International Conference on Social Science and Humanity
Homepage : https://proceedings.antispublisher.org/index.php/icossh
Email : admin@antispublisher.com

e-ISSN : 3063-9611
ICOSSH, Vol. 3, No. 5, 2026
Page 130-138
© 2026 ICOSSH

Inpatient Mortality Trends at Mataram City General Hospital, 2022–2023: Gross and Net Death Rates

Aditiyani Nugraha Pertiwi[1]*, Beny Binarto Budi Susilo[2], Uswatun Hasanah[3], Rizal Pratama Adi Putra[4], Irawansyah[5], Nur Afni[6]

[1,2,3,6] Diploma III Program in Medical Records and Health Information, Bima International MFH University, Mataram, Indonesia

[4,5] Diploma IV Program in Public Sector Accounting, Bima International MFH University, Mataram, Indonesia

Check for updates OPEN ACCESS

(cc) BY-SA

DOI : https://doi.org/10.61796/icossh.v3i5.656

Sections Info

Article history:
Submitted: August 13, 2026
Final Revised: September 07, 2026
Accepted: Oktober 16, 2026
Published: November 22, 2026

Keywords:
Gross death rate
Net death rate
Inpatient mortality
Mortality trends

ABSTRACT

Objective: *The purpose of this study was to review the GDR and NDR trends for the period 2022-2023 at RSUD Kota Mataram and to identify the factors causing the increase and decrease in GDR and NDR mortality rates.* ***Method:*** *This type of research is a mixed methods study using a sequential explanatory approach.* ***Results:*** *The monthly gross and net death rates fluctuated. The highest GDR was 64.81 per 1,000 discharges in October 2022 and 58.20 in January 2023. The highest NDR was 39.75 per 1,000 in December 2022 and 39.27 in January 2023. Interviews identified referral status and critical illness on arrival as possible contributors.* ***Novelty:*** *The study pairs monthly mortality patterns at Mataram City General Hospital with staff interviews on referral conditions and mortality reporting.*

INTRODUCTION

Hospital inpatient mortality statistics can help management identify periods requiring further review. Indonesia's hospital reporting guidance defines the gross death rate (GDR) and net death rate (NDR) per 1,000 inpatient discharges. GDR includes all inpatient deaths, while NDR counts deaths occurring after at least 48 hours of inpatient care [1]. Descriptive studies have used these indicators to summarize hospital mortality [2]. Trend analyses from Surakarta [3] and forecasts from Sukoharjo [4] illustrate distinct uses of mortality data for planning. Interpretation depends on the numerator, denominator, and time interval used [5].

A high crude death rate may reflect the severity of illness or the population a hospital serves. Referral centers may admit patients with advanced or critical conditions, making changes in crude rates difficult to attribute directly to the quality of inpatient care [6]. Research comparing hospital-wide mortality ratios with case reviews found that such ratios have limited ability to indicate avoidable deaths [7]. Indonesian research has also examined factors associated with inpatient mortality in a hospital setting [8].

Preliminary records at Mataram City General Hospital (RSUD Kota Mataram) showed that 64 of 1,209 inpatients discharged in January 2022 died during admission. The study therefore examined monthly GDR and NDR in 2022 and 2023, and used interviews to explore possible explanations for variation and describe how the hospital processed mortality data.

RESEARCH METHOD

The study used an explanatory sequential mixed-methods design. Administrative records were analyzed first, followed by interviews to explore the findings and describe operational context [9]. The quantitative phase covered all monthly inpatient discharge and mortality counts available for January 2022 through December 2023. The qualitative phase used purposive recruitment of staff connected with medical records, intensive care, and inpatient nursing. The methods section of the source reports six informants and the excerpts include labels through Informant 6. The original abstract and qualitative introduction report three. The final interview sample size remains to be confirmed.

The study used a quantitative checklist and a semistructured in-depth interview guide. Based on the national reporting definition [1], GDR was calculated as all inpatient deaths divided by all inpatient discharges, including deaths, multiplied by 1,000. NDR used deaths at or beyond 48 hours as the numerator and the same discharge denominator. The timing category is presented using the reporting definition. The source did not separately identify any deaths recorded exactly at 48 hours.

