

ASSESSMENT OF THE AVAILABILITY OF NEONATAL MORTALITY AND STILLBIRTH RECORDS IN ROUTINE HEALTH INFORMATION SYSTEMS AT HO TEACHING HOSPITAL, VOLTA REGION, GHANA

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Author's contributions

This study was a collaborative effort of the authors. The authors reviewed and approved the final version of the manuscript for publication.

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ABSTRACT

Neonatal mortality and stillbirth remain major public health concerns in low- and middle-income countries, where routine health information systems often face documentation and archival challenges. This study assessed the availability of neonatal mortality and stillbirth data elements within routine health facility records at Ho Teaching Hospital in the Volta Region of Ghana from January 2019 to December 2021. A descriptive cross-sectional retrospective design was used. Data were obtained from delivery registers, admission and discharge registers, monthly midwives' summary reports (Form A), and the District Health Information Management System II (DHIMS-II). Data availability was defined as the presence and accessibility of neonatal mortality and stillbirth data elements in source documents and reporting forms for each reporting month. A total of 108 expected records were assessed (36 months × 3 reporting sources). Overall data availability was 88.2%, with annual rates of 88.9% in 2019, 91.7% in 2020, and 88.9% in 2021. Missing registers in selected months limited full verification of reported data. Neonatal mortality and stillbirth data are largely available at Ho Teaching Hospital; however, strengthening register management, archival systems, and routine data validation processes is necessary to improve data reliability.

Keywords: Neonatal mortality; stillbirth; data availability; health information systems; DHIMS-II; Ghana

INTRODUCTION

Neonatal mortality accounts for nearly half of global under-five deaths, with the majority occurring in low- and middle-income countries (United Nations Inter-Agency Group for Child Mortality Estimation [UN IGME], 2022). Stillbirths, defined as fetal deaths at or after 28 weeks of gestation, remain a neglected indicator in many national health reporting systems despite their importance in measuring the quality of obstetric care (World Health Organization [WHO], 2014). Globally, an estimated 2 million stillbirths occur each year, with the greatest burden occurring in low- and middle-income

countries, particularly in sub-Saharan Africa. Despite increased attention to maternal and newborn survival, stillbirths remain underreported in many routine health information systems, limiting their visibility in planning, monitoring, and policy development. Reliable availability of stillbirth and neonatal mortality data is therefore essential for improving maternal and newborn health programmes. In Ghana, improvements in skilled birth attendance and facility-based deliveries have not been matched by equivalent reductions in neonatal mortality (Ghana Statistical Service [GSS], Ghana Health Service [GHS], & ICF, 2015). Achieving Sustainable Development Goal (SDG) 3 requires robust health information systems capable of producing accurate, accessible, and timely data (United Nations, 2016). The District Health Information Management System II (DHIMS-II) was introduced in Ghana to improve reporting efficiency and accessibility of routine health data (Amoakoh-Coleman et al., 2015). However, several studies have documented persistent challenges, including missing registers, incomplete documentation, and discrepancies between source documents and electronic entries (Kayode et al., 2014; Nutley, Gattiker, & Kahn, 2020). Data availability in this study refers to the presence and accessibility of neonatal mortality and stillbirth data elements in routine source documents and reporting forms for each reporting month. (WHO, 2012). Without consistent availability of source documents, effective monitoring, supervision, and planning are compromised. Ho Teaching Hospital is the major referral facility in the Volta Region and provides comprehensive obstetric and neonatal services. Given its strategic role, assessing the availability of neonatal mortality and stillbirth data at this facility is critical for strengthening maternal and newborn health monitoring systems. This study, therefore, assessed the availability of neonatal mortality and stillbirth data at Ho Teaching Hospital from 2019 to 2021. This study was informed by the health information system performance perspective, which emphasises the production, accessibility, and use of reliable routine health data for decision-making.

METHODOLOGY

Study Design

A descriptive cross-sectional retrospective design was adopted. This design was appropriate for reviewing routine health facility records over a defined period without manipulation of variables.

Study Setting

The study was conducted at Ho Teaching Hospital in the Volta Region of Ghana. The hospital transitioned to teaching hospital status in April 2019 and provides tertiary obstetric and neonatal services to the region and surrounding areas.

Study Period

The study covered a continuous 36-month period from January 1, 2019, to December 31, 2021. The extended timeframe allowed assessment of reporting consistency across three calendar years, including the COVID-19 pandemic period.

Study Population and Eligibility

The study population consisted of routine health facility records documenting neonatal deaths and stillbirths within the study period.

Conceptual Definition

Data availability in this study refers to:

“The presence and accessibility of neonatal mortality and stillbirth data elements in routine source documents and reporting forms for each reporting month.”

Data Sources

Data were extracted from:

- Delivery registers (fresh and macerated stillbirths)
- Admission and discharge registers (early and late neonatal deaths)
- Monthly midwives' summary reports (Form A)
- DHIMS-II electronic database

Variables Assessed

The variables assessed included:

- Fresh stillbirth
- Macerated stillbirth
- Early neonatal death (0–6 days)
- Late neonatal death (7–28 days)

Operational definitions

- **Fresh stillbirth:** fetal death occurring during labour with no signs of maceration.
- **Macerated stillbirth:** fetal death occurring before labour with signs of skin disintegration.
- **Early neonatal death:** death of a live-born infant occurring within 0–6 completed days after birth.
- **Late neonatal death:** death of a live-born infant occurring from 7–28 completed days after birth.

