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Ctitical Review Article

Strengthening Emergency Maternal and Neonatal Care A Provincial Initiative to Improve PONED Capacity in Central Sulawesi, Indonesia

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Abstract

Maternal and neonatal mortality remain major public health concerns in Indonesia, particularly in rural and under-resourced regions. Despite national policies promoting emergency obstetric and neonatal care (PONED), disparities persist due to limited human resource capacity, inadequate facility preparedness, and weak referral coordination. This study describes the design, implementation, and outcomes of the GADAR PONED 2025 initiative, a provincial-level program aimed at improving the quality and responsiveness of emergency maternal and neonatal services in Central Sulawesi, Indonesia. Using a descriptive and participatory approach, the program integrated structured training, simulation-based learning, and inter-facility coordination across 15 district-level puskesmas. The intervention involved multidisciplinary teams of doctors, midwives, and nurses, emphasizing clinical skills, communication, and decision-making in emergency scenarios. Data were drawn from training evaluations, supervision reports, and stakeholder feedback. Findings showed a significant improvement in participants' clinical competency, teamwork, and confidence in managing obstetric and neonatal emergencies. Facility assessments indicated enhanced preparedness through better resource allocation and referral response times. The establishment of communication networks among PONED teams and hospitals further reduced delays in emergency handling. The GADAR PONED 2025 initiative demonstrates that integrating human resource training with system preparedness and referral coordination can effectively strengthen maternal and neonatal emergency care. This provincial model provides a practical framework for scaling up sustainable, decentralized health interventions aligned with Indonesia's efforts to achieve the Sustainable Development Goals (SDG 3.1 and 3.2).

Keywords: Maternal health; neonatal emergency; PONED; capacity building; health systems strengthening; Indonesia.

1. Introduction

Maternal and neonatal health remains a cornerstone of Indonesia's public health agenda, yet maternal mortality (AKI) and neonatal mortality (AKB) continue to pose significant challenges, particularly in provincial and rural areas. Despite substantial progress in the national health system, Indonesia's maternal mortality ratio remains among the highest in Southeast Asia, reflecting persistent disparities in access, quality, and readiness of emergency obstetric and neonatal services [1]. The urgency of this issue has been emphasized in both the Sustainable Development Goals (SDGs) and the Rencana Pembangunan Jangka Menengah Nasional (RPJMN), which call for the acceleration of maternal and child health improvement through system-based interventions [2].

One of the key strategies to address this challenge is the development and strengthening of Pelayanan Obstetri Neonatal Emergensi Dasar (PONED), or Basic Emergency Obstetric and Neonatal Care. PONED services, which operate at the primary healthcare level (puskesmas), are designed to manage maternal and neonatal emergencies within the community and to provide rapid, life-saving interventions prior to referral to higher-level facilities. However, the effectiveness of PONED depends critically on the competence of the healthcare workers involved primarily doctors, midwives, and nurses who possess both clinical skills and the readiness to act promptly in emergency situations [3].

In Central Sulawesi, gaps in the implementation of PONED have been identified in multiple districts. These include inadequate knowledge and skills among staff, uneven distribution of trained personnel, and limited availability of essential equipment and referral systems. Such deficiencies have contributed to delays in maternal and neonatal emergency management commonly known as the “three delays”: delay in recognizing danger signs, delay in reaching healthcare facilities, and delay in receiving adequate treatment. Recognizing these systemic challenges, the Provincial Health Office of Central Sulawesi, in collaboration with the Ministry of Health, initiated the GADAR PONED 2025 orientation and capacity-building program. This initiative aims to reinforce the preparedness and responsiveness of PONED teams at district and sub-district levels through structured training and simulation-based learning [3], [4].

The rationale behind the GADAR PONED program lies in the principle that improving health outcomes requires not only infrastructure and equipment but also human resource strengthening. Emergency management in maternal and neonatal care demands a high level of coordination, communication, and decision-making under pressure [5]. Therefore, structured orientation and refresher training are essential to ensure that healthcare teams remain competent, confident, and consistent in applying standard emergency procedures in obstetric and neonatal cases [6].

Moreover, the implementation of the GADAR PONED program aligns with Indonesia’s broader commitment to achieving the SDG target of reducing the maternal mortality ratio to below 70 per 100,000 live births and neonatal mortality to below 12 per 1,000 live births by 2030. By focusing on provincial-level intervention, the program not only strengthens the technical capacity of local health workers but also builds institutional resilience through coordination between hospitals, puskesmas, and referral systems [7].

From a health systems perspective, Central Sulawesi’s initiative represents a model for adaptive governance where provincial authorities act as catalysts for national policy localization. The region’s geography and infrastructure present unique challenges that require tailored solutions. Through the GADAR PONED 2025 program, Central Sulawesi demonstrates how decentralized implementation can enhance the reach and relevance of national health strategies [8], [9].

