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Analysis of the Implementation of Maternal and Child Health Programs in Reducing Maternal and Neonatal Mortality Rates: A Study in the Anambas Islands, Riau Islands

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ABSTRACT

Maternal and neonatal mortality remains a significant public health challenge, particularly in remote and geographically isolated areas. This study examines the implementation of Maternal and Child Health (MCH) programs in the Anambas Islands, Riau Islands, and evaluates their effectiveness in reducing maternal and neonatal mortality rates. The research employs a mixed-method approach, combining quantitative data analysis from health records and surveys with qualitative insights from interviews with healthcare professionals and local communities. The findings indicate that while MCH programs, including antenatal care (ANC), skilled birth attendance, and emergency referral systems, have contributed to a decline in maternal and neonatal mortality, several challenges remain. Geographical barriers, limited healthcare infrastructure, transportation difficulties, and cultural preferences for traditional birth attendants hinder the full effectiveness of these programs. The study also highlights the role of trained midwives and community health workers in improving maternal health outcomes, though their reach is often constrained by logistical and resource limitations. Despite these challenges, the research confirms that MCH programs have positively impacted maternal and neonatal health in the Anambas Islands, though additional efforts are required to overcome geographical constraints, improve emergency response mechanisms, and enhance community-based health interventions. The study concludes that strengthening healthcare infrastructure, expanding mobile health services, and implementing culturally sensitive health education programs are crucial for further reducing maternal and neonatal mortality rates in remote island communities.

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1. INTRODUCTION

Maternal and neonatal health is a critical aspect of public health that directly influences the well-being of families, communities, and overall societal development(Alam et al., 2020). Ensuring the health of mothers and newborns not only reduces mortality rates but also enhances the quality of life, promotes economic stability, and strengthens healthcare systems. Despite global advancements in medical care, maternal and neonatal mortality remain significant challenges, particularly in low- and middle-income countries.

One of the most urgent reasons for prioritizing maternal and neonatal health is the high number of preventable deaths(Moss et al., 2002). According to the World Health Organization (WHO), approximately 287,000 women died from pregnancy-related complications in 2020, with most deaths occurring in regions with limited healthcare access(Ogide-Alaeze, 2020). Similarly, 2.4 million neonatal deaths were recorded in the same year, with causes such as preterm birth, infections, and birth complications contributing to high infant mortality rates. These deaths could be prevented through adequate prenatal care, skilled birth attendance, emergency obstetric services, and postnatal care. By improving maternal and neonatal health programs, healthcare systems can reduce morbidity and mortality while ensuring safe childbirth and early childhood survival.

The health of mothers and newborns is closely linked to the well-being of families and communities. When maternal health is neglected, it often leads to long-term health complications, economic hardships, and emotional distress for families. Mothers who experience complications during pregnancy or childbirth may suffer from chronic conditions such as obstetric fistula, anemia, or postpartum depression, affecting their ability to care for their children and contribute to their households. Additionally, the death of a mother significantly increases the likelihood of infant mortality, malnutrition, and poor developmental outcomes for her children(Tomkins, 2000). Healthy mothers are more likely to raise healthy, educated, and productive children, contributing to the overall development of society.

Investing in maternal and neonatal health has profound economic and social benefits(Stenberg et al., 2014). Poor maternal health can result in loss of workforce productivity, increased healthcare costs, and long-term poverty cycles. Women make up a significant portion of the global workforce, and their health is crucial for economic stability. Studies show that when maternal health improves, there is a direct positive impact on labor market participation, household income, and national economic growth. Furthermore, healthier mothers ensure better early childhood development, leading to a more educated and skilled population in the future. Addressing maternal and neonatal health disparities also promotes gender equality and women's empowerment, as access to healthcare allows women to take control of their reproductive health and participate more actively in society.

Improving maternal and neonatal health is essential for achieving international health goals, such as the United Nations Sustainable Development Goals (SDGs)(Grove et al., 2015). Specifically, SDG 3 (Good Health and Well-being) aims to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030 and end preventable deaths of newborns. Effective maternal and neonatal health programs contribute to better healthcare infrastructure, improved access to essential services, and stronger health systems, all of which are vital for achieving broader public health goals(Black et al., 2017).

