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Interprofessional Collaboration Training: Maternal-Perinatal Care Simulation to Prevent Maternal Mortality Due to Non-Obstetric Pathology (Non-Communicable Diseases) in Bawean Island, Gresik Regency

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Abstract

Background: Maternal mortality due to non-obstetric pathologies (non-communicable diseases) such as hypertension, diabetes, and cardiovascular disease is a serious challenge in maternal perinatal health, especially in remote areas such as Bawean Island, Gresik Regency. The lack of interprofessional collaboration in managing these cases exacerbates the situation. Interprofessional collaboration training is designed to improve the ability of health workers to provide comprehensive and coordinated care. Objective: This study aims to improve health workers' understanding and skills in interprofessional collaboration through simulation of maternal perinatal care, particularly in preventing maternal deaths due to non-obstetric pathology. Method: This training involved health workers from various professions (doctors, midwives, nurses, and nutritionists) on Bawean Island. The method used was maternal perinatal case simulation with an interprofessional collaboration approach. Participants were divided into multidisciplinary teams to handle simulated cases that included risk identification, emergency management, and advanced care planning. Evaluation was conducted through pre-test and post-test to measure knowledge improvement as well as direct observation of collaboration skills. Result: The results of the training showed significant improvement in participants' knowledge and skills regarding the management of non-obstetric pathology in pregnant women. Participants also reported improved interprofessional communication and coordination skills. The simulation successfully identified critical steps in the management of complex maternal perinatal cases. Implication: This interprofessional collaboration training has important implications in improving the quality of maternal perinatal care, particularly in remote areas. This approach can be adopted as a sustainable training model to reduce maternal mortality from non-obstetric pathologies. Policy recommendations include the integration of similar training in health worker education and training programmes at the national level.

Keywords: *Interprofessional collaboration, simulation, maternal perinatal care, non-obstetric pathology, maternal mortality, Bawean Island.*

Introduction

Maternal mortality is one of the important indicators in assessing the health status of the community. According to the 2020 Inter-Census Population Survey (SUPAS), the maternal mortality rate (MMR) in Indonesia reached 305 per 100,000 live births. The main causes of maternal mortality are generally associated with obstetric complications such as haemorrhage, infection and eclampsia. However, recent studies have shown a significant increase in maternal deaths due to non-obstetric pathologies, especially non-communicable diseases (NCDs) such as hypertension, diabetes mellitus, and heart disease (Indonesian Ministry of Health, 2021).

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On Bawean Island, Gresik Regency, the challenges related to MMR are increasingly complex due to limited health facilities and adequate human resources. Data from the Gresik District Health Office (2022) revealed that of the 12 recorded cases of maternal death, 5 were caused by NCDs. This fact shows that maternal perinatal health interventions must not only focus on obstetric conditions, but also integrate effective management of NCDs.

Interprofessional collaboration (IPC) is becoming an increasingly relevant strategy to improve the quality of maternal perinatal care. IPC involves various health professionals such as doctors, midwives, nurses, and nutritionists working together synergistically to provide holistic care to pregnant women, including early detection and management of NCDs. According to WHO (2022), simulation-based collaborative training has been shown to effectively improve the skills of health teams in dealing with maternal emergencies.

Despite its importance, the implementation of IPC on Bawean Island still faces various challenges. Firstly, limited health human resources hinder effective collaboration. A report by the Gresik Health Office (2022) notes that Bawean has only 2 specialists, while the ratio of midwives and nurses is far from the WHO standard of 1.5 midwives per 1,000 live births. Secondly the lack of integrated training to deal with NCDs during pregnancy is a serious obstacle. A study by Yuniarti et al. (2021) showed that 70% of health workers in Bawean felt less confident in handling hypertension and diabetes in pregnant women due to the lack of simulation-based training. Third, weak interprofessional coordination worsens the handling of maternal perinatal cases with NCDs. According to Prasetyo and Kurniawan (2020), poor communication between health professionals increases the risk of delayed diagnosis and medical intervention, which has a direct impact on maternal safety.

Most studies on maternal mortality still focus on obstetric complications, while studies on managing NCDs in pregnant women through interprofessional collaboration are still minimal, especially in remote areas such as Bawean Island (Putri et al., 2021). In addition, although medical simulation has been implemented in major hospitals in Indonesia, studies that specifically evaluate the effectiveness of collaborative simulation in the context of rural maternal care are still very limited (Sari & Handayani, 2022). Furthermore, no study has examined the direct relationship between IPC, improved health team skills, and prevention of maternal mortality from NCDs in Bawean. This gap demonstrates the need for in-depth research on how simulation-based collaborative training can strengthen the readiness of medical teams to deal with non-obstetric maternal perinatal cases (Rachmawati et al., 2023).

