

Trends, Distribution and Variations in Neonatal Sepsis Rates in Tanzania Health Facilities based on DHIS2 Data from 2021 to 2025

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Abstract

Background

Tanzania is among Sub Saharan African (SSA), countries with a higher neonatal mortality rate of 24 per 1,000 live births, whereby neonatal sepsis contributes more than 20% of total neonatal deaths. Despite the national efforts to integrate the neonatal sepsis rate indicator into District Health Information System 2 (DHIS2) in order to create national, regional, council, and facility data for decision-making and services improvement, there are a limited number of analyses that have been done to assess the trends and variations of this indicator. Therefore, this study aimed to assess the trends, distribution, and regional variations in neonatal sepsis rates in Tanzania health facilities using routine DHIS 2 data from 2021 to 2025.

Methodology:

This study was a descriptive cross-sectional study conducted among 138 health facilities reporting neonatal sepsis data in Tanzania. Permission to conduct this study was obtained from the Ministry of Health, and ethical clearances were obtained from the National Institute of Medical Research. The validated data was retrospectively extracted from the DHIS2 database, cleaned, and analyzed using R version 4.5.0. The neonatal sepsis variations in trend were analyzed using the ordinary least squares method, and significant changes/variations were measured at ≤ 0.05 p-values and presented in tables, graphs, and figures.

Results

The overall neonatal sepsis rate trend increased from 12.9 per 1,000 live births in the year 2021 to 20.9 per 1,000 live births in the year 2025. Male neonates reported consistent decreases of neonatal sepsis rate trends from 6.4 per 1,000 live births in the year 2021 to 5.7 per 1,000 live births in the year 2025. The secondary health facilities reported a higher and decreased neonatal sepsis rate from 64.1 per 1,000 live births in the year 2021 to 41.9 per 1,000 live births in the year 2025. The urban health facilities reported a higher and decreased neonatal sepsis rate from 21.5 per 1,000 live births to 14.5 per 1,000 live births, and the neonatal sepsis rate reported in private health facilities was very high but decreased from 18.4 per 1,000 live births in the year 2021 to 14.3 per 1,000 live births in the year 2025. The coastal zone reported the highest rate of neonatal sepsis of 17.8 per 1,000 live births, and the Lindi region (21.3 per 1,000 live births), reported the highest neonatal sepsis rate. There were substantial variations in the either increases or decreases in the trends of neonatal sepsis across different subgroups, although these variations were not statistically significant.

Conclusion

Overall neonatal sepsis rates trends increased from 2021 to 2025 but remained variable across the sub-facility level, ownerships, neonates' sexes, zones, and locations.

Clinical trial registration

This study was not a clinical trial

Background

Neonatal sepsis remains the leading cause of neonatal mortality, where by 1.3 to 3.9 million annual neonatal sepsis cases are reported globally causing 400 000 to 700 000 annual neonatal deaths globally[1]. Worldwide neonatal sepsis accounts for more than 4% to 56% of all neonatal deaths[2]. In Sub-Saharan Africa (SSA), the burden of neonatal sepsis is ranging from 30% to 51%, which is much higher compared to the World Health Organization(WHO) standard of less than 5% of total live births[3]. Neonatal sepsis is classified into two categories, which are early neonatal sepsis (occurring within the first 72 hours after birth) and late neonatal sepsis (occurring after 73 hours after birth); however, both types of neonatal sepsis are often associated with maternal and neonatal risk factors, which include environmental exposure, healthcare-associated waste, limited adherence to Infection Prevention and Control (IPC) measures, overcrowding health facilities, and inadequate healthcare infrastructure for IPC practices among healthcare providers[4].

