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Maternal Mortality in East Lombok: Recent Trends, Clinical Concerns, and Future Recommendations

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Abstract: The worldwide maternal mortality ratio (MMR) should be below 70 deaths per 100,000 live births in 2030. In the context of Indonesia, the MMR (189) and West Nusa Tenggara Province exceeds the national MMR to 257. MMR of East Lombok Regency was 118.5 deaths per 100,000 live births at 2024, it requires the recent trends in regency level, find the clinical cause and propose the future recommendations. Based on the trend in the last 2020-2024, East Lombok Regency experienced fluctuation rate. Based on the data from Department of Health of East Lombok Regency, the clinical causes of maternal mortality ratio from 2020 to 2024 are hemorrhage, infection, hypertension in pregnancy, cardiovascular disorder, metabolic disorder, covid-19, and others. Several recommendations to be considered are improving emergency response & referral systems, improving emergency response & referral systems, addressing socioeconomic and cultural barriers, and strengthening data monitoring and policy implementation

Keywords: Clinical Cause; Future Recommendations; Maternal Mortality Ratio; Trends

Introduction

Maternal mortality ratio or known as MMR is a parameter of maternal and child health that showed by the number of maternal deaths caused by complications of pregnancy or childbirth per 100,000 live births. Based on clinical findings of global and national research, the high number of MMR are caused by complications during pregnancy or the birth process, such as heavy bleeding, infections, unsafe abortions, and conditions such as HIV/AIDS. In Indonesia, maternal mortality is still a major public health issue since it is a vital sign of women's well-being and the efficiency of healthcare systems (Daningsih et al., 2023; Kurnianingtyas et al., 2024). By 2030, the worldwide maternal mortality ratio (MMR) should be below 70 deaths per 100,000 live births, according to the Sustainable Development Goals (SDGs) (WHO, 2019, 2023). In the context of Global MMR, it is presented the number of 223 per 100,000 live births at 2020 (WHO, 2023). Similarly, based on figure 1, Indonesia's MMR was far higher than the SDGs target as of 2020, at 189 per 100,000 live births (WHO, 2023).

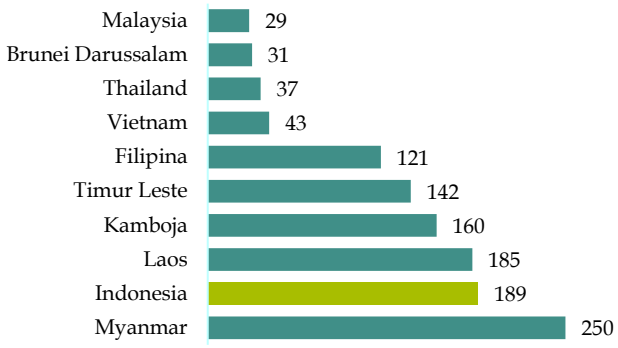

Figure 1. Maternal Mortality Ratio across ASEAN countries 2020.

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In the context of East Lombok, a district in West Nusa Tenggara Province, maternal mortality rates have been notably high. The data from department of health of East Lombok district shows Mortality Rate Ratio consistently above the target of WHO. MMR of East Lombok was 118.5 deaths per 100,000 live births at 2024. These findings are caused by many factors, such as mothers not doing antenatal, delivery, and postpartum care (ANC), delays in decision-making by families, and potential failures within the referral process, raising concerns about systemic issues compromising maternal health emergencies.

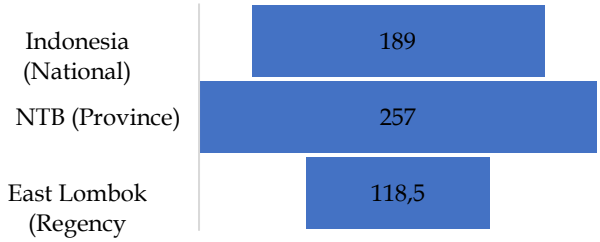


Figure 2. Comparison MMR between National, Province and Regency, 2024

Based on the MMR trends in East Lombok Regency, it is essential to explain quantitatively about the trends in details (Hryciw et al., 2024; Wang et al., 2024; Xi et al., 2024). Furthermore, presenting the clinical cause of MMR, then proposing the future agendas to reduce the MMR in East Lombok Regency.

