

Paediatric deaths at Al-Sabbah Children's Hospital, Juba, South Sudan – an audit

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ABSTRACT

Introduction: Paediatric mortality is a pressing public health concern in South Sudan, particularly in tertiary care settings where systemic challenges constrain access to timely and quality healthcare. In response to this, the Momentum Integrated Health Resilience (MIHR), in collaboration with the Association of Gynaecologists and Obstetricians of South Sudan, undertook a paediatric death audit (PDA) at Al-Sabbah Children's Hospital in Juba. This study aimed to describe the experience and the status of PDA implementations and provide recommendations for improvement.

Method: This was a cross-sectional, descriptive study conducted in September 2024. Data were collected using a standardised tool adapted from the United States Agency for International Development Maternal and Child Survival Programme. To obtain the information, focal group discussions were conducted with 13 members from the PDA hospital committee and officials from the Ministry of Health of Central Equatoria State. Another group obtained retrospective data from the available PDA review forms and guidelines.

Results: Based on this assessment, the PDA committee at Al-Sabbah Children's Hospital is functional. The hospital has verifiable PDA guidelines, mainly from the World Health Organisation, standardised death notification and death review forms that capture paediatric death information, and job aids like the International Classification of Diseases-Perinatal Mortality and the International Classification of Diseases-Paediatric Death to support cause-of-death classification. However, it lacked standardised death certificates with a designated section to record the cause of death. The assessment revealed that only a few deaths were reviewed as sampled by the committee chair.

Conclusion: PDA is well implemented in Al-Sabbah Children's Hospital. The assessment recommends replicating the PDA in other national and state hospitals, as well as forming and training PDA committees on the standardised classification of causes of neonatal and paediatric deaths.

Keywords: paediatric death audit (PDA), Al-Sabbah Children's Hospital, South Sudan

Introduction

An audit of paediatric deaths is a systematic review analysing the deaths, particularly those under five years, to identify medical, social, and other factors contributing to mortality.^[1] In South Sudan, with its fragile health infrastructure, death audits are critical for improving child survival.^[2]

South Sudan records some of the highest under-five mortality rates globally. Contributing factors include malnutrition, infectious diseases (e.g. malaria, pneumonia, and diarrhoea), limited access to quality healthcare, and shortages of trained health personnel.^[3] Paediatric death audits (PDAs) provide information about the causes surrounding child deaths and inform interventions.^[4]

Unlike maternal and perinatal death audits, auditing child deaths has received much less attention.^[6] There are a few published studies on PDAs from low- and middle-income countries (LMICs) as recommended by the World Health Organisation (WHO) in 2018.^[5] As part of quality improvement, the Momentum Integrated Health Resilience (MIHR) in South Sudan was joined by the Child Health Department of the National Ministry of Health (MOH), South Sudan Paediatric Association, and WHO to support the implementation of PDA in 2022. This study reported only the PDA assessment conducted in September 2024.

PDA training was conducted over one day in September 2022, utilizing WHO training materials. Twenty-four health care providers, including 15 females and 9 males, attended the training. The attendees included clinical and medical officers, paediatricians, midwives, laboratory technicians, matrons, administrators, and statisticians. PDA monthly reviews were undertaken.

Al-Sabbah Children's Hospital, Juba — our largest and only specialised paediatric referral hospital — provides an opportunity to investigate the patterns and drivers of child mortality in a low-resource setting. This collaborative study, conducted by MIHR and the Association of Gynaecologists and Obstetricians of South Sudan (AGOSS), sought to identify avoidable factors, assess the care quality, and recommend interventions to reduce preventable paediatric deaths.