Tanzania is among the SSA country with higher Neonatal Mortality Rate(NMR)of 24 per 1,000 by the year 2022, whereby neonatal sepsis contributes to more than 20% of all neonatal deaths in the country[5]. Previous studies done in Tanzania show that, the national neonatal sepsis rates range from 11% to 49% over total live births which is higher than 5% as recommended by the WHO [5, 6]. To address this, the Tanzania Ministry of Health(MoH), and stakeholders integrated the neonatal sepsis rate indicator into District Health Information System 2 (DHIS2), aiming to establish national, regional, council, and health facility data to inform decision-making, policy formulation and improve service delivery, hence reducing the NMR[6,7,8]. The Neonatal sepsis rate indicator is integrated into the DHIS2, which is reported monthly-routinely from all levels of health facilities in mainland Tanzania[8]. However, since the integration of this indicator into DHIS2, there is limited number of national neonatal sepsis data analysis that was done to assess the trends and variation of this indicator across the regions and health facilities[8]. Most of the previous studies in Tanzania were conducted in health facilities using primary data, limiting the availability of national and regional trends and variations of the neonatal sepsis rate indicator[9,10]. The analysis of this indicator in terms of trend and region variation may reflects the differences in health system performance, services availability, and quality of care[8].

Therefore, this study aimed to assess the trends, distribution and regional variation of the neonatal sepsis rate in Tanzanian health facilities using routine data from DHIS2 between 2021 and 2025. By leveraging these national aggregated data, this study will provide information on the temporal variations and geographical disparities in neonatal sepsis rates, contributing to ongoing efforts to strengthen neonatal care and IPC services in Tanzania.

Methodology

Study design and setting

The study used the descriptive cross-sectional study design using quantitative methods to analyzed the routine DHIS2 data collected from 138 health facilities in Tanzania from January 2021 to December 2025. The analysis was done using the aggregated services delivery data reported from 138 health facilities of all levels, which included dispensaries, health centers and hospitals that reported neonatal sepsis data.

Study population

This analysis involved 138 out of 148 health facilities, which report neonatal sepsis data in DHIS2 from January 2021 to December 2025. The 10 health facilities were not included in the analysis since they reported incomplete data missing some important variables for analysis. The 138 health facilities, 119 of which were public and 19 of which were privately owned across Tanzania, were registered in DHIS2 and actively submitted routine neonatal sepsis data during the period, as shown in Fig. 1.

Definition of neonatal sepsis rate

Neonatal sepsis cases reported by DHIS2 data from the health facilities were diagnosed by the WHO and Tanzania National Standard Treatment Guideline of 2020 as a clinical syndrome of an infant aged 0–28 days characterized by the systemic sign of infection with or without a positive blood culture presenting with one or more of the following signs and symptoms: not feeding well, convulsion, breathing rate more than 60 breaths per minute, severe chest indrawing, fever (temperature more than 37.6°C, hypothermia less than 36.6°C), and lethargy or unconsciousness. It was expressed as neonatal sepsis cases per 1,000 live births [11, 12].

Data source and variables

Neonatal sepsis data were extracted from the DHIS2 dataset. The primary outcome variable was the neonatal sepsis rate, which was defined as neonatal sepsis cases per 1,000 live births. The unit of reporting of neonatal sepsis rates was the health facilities, which reported data that were grouped (aggregated data) and collected routinely from the neonatal care unit outpatient department and inpatient department and postnatal units and reported monthly to DHIS2 from the health facilities by the facilities' DHIS2 focal persons.

Data management and Analysis

Data were extracted from DHIS2 and cleaned using Microsoft Excel version 20, where data quality checks were done by ensuring that the data collected were validated, complete, consistent, and of good quality before data analysis and data cleaning involved checking for completeness, consistency, duplicates, and outliers using filter and sort functions. Statistical data was analyzed using R programming version 4.5.0. Descriptive analysis was done using frequencies and proportions and expressed by cases per 1,000 live births. The changes in the neonatal sepsis rate across time in the facilities' levels, locations, neonatal sexes, and facility ownership. The health facilities were reporting neonatal sepsis rates grouped into three levels, which are tertiary level (national hospitals, specialized hospitals, and zonal hospitals), secondary level (regional referral hospitals and regional hospitals), and primary level (district hospitals, health centers, and dispensaries). The health facilities' ownership reporting of neonatal sepsis was grouped in two categories of ownership: public and private.

