



Performance of the Maternal and Perinatal Death Surveillance System in Kasai Province from 2022 to 2024

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Abstract

Introduction: Maternal and Perinatal Death Surveillance and Response still poses serious challenges in the DRC and in the Kasai province. The objective of this study was to evaluate its performance, identify gaps, and propose appropriate solutions to contribute to reducing maternal and perinatal mortality in the province. **Methods:** This was a mixed-methods study with a comprehensive design (cross-sectional analytical for quantitative data, phenomenological for qualitative data) covering the period from January 1, 2022, to December 31, 2024. Quantitative data were analyzed using Epi Info (v7.2.6.0) with descriptive and inferential statistics (95% CI). Qualitative data were analyzed thematically. **Results:** The performance of the system's pillars ranged from 19% to 56%. Only 25% of deaths were reviewed in the province during the evaluation period. Providers trained in maternal and perinatal mortality monitoring (MPM), the availability of MPM forms, the existence of an MPM committee in the health district (HD), the completion of maternal and perinatal death reviews, and the holding of HD MPM meetings are associated with the performance of the MPM system ($p < 0.05$). **Conclusion:** The MPM system remains underperforming in Kasai Province. To strengthen its performance, it is important to address its core components by strengthening infrastructure, financial management, and commu-

nication; and to build the capacity of MPM and HZN providers and foster their retention.

Subject Areas

Psychology

Keywords

Performance, System, Surveillance, Maternal Deaths, Perinatal Deaths, Kasai, DRC

1. Introduction

Maternal and perinatal mortality constitutes a major international public health challenge. According to the World Health Organization (WHO) [1], a maternal death is defined as the death of a woman occurring during pregnancy or within 42 days of its termination, regardless of its duration or location, from a cause related to or aggravated by pregnancy, excluding accidental causes. Worldwide, approximately 514,000 women die each year as a result of pregnancy or childbirth, which is one death per minute. The vast majority of these tragedies (98%) occur in developing countries.

In Africa, maternal mortality ratios (MMRs) reach critical levels, as illustrated in Nigeria by a study reporting 1,732 deaths per 100,000 live births [2]. In the Democratic Republic of Congo (DRC), the Demographic and Health Survey (DHS) [3] estimates this rate at 760 deaths per 100,000 live births. Major disparities characterize the country: 13 provinces have a maternal mortality ratio (MMR) ranging from 300 to 761 deaths, while the other 13 have rates between 100 and 250 deaths per 100,000 live births.

Clinically, maternal hemorrhage is one of the leading causes of death in the DRC [4]. Perinatal mortality is strongly influenced by insufficient prenatal care and advanced maternal age. In Kasai, low birth weight combined with a lack of prenatal monitoring exacerbates the situation. To combat this scourge, the Maternal, Perinatal Death Surveillance and Response (MPDR) system is essential. Based on the principle that each audited death provides data to prevent future tragedies [1], this system has proven effective in improving the quality of care.

Despite its importance, routine registration suffers from bias, and the true maternal mortality rate remains underestimated globally [5]. In the DRC, the operationalization of the SDMPR faces major obstacles: 19% of Health Zones (HZs) remain “silent,” and perinatal deaths are largely underreported [6] [7]. This deficiency severely affects Kasai Province, where the lack of local data and published studies paralyzes the organization of the response. The present research aimed to evaluate the performance of the SDMPR system in Kasai Province in order to identify its weaknesses and propose avenues for improvement.

2. Methods

2.1. Study Design

This was a mixed-methods study with a comprehensive design (cross-sectional analytical for the quantitative, and phenomenological for the qualitative) covering the period from January 1, 2022 to December 31, 2024.

2.2. Study Framework

The study was conducted in Kasai Province (DRC). Health data describes a health pyramid comprised of 18 health zones, 18 general referral hospitals, 46 referral health centers, 500 health centers, and 639 health posts. Human resources include 246 general practitioners, 29 public health specialists, 187 midwives, and 677 nurses. The major clinical constraint is the complete absence of obstetrician-gynecologists and pediatricians.