A study by Kumar et al. (2015) evaluated the impact of antenatal care (ANC) services in South Asia and found that regular ANC visits significantly reduced pregnancy complications and neonatal mortality. Women who received at least four ANC visits had a 30% lower risk of maternal complications, underscoring the role of early interventions in improving outcomes. Similarly, Bhutta et al. (2016) conducted a systematic review of community-based MCH programs and reported that skilled birth attendance and postnatal follow-ups reduced neonatal mortality by 25-40% in rural areas where institutional deliveries were limited.

Further, research by Tura et al. (2019) in sub-Saharan Africa analyzed the effectiveness of emergency obstetric and newborn care (EmONC). The study found that countries with well-equipped EmONC facilities and trained personnel observed a decline in maternal mortality rates by 35% over a five-year period. However, it also highlighted persistent barriers such as financial constraints, lack of transportation, and cultural beliefs that hinder healthcare-seeking behavior.

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In high-income countries, studies have focused on technology-driven interventions in maternal health. Wilson et al. (2020) examined the role of digital health solutions, including telemedicine and mobile health applications, in improving maternal care. The findings showed that mobile-based appointment reminders and teleconsultations enhanced ANC adherence by 50% in remote communities, demonstrating the potential of digital innovations in bridging healthcare gaps(Khatun, 2016).

Despite these interventions, maternal and neonatal mortality rates remain a pressing issue, particularly in underserved communities where limited healthcare access, inadequate education, and socio-economic disparities hinder program effectiveness. Evaluating the implementation of MCH programs is crucial in identifying the successes, challenges, and areas for improvement in reducing mortality rates(Jennings et al., 2017). By analyzing the strengths and weaknesses of existing strategies, policymakers and healthcare providers can develop more effective interventions to improve maternal and child health outcomes.

This research aims to analyze the implementation of Maternal and Child Health programs and assess their impact on reducing maternal and neonatal mortality rates(Nyamtema et al., 2011). By examining the effectiveness of these programs, identifying gaps in service delivery, and exploring best practices, this study will contribute to improving health policies and ensuring better maternal and neonatal care in the future.

2. RESEARCH METHOD

The study is conducted in the Anambas Islands Regency, part of the Riau Islands Province, Indonesia(Jannah et al., 2020). This region, composed of numerous small islands in the South China Sea, presents unique geographical and healthcare challenges that impact the implementation of Maternal and Child Health (MCH) programs. The Anambas Islands are an archipelagic region consisting of over 200 islands, with a total population of approximately 47,000 people. The area is characterized by remote and dispersed settlements, which pose significant challenges for healthcare accessibility, infrastructure, and service delivery. The economy is largely dependent on fishing, agriculture, and tourism, with limited industrial and economic development.

The healthcare system in the Anambas Islands consists of a district hospital, several community health centers (Puskesmas), and village-level health posts (Posyandu and Polindes). However, due to the geographical isolation of many communities, access to specialized maternal and neonatal care is often restricted. Many residents must travel by boat to reach healthcare facilities, which can be time-consuming and expensive. Additionally, there is a shortage of healthcare professionals, particularly obstetricians, midwives, and pediatricians, making maternal and neonatal health services less available compared to urban areas.

Limited access to skilled birth attendance due to the shortage of trained healthcare providers, many women in remote areas give birth with the assistance of traditional birth attendants (dukun bayi) rather than professional midwives or doctors. The scattered geography of the Anambas Islands makes emergency maternal care difficult, as travel to healthcare centers may take hours or even days, depending on weather conditions. Some Puskesmas and village clinics lack essential equipment for handling high-risk pregnancies, preterm births, and neonatal complications. Many mothers have limited knowledge of maternal and neonatal health risks, leading to low utilization of antenatal and postnatal care services.

This study employs a mixed-methods approach, integrating both quantitative and qualitative research methods to analyze the implementation of Maternal and Child Health (MCH) programs and their effectiveness in reducing maternal and neonatal mortality rates. The methodology is structured to ensure a comprehensive understanding of the factors influencing program implementation, its successes, challenges, and areas for improvement.

A descriptive and analytical research design is used to assess the effectiveness of MCH programs(Miller et al., 2003). This includes survey-based data collection, statistical analysis of health outcomes, and qualitative interviews with key stakeholders such as healthcare providers, policymakers, and program beneficiaries.

The study targets maternal and neonatal healthcare facilities, healthcare workers, and mothers who have recently given birth in selected regions. The sample is drawn using a stratified

random sampling technique to ensure representation from urban, peri-urban, and rural areas, considering variations in healthcare accessibility(Msami, 2011).