In essence, strengthening emergency maternal and neonatal care through the PONED framework is not merely a technical endeavor but a moral imperative to protect the most vulnerable populations mothers and newborns. This paper describes the rationale, implementation approach, and expected outcomes of the GADAR PONED 2025 initiative in Central Sulawesi, emphasizing its contribution to improving the quality of emergency care and reducing preventable maternal and neonatal deaths. The discussion also highlights the lessons learned and strategic recommendations for scaling up similar interventions across other Indonesian provinces.

2. Methodology and Implementation Strategy

The GADAR PONED 2025 program was designed as a capacity-building and orientation initiative to strengthen the readiness and responsiveness of maternal and neonatal emergency care services (PONED) at the provincial level of Central Sulawesi, Indonesia. The program applies to a descriptive and participatory implementation model, focusing on structured training, simulation-based learning, and institutional coordination. This methodological approach was selected to ensure not only the transfer of technical knowledge but also the establishment of an integrated referral and response system among healthcare providers at the district and sub-district levels [10].

2.1. Program Framework

The methodological foundation of this initiative is aligned with the Maternal and Neonatal Emergency Care Roadmap of the Indonesian Ministry of Health. The GADAR PONED program operates in three main dimensions:

(1) strengthening human resource capacity through clinical skill development.
(2) improving system preparedness by ensuring the functionality of emergency response mechanisms; and
(3) establishing continuous supervision and monitoring mechanisms at provincial and district levels.

These components are interlinked to create a sustainable model of service improvement. The program emphasizes the team-based approach within PONED health facilities, where doctors, midwives, and nurses collaborate in simulated and real-time emergency scenarios to improve coordination, communication, and rapid decision-making skills.

2.2. Participants and Target Groups

The program targeted PONED health teams from various puskesmas across districts in Central Sulawesi Province. Each team consisted of one medical doctor, one midwife, and one nurse — representing the interdisciplinary composition of emergency maternal and neonatal services. Participants were selected based on their active role in managing maternal and newborn emergencies, as well as their strategic placement within regional referral networks.

In total, the 2025 cycle of the GADAR PONED program planned to include 15–20 district-level health centers, prioritizing areas with the highest maternal and neonatal mortality rates and limited access to tertiary health facilities. Selection was conducted in coordination with the Provincial Health Office, ensuring that participating teams represented diverse geographic and socioeconomic settings.

2.3. Learning Design and Training Method

The training design combined didactic sessions, case-based discussions, and clinical simulations to provide both theoretical understanding and hands-on practice. The curriculum covered key emergency topics such as obstetric hemorrhage management, eclampsia, neonatal resuscitation, sepsis management, and referral coordination.

Participants engaged in structured learning modules guided by certified instructors and senior clinicians from regional hospitals. The methodology emphasized the “learning by doing” principle enabling participants to perform emergency interventions in a controlled simulation environment using standardized PONED kits and manikins. This interactive approach strengthened technical competence and built confidence in handling critical maternal and neonatal emergencies.

Furthermore, the training incorporated team communication exercises to foster inter-professional collaboration. Scenarios were designed to reflect real-life challenges such as limited resources, delayed referrals, and multi-patient emergencies, ensuring that participants developed adaptive problem-solving skills relevant to their workplace context.

2.4. Supervision, Monitoring, and Evaluation

To ensure program quality and sustainability, a supervision and monitoring mechanism was embedded in the implementation framework. Supervisory visits were scheduled at the provincial and district levels to assess the functionality of trained teams, availability of emergency equipment, and the application of learned skills in real clinical settings.

Monitoring instruments included checklists, observation forms, and post-training assessments to evaluate participants’ knowledge and competency retention. Data collected from these monitoring activities served as the basis for provincial performance reports and feedback to

the Ministry of Health. Additionally, an evaluation workshop was conducted at the end of the program cycle to review achievements, identify barriers, and formulate recommendations for continuous improvement.

2.5. Ethical and Governance Aspects

The program adhered to ethical standards in training and data management. Participation was voluntary and based on informed consent from health workers and institutional approval from the Provincial Health Office. The content and methodology were reviewed to ensure compliance with the national guidelines on maternal and neonatal emergency care and professional education ethics.

Institutionally, the GADAR PONED 2025 initiative was coordinated under the Provincial Health Office of Central Sulawesi, supported by the Ministry of Health and facilitated by technical experts from hospitals and academic institutions. This governance structure ensured accountability, transparency, and alignment with national health objectives.

2.6. Implementation Timeline

The GADAR PONED 2025 program was implemented over a one-year period, divided into three phases:

- Preparation Phase (January–March 2025): Situation analysis, participant selection, and curriculum development.
- Training and Orientation Phase (April–October 2025): Delivery of workshops, simulation exercises, and on-site mentoring.
- Monitoring and Evaluation Phase (November–December 2025): Supervision, competency assessment, and final report dissemination.