2.3. Study Population

Our study population consisted of maternal and perinatal death records, healthcare providers, and community members.

Sampling and Selection Criteria

For the quantitative component, the approach was exhaustive, including all 432 usable maternal and perinatal death records from the 18 health zones. The qualitative component used purposive sampling of healthcare providers, health zone managers, and community members, divided into 15 interview groups of 8 to 10 participants. The inclusion and exclusion criteria are presented in **Table 1**.

Table 1. Inclusion and exclusion criteria.

Category	Inclusion criteria	Exclusion criteria
Quantitative component	Records of maternal or perinatal deaths occurring between January 2022 and December 2024, provided they are complete and usable.	Incomplete files or files not containing the information necessary for analysis.
Qualitative component	Healthcare providers and community members who have agreed to participate voluntarily after prior notification.	Individuals who have not given their informed consent or who have decided to withdraw during the process.

Study Variables

The dependent variable was the functionality of the SDMPR committee. The independent variables were: providers trained in SDMPR; availability of SDMPR forms; existence of the SDMPR committee in the health zone; completion of death reviews; and holding of SDMPR meetings at the health zone level. These variables were cross-tabulated with the performance indicators of the health system pillars.

2.4. Data Collection and Analysis

Quantitative data collection was based on a literature review (registers, partograms, review forms) validated by a pretest of 20 records. Deaths not reported in the review reports were identified using healthcare facility registers. The qualitative component

employed semi-structured interview guides, with systematic triangulation to ensure internal validity. Focus groups of 8 to 10 people were organized, recorded, and then transcribed. Les données quantitatives ont été nettoyées sur Excel, puis analysées sur Epi Info (v7.2.6.0) via des statistiques descriptives et inférentielles (IC à 95%). A logistic regression was performed to exclude confounding factors and estimate odds ratios. Le qualitatif a fait l'objet d'une analyse thématique. The performance of a maternal and perinatal death surveillance system is its operational capacity to detect, report, and analyze each maternal death and, most importantly, to implement effective corrective actions to prevent similar deaths in the future. The unit of analysis was the provincial maternal and perinatal death surveillance committee. The performance evaluation criteria for the committee were the proportion of deaths reported, the completion of reviews, the completeness and timeliness of reports, the availability of review forms, and follow-up. The performance threshold was set at 80%. The pillars of the WHO constitute the resources and interventions that can support the death surveillance system.

2.5. Ethical Considerations

The protocol has received approval from the Ethics Committee of the University of Lubumbashi (No. UNILU/CEM/036/2025).

3. Results

Of the 432 deaths recorded in Kasai, the overall notification rate reached 93.75%. Maternal deaths represented 48.38% ($n = 209$) and perinatal deaths 51.62% ($n = 223$). However, only 25.00% ($n = 108$) of these deaths were reviewed, and 88.89% of these were reviewed after the deadline. Furthermore, only 18.52% of the reviews resulted in a written report, and only 13.19% of the cases were processed by the Provincial SDMPR Committee (See [Table 2](#)).

Table 2. Distribution of deaths recorded in Kasai Province from 2022 to 2024 ($N = 432$).

Parameters	Frequency	Percentage (%)
Types of death		
Maternal	209	48.38
Perinatal	223	51.62
Deaths reported		
yes	405	93.75
No	27	6.25
Deaths reviewed		
Yes	108	25.00
No	324	75.00
Deaths reviewed with report		
Yes	80	18.52
No	352	81.48

Continued

Deaths reviewed within the time frame			
Yes	48	11.11	
No	384	88.89	
Cases handled by the Province's SDMPR committee			
yes	57	13.19	
No	375	86.81	

