care.

Case 3: The patient was referred to a higher level hospital for a complication during labour, but the ambulance was delayed resulting in the death of the patient while still at the first level hospital. The modifiable factors identified were the lack of an effective referral system, adequate equipment and trained human resources.

Case 4: In a 'backstreet abortion', a patient was given misoprostol, used for medical termination of pregnancy. She developed complications and sought care at the hospital but could not be saved. One of the modifiable factors was that safe termination of pregnancy services were not sufficiently accessible.

*The 'three delays' approach was applied in the discussion of death cases to identify the modifiable factors associated with death events including patient or community factors (Case 1), the provider (Case 2) or the system (Cases 3 and 4).

c. *Implementation of actions*

Following the three delays model, the identified actions targeted the community (community education facilitated by the hospital board chairpersons and community leaders); the system (provision of resources); or the providers (skills building). Actions toward community were limited and only addressed by one DSR mechanism (MRU).

We observed evidence of implementation of actions recommended from DSR processes which were perceived to result in improved MNCH outcomes. For instance, during the study period outreach training in surgical skills (caesarean section and anaesthesia) was organized by a provincial team of specialists; DCST members were actively involved in organising training and mentoring programmes; and the district paediatrician supported facilities to set up and ensure availability and functioning of the Continuous Positive Airway Pressure (CPAP) therapy machines for neonatal care.

DISCUSSION

While WHO guidelines outline the necessary steps in conducting death surveillance and response,[6] there is little holistic guidance on how this is to be achieved in health systems. By collating elements from the literature into a conceptual framework it was possible to explore the factors enabling or constraining DSR functioning in one district. This framework may be of value in other similar settings. It can be used by researchers or health service managers to explore the functioning of the DSR system, diagnose challenges and promote an inclusive organisational culture of holistic scrutiny into the causes of death.

Maternal, neonatal and child DSR is well established in the South African district health system. Across the five forms of DSR directly related to maternal and child deaths in the study district, we found a range of practices. The surveillance process routinely emphasized on the '4R's' ('Report, Review, Record, Respond'). In most instances, the process followed the 'No name, no blame' approach as stipulated in the guiding documents. There were also holistic approaches to identifying causes of death, efforts to integrate training and support from higher levels, facilitation of multi-disciplinary teams, and elements of institutionalisation of DSR in the district. The latter requires a systemic supportive environment and organisational culture at all levels that are linked to annual planning and budgeting to support the implementation of evidence-based actions.[45] In these regards, the study District had

clearly benefitted from the DSR system strengthening interventions implemented over a number of years.

In certain instances, however, the "no name, no blame" approach was contradicted by an organisational culture of blame and punishment, particularly following maternal deaths. Here the emphasis was on identifying and sanctioning the persons responsible for death incidents and on curbing the institutional ramifications of the incident, instead of using it as an organisational learning event to prevent further incidents.[46] However, this level of scrutiny was not observed in instances of perinatal deaths, showing the difference between maternal and perinatal DSR processes. Such blame cultures in a healthcare organisation can be a source of an increased number of medical errors.[47]

Death events, particularly maternal deaths, are considered to be a barometer of a health system's performance. In this regard, DSR processes can be constrained by the fear of revealing malpractice and poor health system performance, and DSR processes can become politicized and maternal deaths under-reported by bureaucrats unwilling to disclose system failures.[48] In our study setting, DSR processes were facilitated by a high-level political commitment from the national government to compulsory and transparent reporting and reviewing of all cases of maternal or child deaths and implementation of measures to avoid future deaths from identified modifiable factors.

In this study, 'no name, no blame' approaches were observed to facilitate the active participation of various actors, especially those directly linked to death incidents and the possibility of embracing responsibility for the incident.[49] Thus, DSR processes can create a sense of interpersonal trust and trust in the health care organization, key for generating learning and improvement. In contrast, as noted in Kenya, the lack of trust, the fear of blame or individualised disciplinary action conditioned frontline professionals to be reluctant in disclosing data on maternal death.[17]