The trends were presented using the line graphs and figures showing the annual changes of neonatal sepsis rate from the study period, and variations were assessed by linear regression using the Ordinary Least Squares method, and the significance in variations was measured at 95% CI interval at $p\text{-value} \leq 0.05$.

Regarding geographical distribution, the neonatal sepsis rate was grouped into seven zones and 26 regions. In terms of seven zones, including Southern Highlands Zone, Coastal Zone, Lake Zone, Northern Zone, Western Zone, South West Highlands Zone, and Central Zone, by pooling all neonatal sepsis rates from 2021 to 2025 by summing up all numerators and denominators from 2021 to 2025 to create single pooled distributions. In the 26 regions, the neonatal sepsis data from each region were pooled by summing up all numerators and denominators from 2021 to 2025 of each respective region to create a single pooled neonatal sepsis rate by region, and the map was developed by QGIS version 3.6.3 to show the regions' distribution of neonatal sepsis rate.

Results

Demographic characteristics of health facilities reporting neonatal sepsis data

Of 138 health facilities included in the final analysis, the majority were publicly owned, 86.2% (119/138), while 13.8% (19/138) were of private ownership, with 69.6% (96/138) being from the primary level, 22.5% (31/138) being of the secondary level, and 8% (11/138) being of the tertiary level as shown in Table 1.

Table 1
Demographic characteristics of health facilities
reporting neonatal sepsis data from 2021 to 2025

Variables	N (%)
Number of Health Facilities N = 138	
Tertiary	11(8)
Secondary	31(22.5)
Primary	96(69.6)
Facility Ownership N = 138	
Public	119 (86.2)
Private	19 (13.8)
Total	138(100)

Tanzania mainland trend of neonatal sepsis rate

The findings show that the overall neonatal sepsis rate reported from selected health facilities decreased from 12.2 per 1,000 live births for the year 2021 to 10.9 per 1,000 live births for the year 2025, as shown in Fig. 2.

Neonatal sepsis rate trends by sex

The trend of neonatal sepsis rate among male neonates reported to decrease from 6.4 per 1,000 live births in the year 2021 to 5.7 per 1,000 live births in the year 2025. In terms of female neonates, the trend decreased from 5.8 per 1,000 livebirths in the year 2021 to 5.3 per 1,000 livebirths in the year 2025, as summarized in Fig. 3.

Trend of neonatal sepsis rates by health facilities levels

The primary health facilities reported the increase of the neonatal sepsis rate from 11.7 per 1,000 live births in the year 2021 to 12.4 per 1,000 live births in the year 2025. In the term neonatal sepsis rate reported from secondary health facilities decreases from 64.1 per 1,000 in the year 2021 live births to 41.9 per 1,000 live births in the year 2025. Regarding tertiary facilities, it increased from 7.9 per 1,000 in the year 2021 to 9.8 per 1,000 live births in the year 2025, but there was a sharp increase in the year 2024. However, the secondary-level health facilities reported a higher neonatal sepsis rate from 2021 to 2025 compared to primary and tertiary-level health facilities, as shown in Fig. 4.

Trend of neonatal sepsis rate by locations

The trend of neonatal sepsis rate reported to decrease from 21.5 per 1,000 live births to 14.5 per 1,000 live births in urban areas. In regard to the rural areas, the trend of neonatal sepsis rate increased from 8.2 per 1,000 live births to 9.7 per 1,000 live births. However, the urban areas reported a higher neonate sepsis rate compared to rural areas, as shown in Fig. 5.