3.1. Inter-Pillar Performance

The analytical assessment of the six pillars of the health system highlighted two distinct performance categories. The pillars in critical condition (<50%) were Infrastructure (19%, lowest score) and Financing (45%). The pillars in the middle range (53% - 56%) were Human Resources for Health (56%), Medicines, Inputs and Consumables (56%), Governance (54%), and the Health Information System (HIS, 53%). (See **Figure 1**)

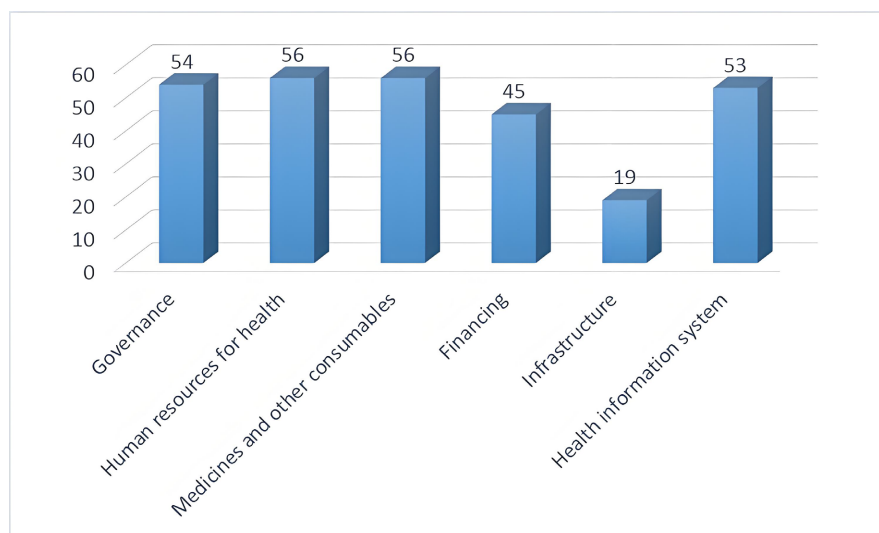


Figure 1. Six pillars of the health system highlighted two distinct performance categories.

Table 3. Factors associated with the performance of the SDMPR system.

Paramètres	fonctionnal System non n (%)	unfonctionnal System n (%)	OR (CI 95%)	p
Notification of deaths				0.0000
No	275 (71.06)	3 (6.67)	34.38 (10.44 - 113.19)	
Yes	112 (28.94)	42 (93.33)	1	
Completion of death reviews				0.0000
No	320 (82.69)	3 (6.67)	66.87 (20.13 - 222.13)	
Yes	67 (17.31)	42 (93.33)	1	
Implementation of the response				<0.0001
No	378 (97.67)	37 (82.22)	9.08 (3.31 - 24.94)	
Yes	9 (2.33)	8 (17.78)	1	

Continued

Follow up			-	0.0000
No	371 (95.87)	0 (0.00)		
Yes	16 (4.13)	45 (100.00)	1	
Report completeness				0.0000
No	359 (92.76)	0 (0.00)	-	
Yes	28 (7.24)	45 (100.00)	1	
Promptitude des rapports				0.0000
Non	375 (96.90)	30 (66.67)	15.63 (6.71 - 36.39)	
Oui	12 (3.10)	15 (33.33)	1	
Availability of SDMPR datasheets				0.0000
No	16 (28.07)	302 (80.53)	10.6 (5.64 - 19.94)	
Yes	41 (71.93)	73 (19.47)	1	
Providers trained in SDMPR				0.0000
No	23 (40.35)	274 (73.07)	4.01 (2.25 - 7.14)	
Yes	34 (59.65)	101 (26.93)	1	
Regular SDMPR meetings				0.0000
No	32 (71.11)	383 (98.97)	38.90 (11.99 - 126.23)	
Yes	13 (28.89)	4 (1.03)	1	

The statistical cross-check demonstrates that the performance of the SDMPR system is significantly linked ($p < 0.05$) to nine major indicators: notification of deaths (OR = 34.38), review of deaths (OR = 66.87), implementation of the response (OR = 9.08), follow-up, completeness of reports, timeliness of reports (OR = 15.63), availability of SDMPR forms, availability of providers trained in SDMPR and regular holding of SDMPR meetings at the ZS level (OR = 38.90) (See **Table 3**).