Monthly and annual rates in this revision were recomputed from the source census counts and rounded to two decimals. The annual rates use total yearly deaths and discharges. The source specifies least squares for trend analysis. The revised figures distinguish observed rates from descriptive linear fits and compare month-to-month changes calculated using unrounded rates. Interviews were summarized using data reduction, display, and matrix analysis. The study integrated the interview themes with the quantitative patterns to inform interpretation.

RESULTS AND DISCUSSION

Results

Mortality in 2022

The 2022 census recorded 14,057 discharges and 745 inpatient deaths, of which 277 occurred before 48 hours and 468 at or beyond 48 hours. Monthly discharges ranged from 798 in February to 1,404 in October. Monthly deaths ranged from 40 in February to 91 in October.

Table 1. Inpatient discharge and death counts, 2022

Month	All discharges	Deaths <48 h	Deaths ≥48 h	Total deaths
Jan	1,209	21	43	64
Feb	798	19	21	40
Mar	1,028	22	30	52
Apr	1,097	22	38	60
May	1,066	17	40	57
Jun	1,228	24	28	52
Jul	1,261	24	43	67
Aug	1,243	23	48	71
Sep	1,218	16	41	57

Month	All discharges	Deaths <48 h	Deaths ≥48 h	Total deaths
Oct	1,404	37	54	91
Nov	1,247	31	32	63
Dec	1,258	21	50	71
Total	14,057	277	468	745

Source: RSUD Kota Mataram inpatient census, 2022.

Table 2. Recalculated GDR and NDR, 2022

Month	GDR per 1,000	NDR per 1,000
Jan	52.94	35.57
Feb	50.13	26.32
Mar	50.58	29.18
Apr	54.69	34.64
May	53.47	37.52
Jun	42.35	22.80
Jul	53.13	34.10
Aug	57.12	38.62
Sep	46.80	33.66
Oct	64.81	38.46
Nov	50.52	25.66
Dec	56.44	39.75
Annual	53.00	33.29

Source: RSUD Kota Mataram inpatient census, 2022.

Monthly GDR ranged from 42.35 per 1,000 in June to 64.81 in October. NDR ranged from 22.80 per 1,000 in June to 39.75 in December. June was the only month under both reference values. The largest increase in monthly GDR was from September to October. For NDR, the largest increase was from November to December.