Method

This research used both quantitative and qualitative approach. The quantitative method used descriptive model to explain the data about the trends of maternal mortality ratio (MMR). Moreover, qualitative approaches are used to present the causes of maternal mortality ratio in East Lombok and propose future recommendations. In this research, the data collected through several ways are at Department of Health of East Lombok Government, current research and publication, and through deep interview with related actors. Both data of mother deaths and live births are in annual number. This research used a form of MMR calculation (Formula 1).

$$MMR = \left(\frac{The\ Number\ of\ Mother\ Deaths}{Total\ of\ Live\ Births}\right) x\ 100{,}00 \quad (1)$$

Note:

- MMR : Maternal Mortality Ratio
- The Number of Mother Date (Person/Year)
- Total of Live Births (Person/Year)

Result and Discussion

In the context of Maternal Mortality Ratio (MMR), the data collected by the department of health from the health facilities in subdistrict level, known as puskesmas. Puskesmas or Public Health Center is a technical implementation unit of regency health department that has the primary function as a first level health care provider. The working area standard of public health centers are one district and to reach their working areas, have a service network covering subsidiary of public health center, mobile public health center units, and midwife units (Regulation of the Minister of Health of Indonesia Number 75 Year 2014 about Public Health Center). East Lombok Regency has 21 subdistricts, are Keruak, Jerowaru, Sakra, Sakra Barat, Sakra Timur, Terara, Montong Gading, Sikur, Masbagik, Pringggasela, Sukamulia, Suralaga, Selong, Pringgabaya, Suela, Aikmel, Wanasaba, Sembalun, Lenek and Sambelia. Each subdistrict has at least one public health center or known as Puskesmas. Fortunately, East Lombok has 35 public health centers distributed across the regency (BPS, 2024).

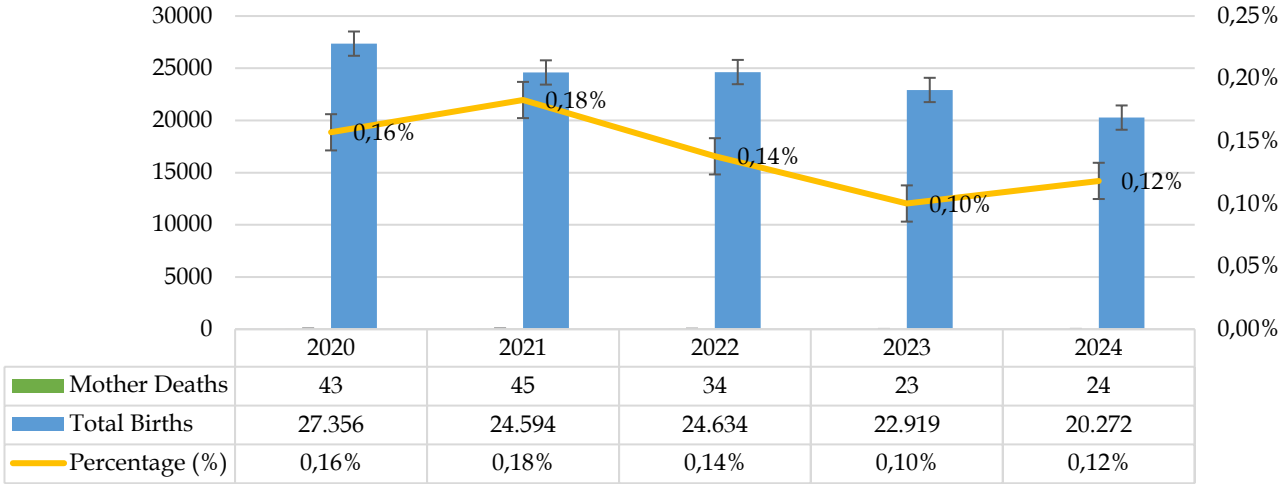
Recent Trends

In this section, we will present the trends of total births, live births, maternal deaths, and the Maternal Mortality Ratio (MMR) over the last five years, from 2020 to 2024 (Nishimura et al., 2024). These indicators are crucial for understanding the overall health and safety of childbirth in each population. By examining these trends, we aim to highlight any improvements or challenges in maternal health and to better understand the factors influencing maternal outcomes. The data will allow for a comparison of changes in the total number of births, live births, and maternal deaths, and how these correlate with shifts in the Maternal Mortality Ratio (MMR). This analysis will provide insights into the effectiveness of healthcare interventions and policies, such as improved maternal care, access to skilled birth attendants, and emergency obstetric services. By tracking these trends over time, we can also identify areas for improvement and inform future strategies aimed at reducing maternal mortality and improving maternal health outcomes.