As proposed by Deis *et al.*[50] DSR meetings can be transformed into instruments of system improvement using a systematic approach that incorporates the 'three delays' model for action including the providers, the health system and the communities in identifying and addressing modifiable factors related to death events. This means that DSR processes should not only seek to identify and correct frontline providers' and managers' practices but also health system and structural factors at the community level,[20] A holistic approach was made possible through the use of standardised protocols and guidelines for DSR that integrated reporting and feedback mechanisms.[46]

Another important element of successful DSR observed was the inclusion and engagement of a multidisciplinary team of actors from various professional backgrounds and managers. This created a space to address not only health system-related problems[50] but also problems related to social structural factors (e.g. social exclusion, poverty). Where these functioned effectively, DSR platforms intersected individual and collective competency and responsibility for MNCH, enabling a community of practice that recognised the contribution and value of all levels, from PHC facilities to district hospitals actors. Furthermore, the inclusion of various stakeholders into DSR processes can also facilitate social autopsies given that some maternal and child deaths occur outside of health facilities. Similarly, a study in four Sub-Saharan African countries reported interdisciplinary teamwork with good communication amongst staff and active participation of staff as enablers of the DSR process.[51] **In contrast, where actors from PHC facilities and hospitals, or when doctors and nurses, managers and providers were disconnected, it resulted in a poor referral process, blame games and deferring of responsibility or avoidance of accountability. Melberg *et al.*[48] referred to a 'defensive referral' as a result of fear of being blamed for maternal death incident.**

When encouraged by leadership support, DSR processes can become a platform for common learning, knowledge sharing and quality improvement.[45] Effective DSR system, according to Kerber *et al.* [52] needs

engaged leadership and use of guidelines and protocols that ensure the complete cycle of the audit system.[53]

Finally, DSR processes were able to systematically and proactively identify and plan actions based on the framework. Though tracking implementation of these actions can be limited in scope, this study nevertheless presented evidence of responsive action implemented as part of DSR.

Limitations

The statements of lived experiences of DSR processes by the respondents could have been what they thought to be the right answer reflecting a social desirability bias in their responses. Being observed, respondents could have behaved differently ('Hawthorne effect'). We did indeed observe instances of where the absence of the national facilitator led to a slackening of meeting processes. **Furthermore, respondents' self-reports and accounts could have led to an overstatement of phenomena. We sought to minimise these biases by prolonged immersion in the field and supplementing formal interviews with observations and informal conversations.[30,54]**

This study was conducted in one district at a particular moment in time. While the forms of DSR are likely to be repeated elsewhere, the study findings related to the functioning of DSR are not generalisable given the management investments made. However, the findings have analytical relevance in illuminating DSR in best-case scenarios and the triangulated nature of the data provide confidence in the data collected.

CONCLUSION

The success of DSR processes resides in the intersection of many contextual factors such as the commitment of a multidisciplinary team of actors and support from district managers, the integration of primary healthcare and district hospitals, and the establishment of a space for mutual trust and learning anchored within the organisational culture of health facilities. A holistic approach is essential to address

the modifiable factors identified, translate them into long-term organisational learning opportunities, and set up evidence-based, 'real-time' responses.

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Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

Interview Guide – Accountability – Review meetings	
A. ACCOUNTABILITY	
Introduction	▪ Can you tell me about your current position/role in the (district) health system? *Probes: For how long have you been in that position?*
Accountability definition	▪ Could you describe to me what accountability means to you? *Probes: What does it make you think of accountability? What does it mean 'being accountable to?'* *How* would *you relate your definition of accountability to MNCH?*
Challenges	Can you share some of the challenges that you face while performing your tasks as a health professional (or mid-level manager) within your district? *Probes: Health Systems challenges/Challenges related to clients & Community/Personal challenges*
- **Line/forms,** - **Guidelines** - **Enablers** - **Barriers** - **Complaints**	▪ In your working area, to whom do you think you are accountable and why? *Probes:* - *Tell me about the reporting structure with regard to your role in the health systems?* - *To/from whom do you report/receive order/provide information/provide technical support/training/supervision* ▪ Are there any accountability guidelines/framework from the DOH that you are using? [*If yes, please describe*] ▪ What are the enabling and limitation factors of the current accountability processes? ▪ Does the District/Sub-district/Hospital/PHC Management Team have a mechanism in place to handle clients' complaints? How does it work? ▪ Can you describe how voice of the vulnerable (and of the community) is being represented within the Health System/clinic committee/ Hospital Board?
Team	▪ What's your experience/perception regarding teamwork and accountability for MNCH? *Probes:* - *Can you tell me about the team members/actors involved in the accountability processes for MNCH (Probe: Level)* - *How will you characterise the attitude and commitment of teamwork regarding MNCH* - *What's your beliefs regarding MNCH and the value of accountability*