Data Availability Indicators

Data availability was assessed at two levels:

1. Availability of source documents

- Presence of delivery register per month
- Presence of admission and discharge (A&D) register per month
- Presence of completed monthly summary reports (Form A)

2. Availability of data elements

- Availability of fresh stillbirth records per month
- Availability of macerated stillbirth records per month
- Availability of early neonatal death records (0–6 days) per month
- Availability of late neonatal death records (7–28 days) per month
- Availability of corresponding entries in DHIMS-II

Data Collection Procedure

Data verification was conducted by the research team using a structured checklist adapted from the WHO Data Quality Review Toolkit. For each of the 36 reporting months, delivery registers, admission and discharge registers, and monthly summary reports (Form A) were physically inspected to confirm the presence of entries for fresh stillbirths, macerated stillbirths, early neonatal deaths, and late neonatal deaths. Missing registers, missing months, and undocumented variables were recorded on the checklist. Where discrepancies were identified between source documents and DHIMS-II entries, these were noted for documentation purposes.

Data Quality Control

To ensure consistency and accuracy during data extraction, completed checklists were independently reviewed by a second member of the research team. Extracted information was cross-checked between source registers, Form A reports, and DHIMS-II entries where available. Any inconsistencies identified were discussed and resolved by the research team before analysis.

Data Analysis

Data were analysed using SPSS version 24. Frequencies and percentages were computed.

Data Availability (%) = (Number of Available Records / Number of Expected Records) × 100

This formula was used to calculate the percentage availability of neonatal mortality and stillbirth records across the study period.

Where:

- **Available Records** = Number of registers/forms present and accessible

- **Expected Records** = Total number of registers/forms that should exist during the study period

Ethical Considerations

Ethical clearance was obtained from the Dodowa Health Research Ethics Review Committee and management of Ho Teaching Hospital. No patient identifiers were collected.

RESULTS

A total of 108 expected records were assessed across the study period, calculated as 36 months × 3 reporting sources per month (delivery register, admission and discharge register, and monthly summary report Form A).

Table 1 presents the annual availability of registers and reporting forms from 2019 to 2021.

Year	Expected Reports	Available	Availability (%)
2019	36	32	88.9
2020	36	33	91.7
2021	36	32	88.9

Overall availability across the three years was **88.2%**. Annual availability rates were 88.9% in 2019, 91.7% in 2020, and 88.9% in 2021. Fresh stillbirth registers were missing in 2–3 months annually. Macerated stillbirth documentation was consistently available.

Table 2 presents the availability of neonatal mortality and stillbirth variables recorded on Form A during the study period.

Year	Expected Entries	Available	Availability (%)
2019	48	42	87.5
2020	48	41	85.4
2021	48	44	91.7

The availability of neonatal mortality and stillbirth variables recorded in Form A ranged from 85.4% to 91.7% across the study period, with the highest availability observed in 2021.

DISCUSSION

The findings of this study indicate that neonatal mortality and stillbirth records were largely available at Ho Teaching Hospital over the 2019–2021 period, with an overall availability rate of 88.2%. This suggests that routine documentation systems were functioning relatively well during the study period. However, the absence of some registers in selected months points to weaknesses in record storage, retrieval, and archival practices. These findings are consistent with previous studies in Ghana and other low- and middle-income settings which have shown that while routine reporting forms are often completed, source document retention and accessibility remain inconsistent. This creates challenges for data verification, supervision, and use of routine health information for decision-making. The missing registers observed in this study may reflect weaknesses in filing systems, staff transitions, limited storage space, or inadequate supervision of records management. Such gaps reduce confidence in the completeness of routine reports submitted into DHIMS-II because electronic entries cannot always be traced back to source documents for independent validation. The implications for maternal and newborn health monitoring are important. Reliable routine data are essential for identifying trends, monitoring service outcomes, and guiding interventions aimed at reducing neonatal deaths and

stillbirths. Strengthening archival systems, standardizing record management procedures, and conducting routine data quality audits would improve the reliability and usefulness of hospital data for planning and evaluation.

LIMITATIONS

This study had some limitations. First, it was conducted in a single facility, which limits the generalizability of the findings. Second, the study focused on data availability and did not assess the accuracy or completeness of all recorded entries in detail. Third, reliance on secondary routine records introduced the possibility of transcription and reporting errors between source documents and DHIMS-II. Finally, missing registers in some months limited full verification of reported neonatal mortality and stillbirth records.

CONCLUSION

Neonatal mortality and stillbirth data at Ho Teaching Hospital are largely available, with an overall availability rate of 88.2% from 2019–2021. However, gaps in register availability limit full verification. Strengthening documentation systems and institutionalising routine data audits will enhance reliability for maternal and newborn health planning.

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