Table 1. Maternal Mortality Ratio, 2020-2024

Year	Total of Live Births	Number of Mother Deaths	Maternal Mortality Ratio (MMR)
2020	27.313	43	157.4
2021	24.549	45	183.3
2022	24.600	34	138.2
2023	22.896	23	100.5
2024	20.248	24	118.5

We calculate the Maternal Mortality Ratio (MMR) in East Lombok Regency based on Formula 1, which involves dividing the number of maternal deaths by the total number of live births, and then multiplying the result by 100,000. This formula provides a standardized measure of maternal mortality relative to the number of live births in the region. The results of the MMR calculation are presented in Table 1, which shows the calculated values for each year under analysis.



	2020	2021	2022	2023	2024
Mother Deaths	43	45	34	23	24
Total Births	27.356	24.594	24.634	22.919	20.272
Percentage (%)	0,16%	0,18%	0,14%	0,10%	0,12%

Figure 3. Mother Deaths and Total Births, 2020-2024

Based on figure 3, the trends of mother deaths fluctuated each year. In 2020, the number of mother deaths in East Lombok is 43 cases (0.16% of total births). This number increased to 45 mother deaths (0.18%) in 2021. Although, there were decline trends for two years, 34 mother deaths (0.14%) in 2022 and 23 deaths (0.10%) in 2023 respectively. However, it inclined softly to 24 mother deaths (0.12%) in 2024.

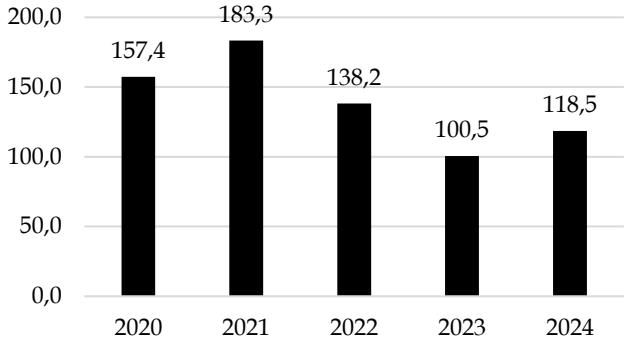


Figure 4. Maternal Mortality Ratio (MMR)

Based on Figure 4, the maternal mortality ratio in east Lombok experienced fluctuation from 2020 to 2024, like the number of mother deaths trends. At 2020, the MMR of East Lombok was 157.4 of 100,000 live births. It increased to 183.3 in 2021. In 2022 and 2023 were declining to 138.2 and 100.5, respectively. Even though the trend was inclined to 118.5 in 2024. All these ratios were far away from the global target (70 of 100,000 live births).

Clinical Concerns

Clinical concerns refer to the medical reason of the high rate of maternal mortality ratio. Based on the data from Department of Health of East Lombok Regency, the clinical causes of maternal mortality ratio from 2020 to 2024 are hemorrhage, infection, metabolic disorder, hypertension in pregnancy, cardiovascular disorder, covid-19, and others. These clinical causes are suitable with research findings across Indonesia (Giena et al., 2022; Julizar et al., 2019; Mahmood et al., 2018; Noor et al., 2018; Pertiwi et al., 2021; Soultoni Akbar et al., 2022). In the context of East Lombok Regency, we divide it into annual causes summaries. In this section we summarize the clinical cause annually and presented in percentage.

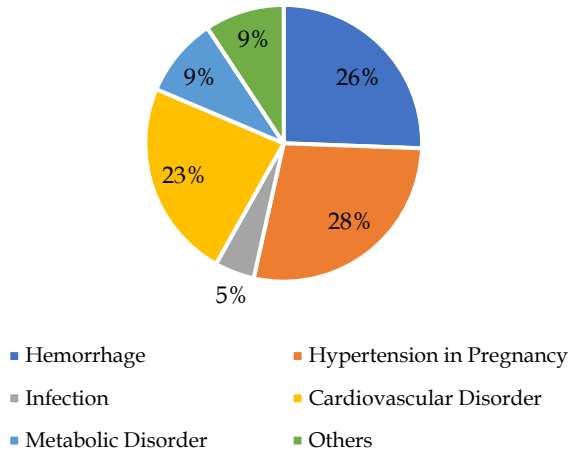


Figure 5. Clinical Cause of MMR in East Lombok Regency, 2020

Based on Figure 5, it is seen that in 2020, there were three main clinical causes of maternal mortality ratio in East Lombok Regency, hypertension in pregnancy (28%) following with hemorrhage (26%) and cardiovascular contributions (23%). While other causes are below 10%, both metabolic disorder and others cause contribute 9%, then infection (5%).