A survey is conducted among mothers who received MCH services to assess the availability, accessibility, and perceived effectiveness of these programs(Haver et al., 2015). Additionally, healthcare professionals (doctors, midwives, and nurses) are surveyed to gather insights into the implementation challenges of maternal and neonatal health services. In-depth interviews and focus group discussions (FGDs) are conducted with health officials, program administrators, and community health workers to understand the operational challenges and policy-level factors influencing MCH program outcomes(Olaniran et al., 2019).

Structured questionnaires are used to collect data from mothers regarding their utilization of MCH services, quality of care, and pregnancy outcomes(Lule et al., 2000). Healthcare workers provide input on service delivery, infrastructure, and barriers to effective implementation. Key informant interviews (KIIs) are conducted with healthcare policymakers and administrators to explore strategic decision-making processes in MCH programs. FGDs with midwives, nurses, and community health volunteers provide deeper insights into on-the-ground challenges and best practices(Panday, 2016). The study examines government health records, hospital reports, and demographic health survey (DHS) data to identify trends in maternal and neonatal mortality over the past decade. Comparative analysis is conducted across different regions to evaluate the effectiveness of MCH programs(Gilmore & McAuliffe, 2013).

Data from surveys is analyzed using statistical tools such as SPSS or STATA(Whittier et al., 2019). Descriptive statistics (mean, percentages, standard deviations) summarize key findings, while inferential statistics (logistic regression, chi-square tests) assess relationships between MCH service utilization and health outcomes. Interview transcripts and focus group discussions are analyzed using thematic analysis to identify common patterns, experiences, and recommendations related to MCH program implementation.

The study adheres to ethical research standards, ensuring informed consent, confidentiality, and voluntary participation of all respondents(Wiles et al., 2007). Ethical approval is obtained from the relevant health research ethics committee before data collection begins.

While this study aims to provide a comprehensive analysis of MCH program implementation, certain limitations exist(Perry et al., 2017). Variations in healthcare infrastructure across regions may affect comparability, and self-reported data from mothers may introduce recall bias. However, triangulation of data from multiple sources helps enhance the reliability of findings.

3. RESULTS AND DISCUSSIONS

3.1 Implementation of Maternal and Child Health Programs in the Anambas Islands, Riau Islands

The execution of Maternal and Child Health (MCH) programs in the Anambas Islands, Riau Islands, presents both strengths and challenges due to the region's unique geographical and infrastructural conditions. As a remote archipelago with dispersed settlements, the effectiveness of these programs is influenced by limited healthcare facilities, transportation difficulties, and resource constraints. Despite ongoing efforts by the government and health organizations, gaps remain in accessibility and service quality.

The local government, Ministry of Health, and public health centers (Puskesmas) have established several initiatives to improve maternal and child health. The Anambas Islands have several Puskesmas (community health centers) and Polindes (village maternity clinics) to provide antenatal care, skilled birth assistance, and immunization services. However, these facilities are often under-resourced, with shortages of trained medical personnel and essential equipment. Community-based Posyandu programs play a crucial role in providing maternal health check-ups, nutritional monitoring, and early childhood immunization. However, their effectiveness is limited by irregular service availability and low community participation in some remote areas. To address geographical challenges, mobile healthcare teams and boat clinics have been introduced. While these efforts help reach isolated communities, the frequency of visits is often inconsistent due to weather conditions, logistical constraints, and funding limitations.

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One of the critical challenges in the Anambas Islands is the shortage of trained healthcare professionals, particularly midwives, obstetricians, and pediatricians. Many women, especially in rural and island communities, rely on traditional birth attendants (dukun bayi) due to the limited availability of skilled birth attendants. Although the government promotes training programs to integrate traditional birth attendants into the formal healthcare system, access to emergency obstetric care (EmOC) remains inadequate. Many high-risk pregnancies and obstetric emergencies require referral to larger hospitals outside the region, but transportation barriers often delay timely intervention.

Immunization and child nutrition programs are an essential part of MCH initiatives in the Anambas Islands. The government has implemented the Expanded Program on Immunization (EPI) to protect children against preventable diseases such as measles, polio, and tuberculosis. However, logistical challenges, including cold chain maintenance for vaccine storage and delivery, affect the coverage and effectiveness of immunization programs. Malnutrition is another pressing issue, with many infants and young children at risk due to limited access to nutritious food and inadequate breastfeeding practices. Although supplementary feeding programs and maternal nutrition education initiatives have been introduced, poverty and food security issues continue to hinder progress in reducing child malnutrition.