Table 4. Factors associated with the performance of the maternal, perinatal death surveillance and response system.

Term	Odds Ratio	95%	C.I.	Coefficient	S.E.	Z-Statistic	P-value
Notification	86.1863	13.8485	149.2716	3.8170	0.6065	6.2930	0.0000
Promptness	86.1863	26.0191	285.4851	4.4565	0.6111	7.2929	0.0000
Completeness	20.9617	9.0996	48.2871	3.0427	0.4258	7.1465	0.0000
Response	12.8379	4.8055	34.2961	2.5524	0.5014	5.0910	0.0000
Follow-up	183.8526	54.2884	622.6335	5.2141	0.6224	8.3779	0.0000
Review completion	66.8564	20.1274	222.0741	4.2025	0.6125	6.8614	0.0000
Availability of fact sheets	0.6410	0.3096	1.3247	-0.4447	0.3714	-1.1974	0.2312
Availability of trained service providers	20.5286	9.7411	43.2625	3.0218	0.3803	7.9449	0.0000
Regular meeting holding	38.8776	11.9809	126.1566	3.6604	0.6006	6.0948	0.0000

After adjusting for variables, eight indicators remained associated with the performance of the maternal, perinatal death surveillance and response system. These were death notification, death review, report completeness, report timeliness, response implementation, follow-up, availability of trained providers, and regular holding of SDMPR meetings ($p = 0.0000$) (See **Table 4**).

3.2. Perceptions of Service Providers

The perceptions of healthcare providers and community members were gathered to understand the reasons for the non-completion of maternal and perinatal death reviews (by Registered Nurses and Hospital Physicians) and to identify corrective measures.

Regarding the main causes of the non-completion of these reviews, the analysis of the interviews highlights several structural, behavioral, and logistical barriers. Institutional weaknesses were identified (absence of functional SDMPR committees in some Health Zones and lack of follow-up on recommendations), health governance problems (proliferation of unregulated healthcare facilities that do not report to the Central Health Zone Office, leading to major delays in the transmission of alerts), psychological and behavioral factors (fear of reprisals or blame from superiors, confusion between “review” and “sanction,” coupled with a degree of negligence on the part of some providers or hospital managers), and logistical constraints (shortage of physical tools (review and notification forms) and excessive centralization of training).

The verbatim transcripts and testimonies of the providers note the following:

Regarding the lack of committees and the communication gap: *“The problem is the absence of SDMPR committees in our health zones. If these committees were established and operational, it would allow for a review and follow-up of recommendations each time there is a death (...). In Kanzala, I note that this committee has never been established. Another factor is the proliferation of structures, which makes it difficult for IT teams to gather information. Sometimes, you learn of a death very late, even though the notification hasn’t been made at the local level.”*

On fear of hierarchy and the role of reviews: *“The IT staff believe that when there is a maternal death, they will be blamed or condemned. Therefore, they either withhold information or report it late. But the purpose of the review is not to condemn, but rather to improve the quality of services. (...) When there is a death, it is not an inevitability to condemn, but it must be reported so that a solution can be found.”*

On the management of tools and responsibility: *“The IT staff and the MDH (Medical Department) don’t conduct reviews. It’s simply negligence. (...) They say they don’t have blank forms (...). Often, they call the Central Office to conduct the reviews; they don’t realize they have this responsibility. At the Central Office, we are given these forms in electronic format. We have never had the physical forms.” However, I know that with the structures supported by the PMNS under PBF*

(Performance-Based Financing), they have an autonomy that allows them to reproduce these tools.