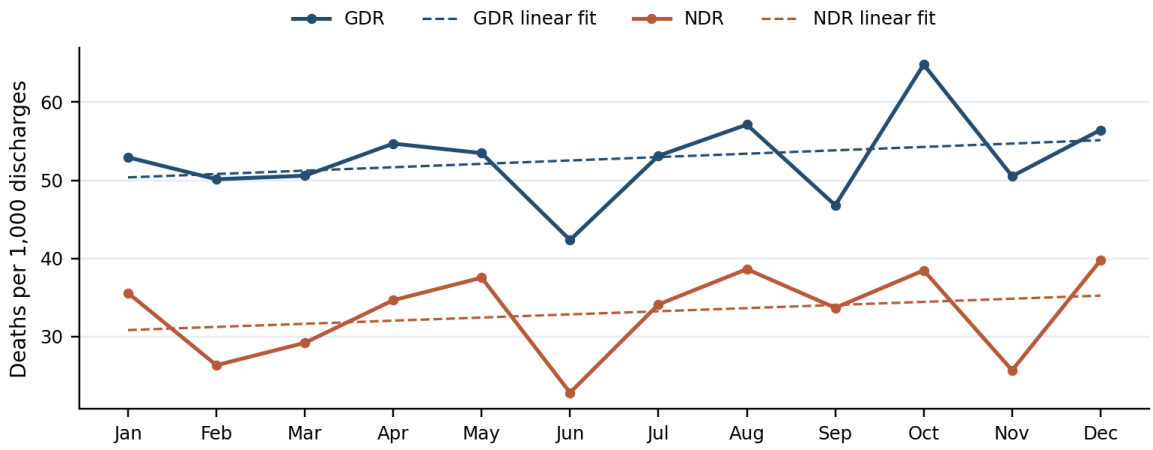

Figure 1. Monthly GDR and NDR with descriptive linear fits, 2022

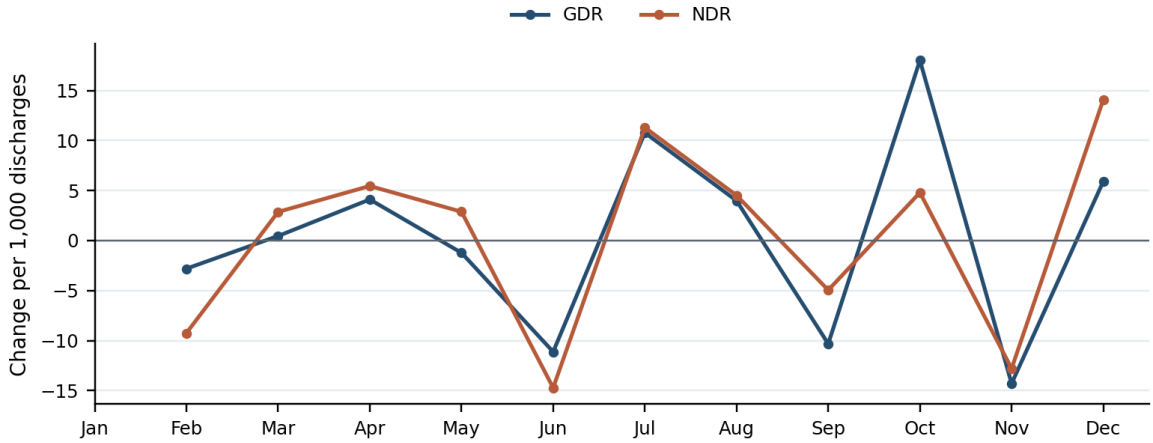

Figure 2. Month-to-month changes in GDR and NDR, 2022

Mortality in 2023

The 2023 census recorded 17,622 discharges and 841 inpatient deaths, of which 286 occurred before 48 hours and 555 at or beyond 48 hours. Monthly discharges ranged from 1,370 in February to 1,626 in May. Monthly deaths ranged from 45 in February to 86 in May.

Table 3. Inpatient discharge and death counts, 2023

Month	All discharges	Deaths <48 h	Deaths ≥48 h	Total deaths
Jan	1,426	27	56	83
Feb	1,370	11	34	45
Mar	1,463	23	40	63
Apr	1,372	25	51	76
May	1,626	34	52	86
Jun	1,476	20	38	58
Jul	1,437	27	47	74
Aug	1,469	26	44	70
Sep	1,498	20	57	77
Oct	1,507	26	44	70
Nov	1,449	18	51	69
Dec	1,529	29	41	70
Total	17,622	286	555	841

Source: RSUD Kota Mataram inpatient census, 2023.

Table 4. Recalculated GDR and NDR, 2023

Month	GDR per 1,000	NDR per 1,000
Jan	58.20	39.27
Feb	32.85	24.82
Mar	43.06	27.34
Apr	55.39	37.17

Month	GDR per 1,000	NDR per 1,000
May	52.89	31.98
Jun	39.30	25.75
Jul	51.50	32.71
Aug	47.65	29.95
Sep	51.40	38.05
Oct	46.45	29.20
Nov	47.62	35.20
Dec	45.78	26.81
Annual	47.72	31.49

Source: RSUD Kota Mataram inpatient census, 2023.

Monthly GDR ranged from 32.85 per 1,000 in February to 58.20 in January, and NDR from 24.82 in February to 39.27 in January. February was the only month under both reference values. Both rates fell most sharply between January and February and increased most sharply between March and April. The 2023 annual GDR and NDR were lower than their 2022 values despite higher discharge and death counts. The annual rates in both years were above the reference values.