Method

Al-Sabbah Children's Hospital is a national referral facility for both outpatient and inpatient medical services. This study was a cross-sectional descriptive assessment. It

targeted health providers and managers who were members of the PDA committee. Interviews were conducted with health providers on the PDA committee and with the hospital's executive director. The assessment included the review of the PDA tools and job aids available, and other services and mortality data at the hospital. It was conducted by a consultant from AGOSS, using the MIHR PDA assessment tool adapted from the United States Agency for International Development (USAID) Maternal and Child Survival Programme tool.^[6] Al-Sabbah Children's Hospital was the only hospital selected for the assessment. This was because it was the only health facility in the country implementing PDA. The aim was to assess the experience, progress, and status of the PDA and the clinical outcomes of its implementation. We describe current national policies and guidelines supporting PDA, identify challenges and adaptations, and provide recommendations for improvements.

The PDA committee in the facility is tasked to systematically review and analyse the under-five deaths to identify causes, contributing factors, and modifiable factors. The ultimate objective is to reduce preventable under-five mortalities and improve the quality of care in the hospital. It comprises professionals involved in child health care. This includes the hospital director as chairperson, the matron, ward in charge, paediatric specialists, general practitioners, pharmacists, laboratory technicians, nutritionists, and data officers, among others. The PDA review process follows a cycle of six steps that starts with the identification and notification of under-5-year-old children's deaths that occurred in the facilities to the audit committee. This is followed by the identification of two members of the PDA committee to collect detailed data on the case using available records, and a death review meeting using the WHO structured audit form, during which the team will analyse the contributing and modifiable factors that led to the death. These steps are followed by others, such as making recommendations and implementing actionable solutions to avoid similar issues in the future, which should also be monitored and evaluated to determine whether improvements occurred.

Data collection and analysis

The study included facility observations and interviews as indicated above. Documentation of the PDA committee, meeting schedules, meeting notes, and reports was checked. Interviews were conducted in English and/or Arabic, but notes were taken in English.

Participants were asked when PDA began and whether it

Table 1. Structure of the assessment

Participants	Number	Data collection method	Data collection tool
PDA committee	17	Focus Group Discussions	Questionnaires
		Review PDA data	Data collection sheet
		Review PDA tools	Direct observations
		Direct observation/verification of data source	
		Historical anecdote	

was part of the hospital's usual quality-of-care activities. They were asked if PDA guidelines were available in the hospital, if activities were coordinated among the committee members, if death notification plans were in place, and if each death was reported to the PDA committee. Enquiries were made about the collection and analysis of paediatric deaths and if the committee made recommendations based on identified modifiable factors, and if action plans were implemented.

Data were collected using a standard tool adapted from the USAID Maternal and Child Survival Programme.^[7] The form was adapted using the KoboToolbox online software, which enabled direct data entry.^[8] This was checked for completeness and transported into SPSS version 29 for descriptive analysis. No personal identifiers were included. This audit assessment was approved by the Directorate of Reproductive Health, National Ministry of Health, and oral consent was obtained from the respondents. Table 1 summarises the data collection methods and tools used.

Results

Results cover the availability of PDA guidelines, forms, and reporting tools; the organisation and implementation of PDA; the assessment of healthcare workers on PDA; and the PDA cycle.

PDA guidelines, forms, and reporting

The hospital had PDA guidelines, mainly from the WHO, standardised death notification and death review forms that included paediatric death information, and job aids like International Classification of Diseases-Perinatal Mortality (ICD-PM) and International Classification of Diseases-Paediatric Death (ICD-PD), which are international coding classifications of diseases in antepartum, intrapartum, and early neonatal deaths. However, there were no standardised death certificates in the hospital. PDA meetings were supported with a sitting

allowance provided by the WHO. Despite limited financial support for implementing death review recommendations, monthly reports were submitted locally to state authorities and made available electronically.

Organisation implementation of PDA

Al-Sabbah Children's Hospital had conducted PDAs for eighteen months before this assessment. The hospital has a functional PDA committee and chairperson. Meetings were attended by the chairperson, health information officer, nurses, nutritionist, pharmacist, laboratory technician, medical officers, and paediatricians, as well as partners from the WHO, United Nations Children's Fund (UNICEF), and MIHR. They discuss how a case was managed, modifiable factors and causes of death, action points, and recommendations, with assigned follow-up responsibilities.