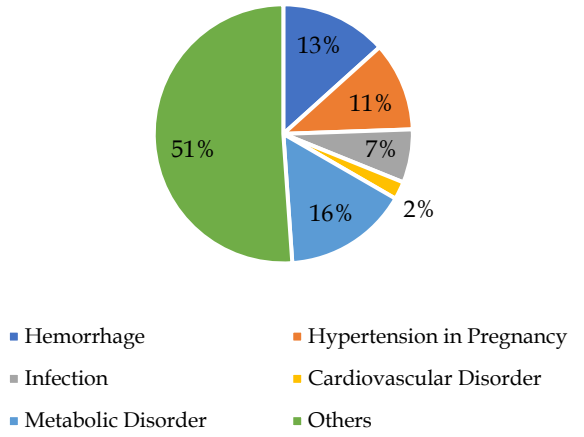


Figure 6. Clinical Cause of MMR in East Lombok Regency, 2021

Based on figure 6, we identified that others cause contribute to 51% to maternal mortality in East Lombok Regency 2021. Moreover, the metabolic disorder (16%), hemorrhage (13%), hypertension in pregnancy (11%), while infection and cardiovascular disorder are 7% and 2% respectively (Meh et al., 2022; Zhang et al., 2023).

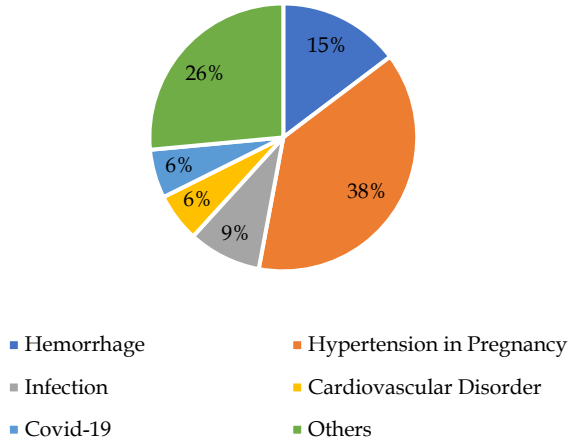


Figure 7. Clinical Cause of MMR in East Lombok Regency, 2022

Based on figure 7, hypertension in pregnancy (38%) became the popular cause of maternal mortality in East Lombok Regency 2022. The second concern is others cause (26%), following with hemorrhage (15%). On the other hand, the rest causes counted to 21% divided into infection (9%), covid-19 (6%) and cardiovascular disorder (6%).

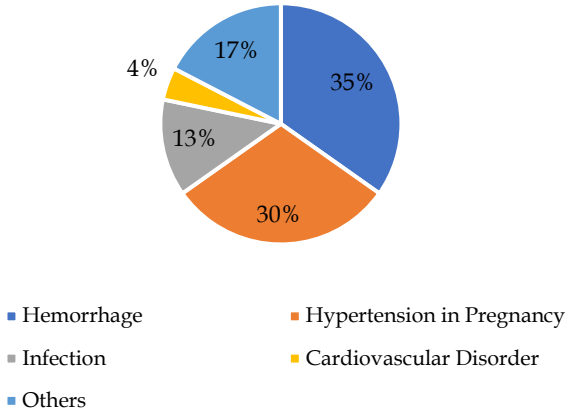


Figure 8. Clinical Cause of MMR in East Lombok Regency, 2023

Based on figure 8, we can see those two main clinical reasons of MMR in East Lombok Regency 2023, are hemorrhage (35%) and followed by hypertension in pregnancy (30%). Further causes of MMR are others (17%), infections (13%) and cardiovascular disorder (4%).

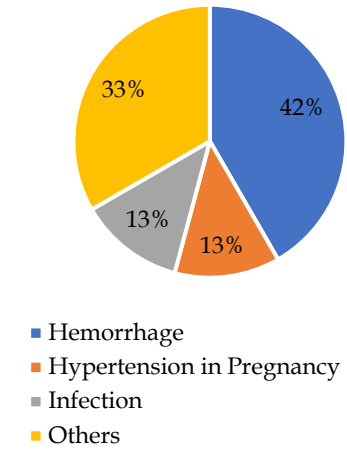


Figure 9. Clinical Cause of MMR in East Lombok Regency, 2024

Based on figure 9, there were 4 (four) causes of MMR in East Lombok Regency in 2024. Hemorrhage took a majority of 42%, followed by others (33%). These two causes contributed to 75% of MMR. While both hypertension and infection had similar contribution, were 13%.