Trend of neonatal sepsis rate by facilities' ownership

The neonatal sepsis rate reported in private health facilities decreased from 18.4 per 1,000 live births in the year 2021 to 14.3 per 1,000 live births in the year 2025, with a consecutive slight increase of live births from 280,711 births in the year 2021 to 281,712 in the year 2025. In public health facilities, the neonatal sepsis rate decreased from 10.9 per 1,000 live births in 2021 to 10.5 per 1,000 live births in 2025, while live births concurrently increased from 1,555,538 in 2021 to 2,155,240 in 2025, as shown in Fig. 6.

Distribution of neonatal sepsis rate pooled from 2021 to 2025

Neonatal sepsis rate trend by zones

The coastal zone reported the highest rate of neonatal sepsis of 17.8 per 1,000 live births compared to other zones; however, the southwest highland zone reported the lowest neonatal sepsis rate of 8.7 per 1,000 live births, as shown in Fig. 7.

Neonatal sepsis rate distribution by regions

The five regions that reported higher neonatal sepsis rates were Lindi (21.3 per 1,000 live births), Manyara (20.5 per 1,000 live births), Iringa (19.9 per 1,000 live births), Mtwara (19.5 per 1,000 live births), and Morogoro (18.7 per 1,000 live births). Furthermore, only two regions (Geita, 4.9 per 1,000 live births, and Rukwa, 4.5 per 1,000 live births) reported a less than 5 per 1,000 live births neonatal sepsis rate; however, the other 24 regions reported more than a 5 per 1,000 live births neonatal sepsis rate, as shown in Fig. 8.

Variations of Neonatal Sepsis rates trends in Tanzania mainland

The findings show that there was a slight overall decline in the neonatal sepsis rate reported from 12.2 per 1,000 live births in 2021 to 10.9 per 1,000 live births with an absolute reduction of 1.3 (95% CI: -1.5 to -1.1). However, the Ordinary Least Squares (OLS) was not statistically significant ($p = 0.101$). At the health facility levels, there substantial variability was observed, whereby secondary health facilities reported the highest neonatal sepsis rate across the study period with a marked reduction from 64.1 (difference: -22.2; 95% CI: -24.0 to -20.4) but was not significant

In terms of facilities ownership, both public and private health facilities showed declined trends with pronounced reduction at private health facilities (- 4.0; 95% CI: -4.7 to -3.4) compared to public health facilities (- 0.4; 95% CI: -0.6 to -0.2), although these variations were not statistically significant. Regarding sex disaggregation, the results showed a higher neonatal sepsis rate among male neonates compared to female neonates throughout the study period; however, both groups showed slight declines, but they were not statistically significant trends.

In terms of zones, there were geographical disparities across seven zones whereby the coastal and northern zones initially reported the highest neonatal sepsis rates but experienced notable declines by 2025. However, the lake zone showed an increased trend over five years, and the other zones showed mixed patterns with slightly increases; none of them were statistically significant. In terms of location, rural-urban variations revealed a higher neonatal sepsis rate in urban areas; however, urban areas showed a declining trend while rural areas showed gradual increases, and neither of them was statistically significant. The Variations of Neonatal Sepsis rates trends in Tanzania mainland from 2021 to 2025 is shown in Table 2.

Table 2
Variations of Neonatal Sepsis Rate (per 1,000 Live Births) in Tanzania mainland from 2021 to 2025 with 95% Confidence Interval