PDA training and supervision

Training to build the PDA committee's capacity was conducted by the hospital administration in collaboration with MIHR and WHO. Unfortunately, PDA training did not include other health facilities within Central Equatoria State.

PDA Cycle

Identifying and notifying death

Authorities are routinely notified of neonatal and paediatric deaths within the hospital, but this doesn't include those occurring within the communities. Deaths are identified from the emergency care register, the outpatient department, the emergency department, the paediatric admission register, and the clinical files.

Collecting information

Information for a death review is compiled from the

case notes, charts, registers, and death notification forms. Medical records and registers do not capture all the necessary information due to poor documentation, lost files, and some records being taken by the patient's guardians.

Not all the paediatric deaths were selected for review. The chairperson and secretary of the PDA committee examined all files and selected those for review based on suspected clinical mismanagement.

Data analysis

The hospital has a standard form for paediatric death review, but does not use international classification systems. Modifiable factors were analysed using the 3-delay model (i.e., the delay at the hospital) and root cause analysis. No data on neonatal and paediatric death trends, audited deaths, recommended changes, or frequency of death audit meetings were displayed.

Tables 2 and 3 show PDA using an electronic digital tool (Comcare application)—an electronic tool used by the MIHR-USAID project for data savings and analysis.

Recommendations and implementing changes

These are based on the identified modifiable factors contributing to death. These include a lack of medical supplies, poor enumeration of healthcare workers, delayed referral of critical cases, power shortages, and a shortage of healthcare workers in the hospital.

Members were designated to follow up on recommendations based on their responsibilities. Other recommendations were assigned to the hospital CEO or administrators. The hospital has a process for reporting to the PDA committee on the progress of recommended actions. However, implementation challenges include issues such as unpaid salaries for months, a lack of financial resources, difficulty in reaching supporting partners like UNICEF, competing priorities, inadequate communication, weak referral systems, and a lack of community engagement.

Positive changes based on mortality audit recommendations

According to participants, introducing PDA significantly reduced mortality at this paediatric referral centre over the past 1.5 years. However, improvements are needed in areas like record-keeping, patient assessment, investigation, and treatment. PDA has also led to improvements in hospital ward organisation, enhanced patient attendance, regular clinical rounds, triage training, instruction of new interns, daily meetings, and clinical note documentation.

Table 2. Number of deaths recorded by health facility staff using digital death notifications, April-September (2024)

Type of Death by Period	Female	Male	Total death notifications
Child death (12 to 59 months)	77	104	181
Early neonatal death (0 to 7 day of life)	21	27	48
Late neonatal (8 to 28 days of life)	2	2	4
Post-neonatal (29 days to less than one year)	38	49	87
Total	138	182	320

Source: MIHR monthly death audit report-2024

Table 3. Timeline

Timeline between admission and death	Female	Male	Total audited deaths
Over 7 days	0	2	2
Before 3 hours	0	1	1
Less than 7 days	1	1	2
6-12 hours	0	2	2
3-6 hours	2	2	4
12-24 hours	4	3	7
24-48 hours	5	3	8
Total	12	14	26

Source: MIHR monthly death audit report-2024

Discussion

This assessment was conducted to describe the experience and status of PDA implementation at Al-Sabah Children's Hospital and to provide recommendations for improvement.

A supportive policy for PDA helps implementation, but does not ensure translation into practice. South Sudan has yet to release a ministerial order on the implementation of PDA at the community, facility, county, and state levels. Al-Sabbah Hospital is the only facility in South Sudan that uses PDA. Most PDA implementation efforts are led by partners such as MIHR, WHO, and UNICEF. Hence, health care workers and some managers believe that PDA is a partner-led intervention that delays ownership countrywide.

Despite the lack of national guidelines for PDA implementation, WHO tools were successfully used to conduct neonatal and paediatric mortality audits at the hospital. This was because review meetings were led by qualified medical cadres, such as paediatricians, who were fully informed about the process.^[9]

The PDA process is well embedded in the hospital. However, the state and national health level authorities lag behind.