Several potential solutions and corrective measures have been proposed. Discussions with stakeholders on the ground have converged on seven priority areas for revitalizing the surveillance system:

1. Regulating healthcare provision: Establish a rigorous mapping of maternity wards and implement a strict legal framework to prohibit deliveries in unsuitable facilities.
2. Operationalizing committees: Establish and strengthen the SDMPR committees within all health zones.
3. Strengthening skills through pooling: Organize decentralized training sessions in pools (similar to vaccination campaign briefings) to reach isolated providers and expand the critical mass of trained professionals.
4. Raising awareness of cultural change: Remind healthcare professionals of the obligation to report all deaths within 48 hours, emphasizing the non-punitive and constructive nature of the reviews.
5. Rigorous monitoring of decisions: Systematically implement and evaluate the recommendations from the reviews to ensure they are not ignored.
6. Logistical empowerment: Encourage local reproduction of notification forms (particularly through FBP/PMNS funding) and ensure the provision of tools in physical format.
7. Local support: Provide guidance and managerial support to the MDHs and ITs regarding their core responsibilities.

4. Discussion

The evaluation of the SDMPR system in Kasai province reveals a major deficiency: only 25% of recorded deaths were reviewed (**Table 2**). This result is attributable to insufficient training of service providers, a lack of review forms, the absence of oversight committees, and inadequate communication resources. This situation reflects the national trend where very few provinces provide sufficient reports (19% of health zones remain silent, and the underreporting of perinatal deaths remains significant) [6] [7]. These shortcomings directly contradict national and international guidelines that place death review at the heart of the SDMPR [1].

The evaluation of the system's pillars (infrastructure 19%, financing 45%, health information system 53%, governance 54%, human health services 56%, medicines/supplies 56%) confirms profound structural weaknesses (**Figure 1**). The governance, the foundation of the system, exhibits weaknesses linked to strategic and operational deficiencies. Smith *et al.* [8] remind us that effective leadership requires accountability mechanisms. Similar to the findings in Nigeria [9], the governance deficit weakens the entire system. Conversely, Vanhaecht *et al.* [10] emphasize that a quality system relies on the continuous questioning of stakeholders regarding their values and the performance of services.

Financing and infrastructure have shown the poorest performance. Under-al-

location of funds and dependence on external aid weigh down the system. Regarding human resources, shortcomings stem from demotivating salaries, lack of training, and staff instability. Moses *et al.* [11] confirm that staff shortages and poor financial management are priority challenges, while Kinney *et al.* [12] reiterate that human capital is the heart of the system. Furthermore, Burchett *et al.* [13] highlight the importance of policies for access to emergency care in reducing mortality. The health information system (HIS) is directly supported by communication. Brown [14] shows that a lack of motivation, communication breakdowns, and a leadership deficit undermine quality governance, while Dai *et al.* [15] emphasize that a climate of trust stimulates service use. To optimize HR, Karsh *et al.* [16] advocate human factors engineering, and Vasquez *et al.* [17] reiterate the key role of continuing education. The performance of the SDMPR was significantly associated with organizational inputs and processes (Tables 3-4), a systemic approach validated by Resta *et al.* [18] and Kodan [19].

5. Limitations and Transferability

This research has two major limitations: the risk of information bias related to the quality of routine health information system(HIS) data (compensated by source triangulation) and the scarcity of local studies published in Kasai to serve as a historical comparison. Nevertheless, since the Kasai health system is similar to that of other provinces in the DRC and many developing countries, the results of this study have strong transferability value.

6. Conclusion

The SDMPR system in Kasai Province remains underperforming, with no pillar achieving a score above 56%. The system fails to document and analyze mortality to organize an effective response. To address these shortcomings, it is imperative to implement the recommended actions: provide routine training to healthcare providers, promote the use of physical data collection tools, strengthen local committees, and shift from a culture of punishment to one of continuous clinical learning.

Conflicts of Interest

The authors declare no conflicts of interest.

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