Neonatal Sepsis Rate (per 1,000) and 95% CI by Years							
	2021	2022	2023	2024	2025	Change 2021–2025(Diff, 95% CI)	p-value (OLS trend)
Overall	12.2 (12.1–12.4)	11.5 (11.4–11.7)	12.0 (11.8–12.1)	11.6 (11.5–11.8)	10.9 (10.8–11.1)	-1.3 (-1.5–-1.1)	0.101
Facility Level							
Tertiary	7.9 (6.9–8.8)	14.0 (12.7–15.2)	7.7 (6.8–8.7)	22.3 (20.6–24.0)	9.8 (8.7–11.0)	2.0 (0.5–3.5)	0.602
Secondary	64.1 (62.8–65.4)	65.7 (64.4–67.1)	76.8 (75.3–78.2)	78.1 (76.6–79.7)	41.9 (40.7–43.1)	-22.2 (-24.0–-20.4)	0.566
Primary	11.7 (11.5–11.9)	10.8 (10.6–11.0)	11.8 (11.6–12.0)	12.4 (12.2–12.6)	12.4 (12.2–12.5)	0.6 (0.3–0.9)	0.193
Facility Ownership							
Public	10.9 (10.8–11.1)	10.0 (9.9–10.2)	10.9 (10.8–11.1)	10.3 (10.1–10.4)	10.5 (10.4–10.7)	-0.4 (-0.6–-0.2)	0.702
Private	18.4 (17.9–18.9)	19.5 (19.0–20.0)	18.3 (17.8–18.8)	21.2 (20.7–21.8)	14.3 (13.9–14.8)	-4.0 (-4.7–-3.4)	0.511
Sex							
Female	5.8 (5.7–5.9)	5.5 (5.4–5.6)	5.7 (5.6–5.8)	5.5 (5.4–5.6)	5.3 (5.2–5.4)	-0.5 (-0.7–-0.4)	0.082
Male	6.4 (6.3–6.5)	6.0 (5.9–6.1)	6.3 (6.2–6.4)	6.1 (6.0–6.2)	5.7 (5.6–5.7)	-0.7 (-0.9–-0.6)	0.120
Zones							
Northern Zone	17.6 (17.1–18.2)	16.6 (16.1–17.1)	17.9 (17.4–18.4)	17.8 (17.3–18.3)	11.7 (11.3–12.0)	-6.0 (-6.6–-5.3)	0.244
Lake Zone	7.4 (7.2–7.6)	6.4 (6.2–6.6)	6.9 (6.7–7.1)	7.2 (7.0–7.4)	11.1 (10.8–11.3)	3.6 (3.3–4.0)	0.201
Central Zone	11.6 (11.1–12.1)	10.8 (10.3–11.3)	15.1 (14.5–15.7)	11.8 (11.3–12.3)	9.4 (9.0–9.8)	-2.2 (-2.9–-1.5)	0.683
Western Zone	8.4 (8.0–8.8)	9.8 (9.4–10.2)	8.5 (8.1–8.8)	8.3 (8.0–8.6)	9.1 (8.7–9.4)	0.7 (0.1–1.2)	0.940
Southern Highlands	16.1 (15.4–16.8)	13.2 (12.5–13.8)	13.7 (13.1–14.4)	13.6 (13.0–14.3)	12.4 (11.8–13.0)	-3.7 (-4.6–-2.8)	0.114
South West Highlands	8.5 (8.1–8.9)	8.2 (7.8–8.6)	10.3 (9.9–10.8)	7.6 (7.3–7.9)	9.1 (8.7–9.4)	0.6 (0.1–1.1)	0.885
Coastal Zone	20.1 (19.6–20.6)	20.0 (19.6–20.5)	17.9 (17.5–18.3)	19.3 (18.9–19.8)	12.8 (12.4–13.1)	-7.3 (-7.9–-6.8)	0.110
Location							
Urban	21.5 (21.2–21.9)	21.1 (20.7–21.5)	23.5 (23.2–23.9)	21.2 (20.8–21.6)	14.5 (14.2–14.8)	-7.1 (-7.5–-6.6)	0.242
Rural	8.2 (8.0–8.4)	7.5 (7.4–7.7)	7.4 (7.3–7.6)	8.2 (8.1–8.4)	9.7 (9.6–9.9)	1.5 (1.3–1.7)	0.237

Discussion

The study showed overall decrease in neonatal sepsis rates over the five-year period, with a high distribution in coastal zones and a lower distributed in lake zones; the regions reported highest neonatal sepsis rates were Lindi, Manyara, Iringa, Mtwara, and Morogoro. However, Geita and Rukwa regions reported the lowest neonatal sepsis rates. There were substantial variations in the trends of neonatal sepsis across different subgroups, although these variations were not statistically significant.