The survey found that partners and hospital administrators initiated most capacity-building and skills-transfer activities. This could be due to a lack of resources or leadership.^[10] Prevailing principles dictate that country health authorities assume full responsibility for the quality of care, including PDA, and utilize review results and recommendations to improve healthcare quality and policymaking.^[11,12] This study also indicated that all neonatal and paediatric fatalities in the hospital are notified, unlike maternal and perinatal deaths. Community engagement remains inadequate.

Despite improvements in hospital recording, gathering information from registers and patient files remains difficult due to poor documentation. Irregular salary payments may demotivate staff, as noted in our previous study.^[10] The study also indicated that ICD-PM and ICD-PD are not used to standardise causes of death, and mortality audit statistics are not displayed anywhere within the facility.^[13] Modifiable factors contributing to newborn and paediatric fatalities, precise and actionable suggestions, and designated personnel to follow up on recommended activities were clearly described in all of the evaluated death audit forms.

Most of the PDA committee's suggested changes were not adopted. This could be linked to insufficient financial resources. The Abuja Declaration states that health should receive at least 15% of the country's annual budget.^[14]

All assessed death review documents demonstrated good confidentiality. However, having a formal code of conduct that states that individual staff names should not be included in meeting discussions, and no names should be included in audit documents.^[15] Although PDA committee members should sign a document underlying this practice, no such form exists in the facility.

Supportive policy and political environment

South Sudan lacks a law or ministerial order to institutionalise and implement PDA, with Al-Sabbah Hospital being the only facility practising it. Partners

like MIHR, WHO, and UNICEF have been largely responsible, giving the impression that PDA is a partner-led initiative.

The lack of coordination among different levels of health structures (National, States, and Counties), irregularities in government salaries, inadequate resources, and the MOH's commitment to governance hinder effective implementation of PDA.

To address these challenges, the MOH should prioritise the signing of pending health policy documents (the Child Health Survival Strategy) and coordinate monthly PDA review meetings and the submission of reports.

Lessons learned

- Systematic data collection arising from a standardised approach to PDA reviews has the potential to generate the first official database development on under-five mortality in South Sudan.
- Initiating and setting up PDA is a process that requires collective efforts from all child health partners.
- Involvement of health authorities at the MOH to ensure a nationwide set-up of PDA.
- Committed and dedicated health care providers ensure the sustainability of PDA.
- Adequate financial resources are needed to address identified gaps.
- While PDA is meant to improve the quality of care for children, awareness and community engagement are necessary to enhance sustainability.

Obstacles to implementing PDA

- Lack of financial resources for implementation of death review recommendations, lack of community engagement, and lack of MOH support.
- Patients disappear from the hospital because of financial constraints or a perception of poor services.
- Lack of qualified human resources, especially nurses.
- Lack of essential laboratory investigation.
- Late referrals from lower-level health facilities.
- Lack of resuscitation equipment and essential medical consumables.
- Lack of reliable sources of oxygen.

- With the expansion of Juba city, the hospital facilities have not kept pace with the increasing influx of patients

Conclusion

Although not officially endorsed by state and national health authorities, PDA is well implemented at Al-Sabbah Children's Hospital. The assessment recommends replicating PDA in other national and state hospitals, and forming and training PDA committees to standardise the classification of neonatal and paediatric causes of death. Adequate funding is crucial.

The study recommends:

1. Development and dissemination of PDA national guidelines.
2. Expand PDA to health facilities across the country.
3. Refresh training for facility PDA committees with emphasis on ICD-MM, ICD-PM, display of mortality data, and code of conduct.
4. Engagement of Boma health workers in reporting and collecting information on deaths in the community.
5. Increase budget allocation for health in general and Maternal, Neonatal and Child Health (MNCH) to ensure staff motivation, purchase of essential medicines, and resources.
6. Explore potential linkages between PDA and Maternal and Prenatal Death Surveillance Response (MPDSR) reviews in facilities that only implement MPDSR, ensuring PDA also occurs.
7. PDA activities are funded by activities, but there is a need for the MOH or the hospital to take ownership.

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