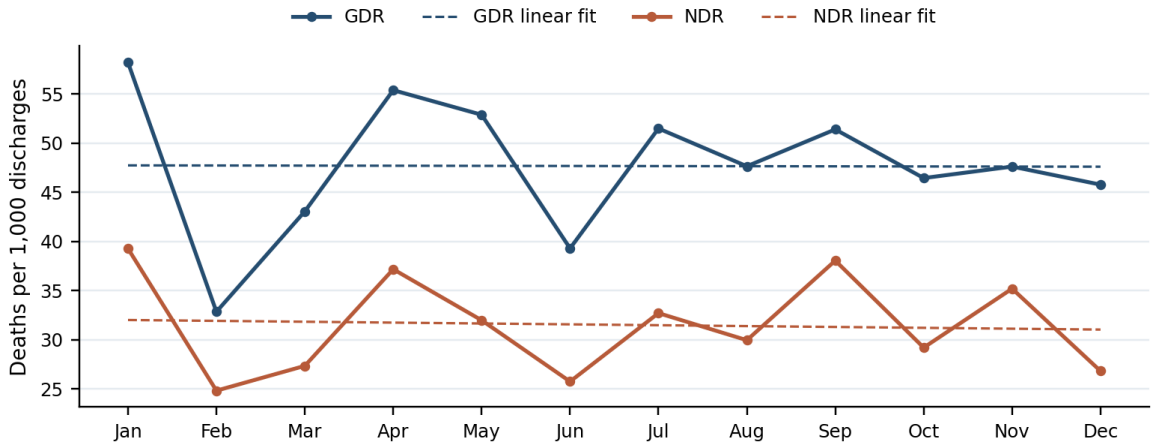

Figure 3. Monthly GDR and NDR with descriptive linear fits, 2023

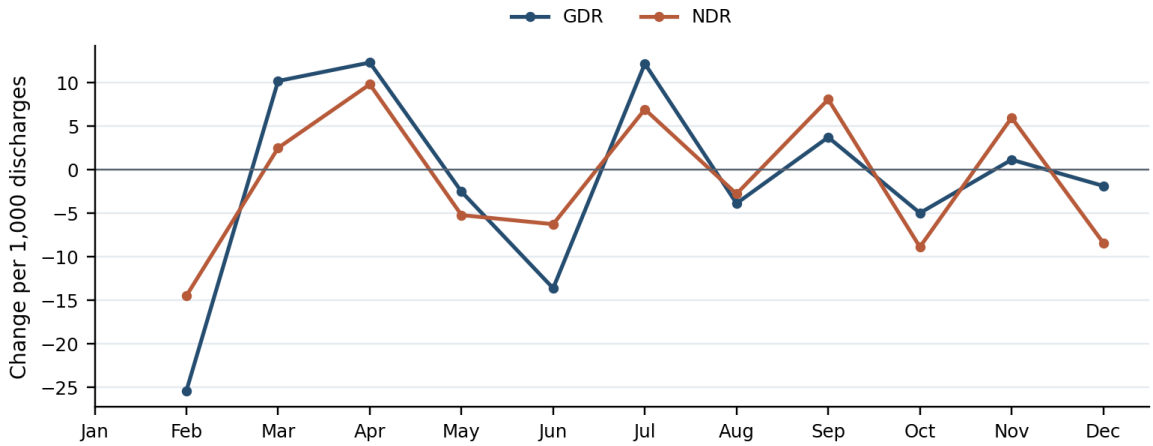

Figure 4. Month-to-month changes in GDR and NDR, 2023

Qualitative results

Resources, procedures, and training

Informants identified the availability of equipment as relevant to care for critically ill patients. One informant described a newborn needing respiratory support and the potential consequences if the necessary equipment was unavailable. Staff reported that standard operating procedures were available for interventions and care, including intravenous access, ventilation, and injections. These accounts describe staff perceptions and reported practice. Informants also described differences in access to training. One noted that costs limited direct participation and that staff who attended shared learning with colleagues.

"We have standard operating procedures for each intervention, such as inserting an IV or giving an injection, and we have been following them." (Informant 2, translated excerpt)

Condition on arrival and referral transport

Interviewees identified critical illness on arrival as a possible contributor to observed mortality. One informant described how delayed referral, ambulance availability, and a lack of respiratory support during transport could affect a critically ill infant. These interviews describe perceived contributors. They do not quantify their contribution to individual deaths or monthly changes.