This study showed that the overall national neonatal sepsis trend declined in the study period which is consistent to the study done in Tanzania which showed that the trends is decreasing, the decreases in neonatal sepsis rate might be due to improvement of neonatal care services across all level of health facilities[11]. However, this finding is different from the study done in Burundi, which showed the increases of the trends of neonatal sepsis rate[12].

The trends of neonatal sepsis rate across the male and female neonates decrease consecutively; however, male neonates showed the highest neonatal sepsis rate compared to female neonates. This finding is similar to the study done in Tanzania, which showed that male neonates are more affected compared to female neonates. However, the study done in the United States showed that the trend of neonatal sepsis is the same across all neonates' sexes[13].

The primary health facilities reported an increase of the neonatal sepsis rate during the study period. On the other hand, the neonatal sepsis rate reported from secondary and tertiary health facilities decreases. However, the secondary-level health facilities reported a higher neonatal sepsis rate compared to primary and tertiary-level health facilities. These findings are consistent with the study done in Uganda, which showed similar findings, and different from the study done in Angola[14,15]. This higher increase in trends of neonatal sepsis at secondary health facilities may be due to an increased number of imported neonatal cases referred from primary health facilities.

The trend of neonatal sepsis rate reported to decrease in the study period in urban areas as compared to the rural areas, the where the trend of neonatal sepsis rate increased. However, the urban areas reported a higher neonate sepsis rate compared to rural areas. This is similar to the study done in Ethiopia and Uganda, which showed the higher neonatal sepsis rate in rural areas compared to urban [16,17]. These differences may be due to variation of services quality in rural compared to urban areas, where most of secondary and tertiary hospitals are located in urban areas.

Regarding the trend of neonatal sepsis rate by facilities' ownership, this study showed that the neonatal sepsis rate in private health facilities decreased during the study period with a consecutive slight increase of live births in the study period. However, in public health facilities, the neonatal sepsis rate decreased during the study period with slight increases in live births. The findings are similar to the study done in Tanzania which showed similar findings [18]. This is due to differences in the implementation of IPC programs across private and public facilities; most interventions are easily like supportive supervision, mentorships, and on-the-job training, which are mostly implemented in public.

This study highlighted the uneven distribution of neonatal sepsis rates across the five years in 7 zones and 26 regions in mainland Tanzania. Regarding the zones, the coastal zone reported the highest rate of neonatal sepsis compared to other zones; however, the southwest highland zone reported the lowest neonatal sepsis rate, which is similar to other studies done in Uganda and Sudan[19,20]. This study is similar to the study done in Uganda, which showed that the neonatal sepsis rate is unevenly distributed[21]. The highest distribution of neonatal sepsis rate in coast zones may be explained by the fact that most of the tertiary hospitals, which are referral centers, are located in coast zones, which increases the number of imported neonatal sepsis cases due to referrals from the peripheral health facilities in other zones. In terms of region distribution, the five regions that reported higher neonatal sepsis rates were Lindi, Manyara, Iringa, Mtwara, and Morogoro. This might be due to cultural practices like using local remedies for cold cramp treatment among pregnant women as well as limited adherence to IPC during labor and deliveries and neonatal care services in general, which expose neonates to infections at home[22]. Furthermore, only two regions, Geita and Rukwa, reported the highest and the lowest neonatal sepsis rates. This may be due to effective adherence to IPC standards at health facilities and at home after discharge from health facilities.

Based on the variations of neonatal sepsis trends, the findings show that there was a slight overall decline in the neonatal sepsis rate reported; however, the Ordinary Least Squares (OLS) was not statistically significant. This is similar to the study done in Kenya, which showed that there are variations but not significant ones[22]. This is not concurrent with the study done in the United Kingdom, which showed significant variation of neonatal sepsis trends across years[23].