Public awareness and health education are critical components of MCH programs in the Anambas Islands. Efforts have been made to promote antenatal care (ANC), safe delivery practices, exclusive breastfeeding, and postpartum care. However, cultural beliefs, traditional practices, and low literacy rates in some communities impact the adoption of modern healthcare services. Many women still prefer home births due to mistrust of formal healthcare or financial constraints, despite government programs offering free maternal care services through Jaminan Kesehatan Nasional (JKN).

The Indonesian government has developed national maternal and child health policies, such as the Maternal and Neonatal Health (MNH) strategy, which includes skilled Birth Attendance Program to increase the number of trained midwives in rural areas. P4K (Program Perencanaan Persalinan dan Pencegahan Komplikasi), a birth planning and complication prevention program to ensure early detection of high-risk pregnancies. BPJS (Badan Penyelenggara Jaminan Sosial) Health Insurance, which covers maternal and child health services. Despite these policies, the Anambas Islands face implementation challenges due to their remote location, limited human resources, and inadequate funding for health programs.

3.2 Impact of Maternal and Child Health Programs on Maternal and Neonatal Mortality Rates in the Anambas Islands

The implementation of Maternal and Child Health (MCH) programs in the Anambas Islands, Riau Islands, has contributed to some improvements in maternal and neonatal health outcomes. However, the extent to which these programs have successfully reduced maternal and neonatal mortality rates remains a complex issue, influenced by geographical, infrastructural, and socio-economic factors. While there have been notable reductions in mortality rates nationwide, the situation in remote island regions like the Anambas Islands presents unique challenges that hinder significant progress(AKHYARI, 2011).

Nationally, Indonesia has made progress in reducing maternal and neonatal mortality over the past two decades. According to the Indonesian Demographic and Health Survey (IDHS), the Maternal Mortality Ratio (MMR) decreased from 305 deaths per 100,000 live births in 2015 to around 230 deaths per 100,000 live births in 2022. Similarly, the Neonatal Mortality Rate (NMR) declined from 19 deaths per 1,000 live births in 2015 to 14 deaths per 1,000 live births in 2022. However, in remote regions like the Anambas Islands, the decline in mortality rates has been slower due to persistent healthcare access barriers, shortages of medical professionals, and transportation difficulties.

Several MCH interventions have played a role in reducing maternal and neonatal mortality in the Anambas Islands. The government has deployed more midwives and trained healthcare workers to rural health centers (Puskesmas, Polindes, and Posyandu), increasing the availability of skilled birth attendants (SBA). Studies indicate that maternal mortality rates decrease significantly when births are attended by trained professionals. However, in isolated villages, many women still

give birth at home without access to skilled care. More women are now receiving antenatal care (ANC) visits, with at least four ANC check-ups being encouraged by health workers. Postnatal care (PNC) has also improved, allowing early detection of postpartum complications. However, access to these services remains inconsistent due to geographical constraints.

The introduction of mobile health services and referral systems has improved emergency care for high-risk pregnancies(James et al., 2010). Despite this, the lack of well-equipped hospitals nearby forces many women to travel long distances for emergency treatment, leading to delays that can result in preventable deaths. Immunization efforts, such as the Expanded Program on Immunization (EPI), have helped reduce deaths from preventable neonatal infections(Sarkar et al., 2015). Increased awareness of kangaroo mother care (KMC) and exclusive breastfeeding promotion has also contributed to better neonatal survival rates.

Despite progress, several key challenges continue to hinder further reductions in maternal and neonatal mortality in the Anambas Islands(Sutiyono, 2001). Many women experience delays in reaching healthcare facilities, particularly in emergencies, due to the need for boat travel to access medical services. This increases the risk of complications during childbirth. Although midwives and trained birth attendants have been deployed, there is still a shortage of obstetricians, pediatricians, and anesthesiologists needed for high-risk deliveries and emergency C-sections(Victora et al., 2010). Low Utilization of Health Services Due to Cultural and Economic Factor. Some women prefer traditional birth attendants (dukun bayi) or avoid healthcare facilities due to financial constraints, cultural beliefs, or lack of awareness about maternal risks. The absence of specialized maternal and neonatal intensive care units (NICUs) means that many newborns with low birth weight, infections, or breathing difficulties do not receive adequate treatment.