"If a baby is already critically ill and the referral is delayed because there is no vehicle or ambulance, and respiratory support is not used during the journey, that also affects the transfer." (Informant 2, translated excerpt)

Mortality reporting

Staff described entering discharge and death information at ward level in the Hospital Management Information System (SIMRS), retrieving it from the daily inpatient census, and using Microsoft Excel to calculate and compile indicators. The original account describes reporting to hospital management and external health authorities on monthly, quarterly, and annual schedules, with monthly collection by the fifth day of the following month. Previous work describes a similar flow from ward-level entry to mortality reporting [10] and the use of inpatient census data to evaluate inpatient indicators [11].

"We first retrieve the data from SIMRS and then calculate the rates manually using Excel." (Informant 6, translated excerpt)

Discussion

The yearly rates declined, but monthly variation and repeated exceedance of reference values persisted. A lower crude rate can follow changes in discharges, case severity, or referral patterns. These data do not establish sustained improvement in hospital service quality. Mortality patterns can guide structured review of high-rate months and the associated case mix, referral timing, and care processes [6]. Reviews of deaths and the circumstances of care can provide information that aggregate rates alone cannot supply [7].

Informants' accounts of severe illness on arrival and transport constraints are consistent with the need to examine referral pathways. Work from another Indonesian referral setting has evaluated integrated risk management and factors affecting mortality [12]. Equipment availability, implementation of procedures, and staff training represent distinct aspects of care assessment [13]. This study did not directly measure their effect on mortality. The interview findings provide questions for case review and service evaluation.

Combining SIMRS exports with a standardized calculation sheet would make the numerator, denominator, timing category, and rounding easier to verify. Transparent reporting should include a reconciled interview count, selection criteria, and how themes were developed [14]. Patient-level admission severity, diagnoses, transfer source, and organ support would help future studies account for confounding and report adjusted comparisons alongside crude rates [15].

CONCLUSION

Fundamental Finding: Monthly GDR and NDR fluctuated in both years. The annual rates declined in 2023, while many monthly rates remained above their respective reference values. **Implication:** GDR and NDR provide information that hospital management can use to plan and evaluate inpatient services. **Limitation:** The analysis used aggregate hospital data and could not adjust for patient severity or case mix. The number of interviewed informants is inconsistently reported in the source. **Future Research:** Future studies could examine risk-adjusted mortality using patient-level data and assess referral delays and admission severity alongside documented care processes.

REFERENCES

[1] Ministry of Health of the Republic of Indonesia, Profil Kesehatan Indonesia 2023. Jakarta, Indonesia: Kementerian Kesehatan Republik Indonesia, 2024, table 7. [Online]. Available: https://www.kemkes.go.id/app_asset/file_content_download/172247989066aaf512936579.51341712.pdf

[2] N. Khasanah, N. Fadillah, and I. Sari, "Analisis deskriptif indikator gross death rate (GDR) dan net death rate (NDR) di rumah sakit X pada tahun 2016–2020," Media Bina Ilmiah, vol. 16, pp. 7595–7602, 2022.

[3] B. A. Pratama, "Trend mortalitas dengan indikator gross death rate dan net death rate per tahun di Rumah Sakit PKU Muhammadiyah Surakarta tahun 2017–2021," Indones. J. Med. Sci., vol. 10, no. 1, pp. 94–101, 2023. [Online]. Available: https://garuda.kemdiktisaintek.go.id/documents/detail/3288837

[4] L. A. S. Rahayuningsih, E. N. Rahmawati, and J. N. F. Fadhilah, "Prediksi gross death rate dan net death rate di Rumah Sakit PKU Muhammadiyah Sukoharjo tahun 2024–2028," J. Midwifery Health Sci., vol. 4, no. 2, 2024. [Online]. Available: https://www.ojs.udb.ac.id/ovum/article/view/4143

[5] Harjanti, S. Ediyono, and V. Ismawati, "Implikasi epistemologi: Pengukuran gross death rate (GDR) dan net death rate (NDR) dalam studi demografi," Indones. J. Health Inf. Manag., vol. 4, no. 1, pp. 1–6, 2024. [Online]. Available: https://garuda.kemdiktisaintek.go.id/documents/detail/4233222

[6] B. Jarman et al., "Explaining differences in English hospital death rates using routinely collected data," BMJ, vol. 318, no. 7197, pp. 1515–1520, 1999, doi: 10.1136/bmj.318.7197.1515.