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	▪ How do you perceive the performance of the team with regard to MNCH? *Probes:* - *Do you share the same goals? How do you set up these goals [decision making process]* - *Can you comment on the level of participation and collaboration work environment?* - *How do you monitor group accountability for MNCH*
Adverse events	▪ How do you perceive a case of adverse event (e.g. maternal or child death) as a team and/or individual? *Probes:* - *Please elaborate* - *How is the climate within your team when it comes to adverse event?* ▪ When you have to justify/explain/answer on an adverse event, how do you perceive the role of team members (peers)?
	▪ How would you characterise the role of the investigation team regarding an adverse event? [Team: DCST, Province, or other] *Probes:* - *Does the investigation result in sanctions and/or learning? [Please elaborate]* - *If learning, how often does the training happen? By Whom?* - *How do you identify areas for improvement [beside when an adverse event occurs]?*
Improvement	▪ If you are given all the means to improve accountability, how would you go for it and what would you prioritize? ▪ In your view, what can be done regarding accountability to improve MNCH outcomes?
B. DEATH REVIEW MEETINGS	
Actors/Who?	▪ Can you please describe who attends the meeting? *Probe:* - *Who are the actors from district office, hospital, PHC? Doctors vs Nurses and/or others?*
Meeting	▪ How would you describe the structure of the meeting? *Probe:* - *Who chairs, the agenda, how long, frequency, participation/engagement?* - *What are the drivers/facilitators/barriers to this [name] meeting and related processes?*

Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

	- *What, from your perspective, is the difference between MRU, PPIP/CHIP and other review meetings [name]?*
Decision process	▪ How would you describe the decision process during the [name] meeting? *Probes:* - *What happens? What do you discuss? How do the discussions of the meetings lead to decision or [positive] results (for actions)?*
Dealing with adverse events (deaths)	▪ How do you deal with adverse events e.g. maternal or child death? *Probes:* - *Can you describe the situation of maternal, neonatal and child death (mortality) in this area since you started in your position?* - *Can you share from your experience an example of an adverse event (maternal or child death) and how was the process of enquiry?* - *How do you see the problem of death in terms of accountability?* - *Do you have/know any policy/guideline for dealing with death event?*
	▪ How do you see the role of the [name] meeting as a structure that is facilitating/supporting accountability processes for MNCH? *Probes:*
	▪ How would you describe the role of communities in addressing MNCH problems? ▪ How would you describe the role and level of engagement of PHC facilities? *Probes:* - *Referral processes* - *Role of Provincial and National department of Health*
Actions/Outcomes	▪ What from your perspective are some of the key actions and outcomes on MNCH as a result of the [name] meeting? *Probes:* - *How sustainable are these actions? [Please elaborate]*
Conclusion	- Remind Ethics and right to withdraw from the study at any time - Thanking the informant

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	Pg 1, L1-3
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	Pg 2, L1-28
Introduction	
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Pg 4, L1 - Pg6, L2
Purpose or research question - Purpose of the study and specific objectives or questions	Pg 6, L3-13
Methods	
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	Pg 8, L1-pg9 L5
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	Pg12, L4-15
Context - Setting/site and salient contextual factors; rationale**	Pg 9, L6-pg10 L11
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	Pg10, L12-pg11, L7
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	Pg12, L17-22; Pg31, L11-15
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	Pg10, L14-pg11 L21

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Pg10, L28-30 Pg11 L12-13
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Pg11, L25-pg12, L3
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Pg11, L25-pg12, L3
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Pg12, L6-15

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pg12, L24-pg27, L18
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Pg12, L24-pg27, L18

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pg27, L19-pg29, L30
Limitations - Trustworthiness and limitations of findings	Pg30, L1-16

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Pg30, L29
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Pg31, L1-6

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388