Future Recommendations

Based on the maternal mortality trends and its clinical cause, it leads to proposed implementable solutions (Syairaji et al., 2024). The recommendations are

based on the findings, research and other related references. Reducing the Maternal Mortality Ratio (MMR) at the regency (district) level requires a multi-sectoral approach involving healthcare improvements, policy interventions, and community engagement. Few strategies are possibly implemented at East Lombok Regency, following by:

1. *Strengthen Maternal Healthcare Services* (Fibriana et al., 2016; Istifa et al., 2021; Kyambille et al., 2024; Nisa et al., 2022; Yuriati, 2016):
   - Increase Access to Quality Maternal Care such as ensuring all health facilities provide Basic Emergency Obstetric and Neonatal Care (BEmONC) and Comprehensive Emergency Obstetric and Neonatal Care (CEmONC).
   - Strengthen referral systems between community health centers (Puskesmas) and hospitals.
   - Improve Antenatal, Delivery, and Postnatal Care through strengthening the implementation of at least four antenatal care (ANC) visits as recommended by WHO.
   - Promote institutional deliveries with skilled health professionals.
   - Ensure postnatal care within 48 hours of delivery, focusing on monitoring complications.

2. *Improve Emergency Response & Referral Systems* (Azmi Meisari, 2021; Listyorini & Wijananto, 2019a, 2019b; Luluk, 2020; Mulyono & Umaroh, 2023; Pohan et al., 2021; Wibowo et al., 2023; Widyantari & Dayani, 2023):
   - Establish maternal emergency call centers and quick response teams, then provide ambulance service, especially in remote areas.
   - Strengthen coordination between Puskesmas, district hospitals, and provincial hospitals.

3. *Address Socioeconomic & Cultural Barriers* (Diarsvitri & Utomo, 2022; Erlina Puspitaloka Mahadewi et al., 2021; Hidayatun Saliha, Nanik Rahmawati, 2019; Janti, 2021; Krishnan et al., 2011; Marsilia, 2019; Pascapurnama et al., 2018)
   - Improve Health Education & Awareness, through several programs like conducting maternal health education programs targeting pregnant women, families, and community leaders. Then, promoting family planning services and access to contraceptives to prevent high-risk pregnancies.
   - Community-Based Interventions through strengthening the role of village midwives (Bidan Desa) and community health workers (Kader Posyandu). Moreover, utilizing local religious and traditional leaders to address myths and encourage hospital deliveries.
   - Financial Support & Health Insurance by ensuring full coverage of maternal health under JKN (National Health Insurance) schemes. Hence, implementing financial aid programs for poor families to access maternal care.

4. *Strengthen Data Monitoring & Policy Implementation* (Anggraini & Rahayu, 2017; Markam et al., 2021; Pandiangan & Erlinda Muslim, 2022):
   - Improve Maternal Death Audits (PWS-KIA, MPDSR) through conducting routine maternal death reviews to identify causes and improve services. Furthermore, use data-driven policies to target high-risk areas.
   - Strengthen Government Commitment & Budget Allocation, through increasing regency-level budget for maternal health programs. Then, improving collaboration between health departments, local government, and NGOs.

Conclusion

The trends of Maternal Mortality Ratio (MMR) in East Lombok Regency from 2020 to 2024 showed fluctuation. The clinical cause of MMR in East Lombok regency also explained annually which conclude to several case, are hemorrhage, infection, metabolic disorder, hypertension in pregnancy, cardiovascular disorder, covid-19, and others. Furthermore, it requires collaboration multi-sectors to achieve MMR of 70 per 100,000 live births by 2030. Several recommendations to be considered are improving emergency response & referral systems, improving emergency response & referral systems, addressing Socioeconomic & Cultural barriers, and strengthening data monitoring & policy implementation

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Author Contributions
In this research, we divided the work into a team. Novya Prabawati is responsible for making comprehensive background and research methodology. Furthermore, Dewa Made Sucipta contributes to data analysis and interpretation. Nurul Hidayati is responsible for checking the conclusion and references.

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Conflicts of Interest
The authors declare no conflict of interest.

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