[7] H. Hogan et al., "Avoidability of hospital deaths and association with hospital-wide mortality ratios: Retrospective case record review and regression analysis," BMJ, vol. 351, Art. no. h3239, 2015, doi: 10.1136/bmj.h3239.

[8] D. A. Raharni, H. Djasri, and D. Ratmasari, "Analisis faktor yang memengaruhi mortalitas pasien rawat inap di Rumah Sakit Akademik UGM," J. Manaj. Pelayanan Kesehat., vol. 26, no. 4, pp. 49–63, 2023. [Online]. Available: https://journal.ugm.ac.id/v3/JMPK/article/download/11082/3943/

[9] M. D. Fetters, L. A. Curry, and J. W. Creswell, "Achieving integration in mixed methods designs: Principles and practices," Health Serv. Res., vol. 48, no. 6 pt. 2, pp. 2134–2156, 2013, doi: 10.1111/1475-6773.12117.

[10] Y. T. Utami, N. Wikan, and V. Shabetini, "Pelaksanaan pelaporan data mortalitas rawat inap di rumah sakit," in Pros. Seminar Informasi Kesehatan Nasional, 2023. [Online]. Available: https://garuda.kemdiktisaintek.go.id/documents/detail/3757516

[11] E. N. Rahmawati, N. Cahyaningrum, F. Febrianti, and S. Y. Sari, "Analisis pemanfaatan data sensus harian rawat inap untuk evaluasi pelaporan indikator rawat inap," Infokes, vol. 15, no. 1, pp. 68–78, 2025. [Online]. Available: https://ojs.udb.ac.id/index.php/infokes/article/view/4775

[12] D. Wewengkang, A. G. Sidqi, Rulia, A. L. Rahmiyati, and V. Paramarta, "Analisis penerapan manajemen risiko terintegrasi dan faktor-faktor yang mempengaruhi mortalitas pasien di RSUD Sele Be Solu Kota Sorong," J. Manaj. Terap. Keuang., vol. 14, no. 3, pp. 1412–1423, 2025. [Online]. Available: https://online-journal.unja.ac.id/mankeu/article/download/48418/22133

[13] A. Donabedian, "The quality of care: How can it be assessed?," JAMA, vol. 260, no. 12, pp. 1743–1748, 1988, doi: 10.1001/jama.1988.03410120089033.

[14] A. Tong, P. Sainsbury, and J. Craig, "Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups," Int. J. Qual. Health Care, vol. 19, no. 6, pp. 349–357, 2007, doi: 10.1093/intqhc/mzm042.

[15] E. von Elm et al., "The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies," PLoS Med., vol. 4, no. 10, Art. no. e296, 2007, doi: 10.1371/journal.pmed.0040296.

***Aditiyani Nugraha Pertiwi (Corresponding Author)**
Diploma III Program in Medical Records and Health Information, Bima International MFH University, Mataram, Indonesia
Email: aditiyaninugrahap@gmail.com

Beny Binarto Budi Susilo
Diploma III Program in Medical Records and Health Information, Bima International MFH University, Mataram, Indonesia

Uswatun Hasanah
Diploma III Program in Medical Records and Health Information, Bima International MFH University, Mataram, Indonesia

Rizal Pratama Adi Putra
Diploma IV Program in Public Sector Accounting, Bima International MFH University, Mataram, Indonesia

Irawansyah
Diploma IV Program in Public Sector Accounting, Bima International MFH University, Mataram, Indonesia

Nur Afni
Diploma III Program in Medical Records and Health Information, Bima International MFH University, Mataram, Indonesia