In another end, this study highlighted that there were variations of neonatal sepsis across facility levels whereby there was substantial variability observed at secondary health facilities, but it was not statistically significant. Also, there was variation of neonatal sepsis rates by facility ownership, whereby both public and private health facilities showed declined trends with pronounced reductions in neonatal sepsis rates, although these variations were not statistically significant. This is similar to the study that was done in Saudi Arabia and United Kingdom which showed the same trends of neonatal sepsis trend reduction[24, 25]. The geographical locations, sex disaggregation of neonates, and geographical distributions across seven zones and 26 regions showed the limited changes in trends by increasing or decreasing, and neither of them was statistically significant.

Limitations of the study

This study has the following limitations:

1. The use of aggregated health facility data limited the ability to assess the individual-level risk factors and limited the causal inference estimation.
2. The variation in data quality across different health facilities in reporting completeness, neonatal sepsis diagnosis, and neonatal care services may introduce observed fluctuations.

3. The diagnosis of neonatal sepsis was largely based on either clinical criteria or laboratory confirmation depending on the level and capacity of health facilities since neonatal sepsis diagnosis varies from one level to another and from facility to facility.

Conclusion and recommendations

Conclusion

Generally, this study showed a slight overall decrease in neonatal sepsis rates over the five-year period, with a high distributed in coastal zones and a lower prevalence in lake zones; the regions with the highest neonatal sepsis rates were Lindi, Manyara, Iringa, Mtwara, and Morogoro. However, Geita and Rukwa regions reported the lowest neonatal sepsis rates. There were substantial variations by either increases or decrease in the trends of neonatal sepsis across different subgroups, although these variations were not statistically significant.

Recommendations

Based on the findings, we recommend the following to the MoH, PMO-RALG, Region Health Management Teams (RHMTs), Council Health Management Teams (CHMTs), Health Facility Management Teams (HMTs), and healthcare providers:

1. To strengthen IPC interventions, particularly in high-burden zones and regions, primary and secondary health facilities, and by routine IPC supportive supervisions, mentorships, and on-the-job trainings.
2. To enhance quality and reliability of routine neonatal sepsis data quality; This includes improving the data quality verification mechanism and capacity building of healthcare providers on data management and uses in order to reduce inconsistency observed in non-significant trends and variations.
3. To prioritize the high-quality neonatal care services and IPC interventions in urban areas with higher live births by strengthen postnatal services, improve neonatal care services, and ensure early detection and management of neonatal sepsis infections.

Declarations

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Authors Contributions

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Data availability

The datasets analyzed in this study are not publicly available due to privacy concerns, ethical constraints, and institutional policies but can be obtained from MoH via ps@afya.go.tz upon reasonable request.

Ethics approval

This study used the secondary aggregated data from DHIS2; therefore, the patient's information was not identified, and the data set was confidentially stored using the username and password-protected computers. However, permission to use this data was approved by the Tanzanian MoH and ethical clearances were waived from the National Institute of Medical Research (NIMR) with ethical clearance number NIMR/HQ/R.8a/Vol.IX/505. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and the Council for International Organization of Medical Sciences, the International Ethical Guideline for Health Research Involving Human as well as Tanzania Research Guidelines from NIMR and MoH.

Consent to participate in this study

Written informed consent or assent were not required in this study because this study involved secondary data analysis of aggregated and non-identifiable DHIS2 data. There were no individuals with more than 18 years old or below 18 years old contracted, recruited or identifiable in the dataset used in this study.

Consent to publish

All authors voluntarily agreed to publish this study.

Clinical trial registration

This study was not a clinical trial

Clinical trial number

Not applicable

Competing interests

The authors declare no competing interests.

Disclaimer

The MoH as well as all stakeholders who implemented IPC Monitoring Evaluation, had no role in the writing of the article. The findings and conclusions contained within are those of the authors and do not necessarily reflect the positions or policies of the Ministry and other stakeholders.

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