3.3 Comparison of Research Results with Previous Research

Several past studies have demonstrated the positive impact of MCH programs on maternal and neonatal health outcomes. Research by Titaley et al. (2018) on maternal health services in rural Indonesia emphasized that increased antenatal care (ANC) visits and postnatal follow-ups significantly reduce maternal and neonatal mortality rates. This study similarly found that in the Anambas Islands, mothers who attended at least four ANC visits had fewer complications during pregnancy and childbirth, supporting the role of ANC in improving health outcomes. Previous studies, such as those conducted by Koblinsky et al. (2016) and Campbell & Graham (2018), highlighted that the presence of trained midwives and healthcare workers during childbirth leads to a significant reduction in maternal and neonatal mortality. This research confirms that in the Anambas Islands, the availability of trained midwives and community health workers in remote villages has helped prevent birth complications and reduce mortality risks.

Research by Bhutta et al. (2021) in South Asia and Lawn et al. (2020) in Africa emphasized that well-established referral systems improve maternal survival rates by ensuring timely access to emergency care. In this study, it was found that the implementation of emergency transportation services, including boat ambulances, has played a role in reducing maternal deaths, although challenges such as long travel times and limited healthcare facilities on small islands remain significant barriers.

Despite these similarities, this study also found notable differences compared to previous research, particularly in the unique challenges faced in remote island communities. Unlike studies conducted in urban areas and mainland regions, such as those by Pasha et al. (2019) and Ronsmans & Graham (2017), this research found that geographical isolation in the Anambas Islands significantly limits access to healthcare services. While previous research emphasized the role of transportation improvements, this study reveals that weather conditions, long travel distances between islands, and the lack of healthcare facilities remain major obstacles in reducing maternal and neonatal mortality.

In contrast to findings from studies in high-income countries like Sweden and Canada, where maternal mortality is near zero due to institutional deliveries and advanced medical care, this study found that many women in the Anambas Islands still rely on traditional birth attendants (dukun bayi). Research by Titaley et al. (2018) also noted similar findings in rural Indonesia, where cultural beliefs and distrust in modern healthcare systems lead to lower facility-based deliveries.

While studies such as those by Lawn et al. (2020) and Bhutta et al. (2021) highlighted that health education campaigns significantly increase maternal healthcare utilization, this study found

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that awareness programs in the Anambas Islands have had a limited impact. Many women still lack knowledge about the importance of antenatal care and institutional deliveries, indicating that existing outreach efforts may not be sufficiently tailored to the local cultural and linguistic context.

The comparison between this research and previous studies highlights several important insights. Maternal and child health programs have led to a decline in mortality rates in both urban and rural settings, but geographical and cultural barriers continue to affect health outcomes in remote islands. The presence of skilled birth attendants and antenatal care services is consistently linked to lower maternal and neonatal mortality rates, but their impact is weakened by limited healthcare infrastructure and referral challenges in island regions. Community-based health interventions and transportation services are critical for improving health outcomes in remote areas, but their effectiveness is hindered by long distances, weather-related transport issues, and cultural resistance.

4. CONCLUSION

This study analyzed the implementation of Maternal and Child Health (MCH) programs in the Anambas Islands, Riau Islands, focusing on their impact on maternal and neonatal mortality rates. The findings indicate that while MCH programs have contributed to a decline in mortality rates, significant challenges remain due to geographical isolation, infrastructure limitations, and cultural factors. The research confirms that antenatal care (ANC), skilled birth attendance, and emergency referral systems play a crucial role in improving maternal and neonatal health outcomes. The presence of trained midwives and community health workers has helped reduce complications during childbirth, aligning with previous studies that emphasize the importance of professional healthcare services. However, limited healthcare facilities, long travel distances, and reliance on traditional birth attendants (dukun bayi) continue to hinder further progress in reducing mortality rates. Despite the efforts to strengthen healthcare services, transportation barriers and inadequate emergency response systems remain major obstacles. The study highlights that although boat ambulances and mobile health teams have improved access to emergency care, unpredictable weather conditions and long referral times still pose risks to maternal and neonatal survival. Additionally, the effectiveness of health education and awareness programs has been limited, as many women continue to prefer traditional birthing practices over institutional deliveries. Based on these findings, it is evident that while maternal and child health programs have had a positive impact, further improvements are necessary. Strengthening healthcare infrastructure, increasing skilled healthcare personnel, expanding emergency referral systems, and enhancing culturally sensitive health education programs are essential steps to further reduce maternal and neonatal mortality rates in remote island communities. Future research should focus on developing more adaptive and community-based healthcare strategies to ensure that every mother and child receives the necessary care, regardless of geographical challenges.

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