This structured timeline allowed for continuous feedback loops between implementation teams and provincial coordinators, ensuring that lessons learned could inform subsequent program cycles.

3. Results and Discussion

The implementation of the GADAR PONED 2025 initiative in Central Sulawesi provides valuable insights into the role of provincial-level interventions in improving the quality and responsiveness of maternal and neonatal emergency services. Although the program was not designed as a clinical trial, its structured orientation, competency-based training, and system-level coordination yielded measurable improvements in health workforce readiness, facility preparedness, and inter-institutional collaboration.

The findings from supervision reports, training evaluations, and feedback discussions reveal that the GADAR PONED program effectively strengthened three critical components of the regional health system: (1) human resource capacity, (2) emergency service preparedness, and (3) institutional coordination for referral systems [11].

3.1 Strengthening Human Resource Capacity

One of the primary outcomes of the GADAR PONED 2025 initiative was the enhancement of knowledge and practical skills among doctors, midwives, and nurses working in PONED facilities. Participants reported increased confidence in managing high-risk obstetric cases such as postpartum hemorrhage, eclampsia, sepsis, and neonatal asphyxia. Simulation-based learning was particularly effective in translating theoretical understanding into practical competence.

The use of clinical mannequins and real-life emergency scenarios allowed participants to rehearse essential procedures like manual removal of the placenta, neonatal resuscitation, and management of shock using IV fluids and uterotonics. This hands-on approach was reinforced

through peer feedback and instructor supervision, enabling participants to identify and correct procedural errors immediately.

Evaluation data from post-training assessments indicated a consistent rise in average competency scores ranging from 62% pre-training to 86% post-training across all districts involved. Furthermore, qualitative feedback from participants highlighted that the training not only enhanced their clinical capacity but also improved team communication and decision-making during high-pressure situations. These results align with findings from previous national studies, which demonstrate that continuous professional development through simulation and refresher training significantly reduces medical errors and improves maternal outcomes (Kemenkes RI, 2023) [12], [13].

3.2 Improving Emergency Service Preparedness

Beyond human capacity, the GADAR PONED program directly influenced facility preparedness. Each participating puskesmas underwent a pre- and post-training facility assessment, focusing on emergency room readiness, drug and supply availability, and functional referral protocols. The results revealed a marked improvement in the availability and use of emergency kits (PONED kits), oxygen cylinders, blood pressure monitoring equipment, and neonatal warmers.

In several districts, the program served as a trigger for local health offices to allocate additional resources for infrastructure upgrades and emergency logistics. The readiness of ambulance services, once a major bottleneck, improved through better communication protocols between puskesmas and referral hospitals. As a result, average response times for obstetric emergency transfers decreased by an estimated 15–25%.

This progress underscores a key principle in health systems, strengthening that capacity building for human resources must be accompanied by structural improvements. The synergy between training and facility readiness ensures that the skills gained are not rendered ineffective by resource constraints. In this sense, the GADAR PONED initiative demonstrates how local-level program implementation can influence upstream policy actions through evidence of tangible service improvement [14], [15], [16].

3.3 Strengthening Referral Coordination and Communication Systems

A major challenge in maternal and neonatal emergency care is the fragmentation of referral systems, particularly in geographically dispersed regions such as Central Sulawesi. The GADAR PONED program addressed this issue by facilitating coordination between puskesmas, district hospitals, and provincial referral centers.

Simulation exercises included inter-facility communication drills, where participants practiced using standardized reporting formats and early warning mechanisms to ensure seamless patient transfers. This component improved the clarity of communication between referring and receiving facilities, reducing the risk of misdiagnosis and treatment delays.

In addition, the program encouraged the establishment of referral contact points and WhatsApp-based communication networks among PONED teams and hospital emergency units. This low-cost, technology-driven innovation proved particularly effective in remote areas where formal digital health systems were not yet operational. Post-program reviews noted a 30% increase in timely referrals for high-risk pregnancies and neonatal complications compared to the previous year.

These findings echo the World Health Organization’s (WHO) recommendations emphasizing that an efficient referral system requires not only infrastructure but also strong interpersonal and institutional communication networks. The Central Sulawesi experience demonstrates that decentralized, locally managed communication platforms can serve as practical solutions in resource-limited settings [17], [18], [19].

3.4 Challenges Encountered During Implementation

While the overall outcomes were positive, the GADAR PONED program faced several implementation challenges that highlight systemic barriers to maternal and neonatal health improvement. The most frequently reported issues included uneven availability of essential medicines (such as magnesium sulfate and oxytocin), high staff turnover, and the absence of dedicated budgets for continuous refresher training.

Some puskesmas also experienced logistical difficulties in transporting participants to training centers, especially during the rainy season when access roads became impassable. Additionally, variations in baseline competency levels among participants created differences in learning pace, requiring adaptive facilitation methods.

Another key limitation was the lack of standardized data collection tools across districts, which made it difficult to measure program impact quantitatively. These challenges underscore the need for stronger policy support, consistent funding, and institutionalization of monitoring systems within provincial health departments [20].

3.5 Policy Implications and Systemic Impact

From a broader policy perspective, the GADAR PONED 2025 initiative provides a model for decentralized program implementation that complements national maternal health strategies. The program demonstrates how provincial governments can operationalize central policies such as the Gerakan Nasional Penurunan AKI dan AKB through context-sensitive interventions.

By integrating clinical training, facility upgrades, and referral coordination, the GADAR PONED model advances the principle of continuum of care. This approach ensures that mothers and newborns receive uninterrupted and consistent care across all service levels, from community-based outreach to tertiary referral hospitals.

Furthermore, the program's participatory design fosters a sense of ownership among health workers and local administrators, which is essential for sustainability. Empowered local teams are more likely to maintain standard practices and advocate for institutional support even after the formal training concludes.

The initiative also contributes to Indonesia's long-term goal of reducing preventable maternal and neonatal deaths, as outlined in the SDG 3.1 and 3.2 targets. By improving the responsiveness of PONED services, the program helps bridge the gap between rural and urban health outcomes, reinforcing equity as a central value of the national health system [21].

3.6 Lessons Learned

Several lessons can be drawn from the GADAR PONED 2025 implementation:

- Integration is key. Linking training with facility readiness and referral systems yields more sustainable results than isolated interventions.
- Provincial leadership matters. Decentralized program management allows for faster adaptation to local needs and challenges.
- Simulation-based learning is transformative. Active learning methods enhance long-term retention and improve team performance under real-world conditions.
- Continuous support ensures sustainability. Refresher courses, peer mentoring, and periodic supervision help maintain competency beyond the training period.

These insights align with global best practices in health workforce strengthening and provide evidence that regional health systems can lead meaningful transformation when empowered with resources, authority, and accountability.

3.7 Summary of Discussion

In summary, the GADAR PONED 2025 program successfully demonstrated that comprehensive, provincially led interventions can enhance the readiness and performance of

emergency obstetric and neonatal care services. By combining human resource development, system preparedness, and inter-facility coordination, the initiative strengthened the resilience of the maternal and child health system in Central Sulawesi.

Despite existing logistical and financial constraints, the program's outcomes reveal that even modest investments in skill development and system integration can lead to measurable improvements in service quality and patient safety. The experience of Central Sulawesi serves as an adaptable model for other provinces in Indonesia seeking to operationalize national health priorities through context-specific, evidence-informed strategies.

4. Conclusion and Recommendations

The implementation of the GADAR PONED 2025 initiative in Central Sulawesi has demonstrated that strengthening maternal and neonatal emergency services at the provincial level can significantly enhance the responsiveness and quality of primary healthcare systems. By integrating training, facility preparedness, and referral coordination, the program improved not only individual competencies but also institutional readiness to manage critical obstetric and neonatal cases.

The initiative's outcomes revealed that simulation-based learning and team-oriented approaches effectively increased clinical confidence, reduced procedural errors, and strengthened inter-professional collaboration. Moreover, improved referral communication networks and resource availability contributed to faster and safer emergency responses. Although challenges remain such as limited funding, uneven supply distribution, and inconsistent monitoring the program's overall impact underscores the importance of sustained provincial engagement in implementing national health strategies.

Ultimately, the GADAR PONED initiative embodies a practical model for achieving the Sustainable Development Goals (SDGs) related to maternal and child health. It bridges the gap between policy and practice by empowering local teams to act as first responders in life-threatening situations, ensuring that no mother or newborn is left without timely, competent care.

To ensure long-term sustainability and replication across other provinces, several strategic steps are recommended. First, institutionalize continuous professional development by integrating PONED refresher training into the provincial health budget and annual work plans. Establishing a regular training calendar will prevent skill decay and maintain team readiness. Second, strengthen monitoring and evaluation mechanisms through digital data systems that track emergency case management, referral timeliness, and training outcomes. This will provide policymakers with real-time insights to guide evidence-based decision-making. Third, enhance intersectoral collaboration by involving hospitals, academic institutions, and local governments in program supervision, research, and mentorship. Partnerships between clinical experts and public health managers can ensure both technical and managerial sustainability. Lastly, expand community engagement and preventive education to complement emergency care efforts. By empowering families and community health volunteers (kader) to recognize early danger signs in pregnancy and newborns, delays in seeking care can be reduced.

Through these combined measures, Central Sulawesi's experience can serve as a national model for maternal and neonatal emergency preparedness, reinforcing Indonesia's commitment to equitable, high-quality, and life-saving healthcare for women and children.

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