Failure to integrate collaborative approaches in maternal perinatal care will exacerbate maternal mortality on Bawean Island. Poorly managed NCDs during pregnancy risk fatal complications such as preeclampsia, heart failure and diabetic ketoacidosis (MOH RI, 2021). Without intervention through collaborative training, skill gaps and miscommunication between health professionals will continue to hamper rapid response to maternal emergencies (Yuniarti et al., 2021).

This study aims to develop and implement the programme 'Interprofessional Collaboration Training: Simulation of Maternal Perinatal Care' to improve health team competence in managing NCDs in pregnant women on Bawean Island. The programme will involve real case-based simulation scenarios, interprofessional communication training, and pre- and post-intervention skills evaluation. The main contributions of this study include: (1) Providing a simulation-based collaborative training model that can be replicated in other remote areas; (2)

Strengthening the capacity of health workers in managing NCDs during pregnancy; (3) Filling the literature gap on IPC in a non-obstetric maternal perinatal context.

The novelty of this study lies in the integration of an interprofessional collaborative simulation focusing on managing NCDs during pregnancy, which has not been widely studied, especially in rural areas such as Bawean. Moreover, the programme not only measures technical skill improvement, but also strengthens interprofessional communication to ensure a rapid and coordinated response when facing non-obstetric maternal complications (Rachmawati et al., 2023). Thus, the results of this study are expected to be an important reference for policy makers to adopt collaborative approaches as a key strategy in reducing maternal mortality, particularly due to NCDs, in remote areas.

Material and Method

Interprofessional Collaboration Training: Simulation of Maternal Perinatal Care to Prevent Maternal Mortality due to Non-Obstetric Pathologies (Non-Communicable Diseases) was conducted on Bawean Island, Gresik Regency, which consists of two sub-districts: Tambak and Sangkapura sub-districts. This activity took place over two days, from 31 October to 1 November 2024. The study design used was quasi-experimental with a pre-test and post-test approach without a control group, aiming to evaluate the effectiveness of interprofessional collaboration training in improving the competence of health workers in handling maternal perinatal cases related to non-communicable diseases.

The training participants were health workers working in health care facilities on Bawean Island, including doctors, midwives, and nurses, with a total of 60 participants. They were randomly divided into small groups to maximise interprofessional interaction and collaboration. The training materials covered two main aspects, namely maternal and neonatal emergencies and interprofessional collaboration (IPC). The material on emergencies includes handling cases such as postpartum haemorrhage, hypertension in pregnancy, neonatal asphyxia, and low birth weight. Meanwhile, the interprofessional collaboration course focused on strategies and practices for effective collaboration between health professionals in emergency situations to improve the quality of patient care.

The training method uses case scenario-based simulations that reflect real situations in the field. Each group was given a different scenario that required effective interprofessional collaboration and communication to solve the case at hand. After the simulation, a debriefing session was conducted to reflect and discuss team performance, challenges that arose, and areas for improvement. Evaluation of the training was conducted by comparing pre-test and post-test results related to participants' knowledge and skills in handling maternal perinatal cases due to non-communicable diseases. In addition, direct observation during the simulation and feedback from participants were used to measure the improvement of competence as well as the effectiveness of the interprofessional collaboration that had been implemented.

Prior to the start of the training, all participants were fully informed about the objectives and procedures of the activity. Participation was voluntary, and confidentiality of participants' data was strictly maintained to ensure the principles of research ethics were maintained. With this approach, it is expected that the competence of health workers on Bawean Island in handling maternal perinatal cases due to non-communicable diseases will increase significantly. Furthermore, the training is expected to contribute to reducing maternal mortality in the region, while strengthening interprofessional collaboration in providing optimal health services.

Result

Interprofessional Collaboration Training Outcomes: Simulation of Maternal Perinatal Care to Prevent Maternal Mortality from Non-Obstetric Pathologies in Bawean Island, Gresik Regency

The interprofessional collaboration training conducted on Bawean Island aimed to improve the competence of health workers in handling maternal perinatal cases related to non-communicable diseases. This activity involved doctors, midwives, and nurses from two sub-districts, Tambak and Sangkapura. Through a scenario-based simulation approach, participants not only deepened their clinical knowledge but also strengthened their interprofessional collaboration and communication skills.

The following are the results of the training evaluation which include participant demographic data, pre-test and post-test results, as well as direct observation during the simulation:

Participant Demographic Data

Profession Category	Number of Participants	Percentage (%)
Doctor	15	25%
Midwife	25	41.7%
Nurse	20	33.3%
Total	**60**	**100%**

The data above shows that the majority of participants were midwives (41.7%), followed by nurses (33.3%) and doctors (25%). This composition reflects interprofessional involvement in efforts to improve the quality of maternal perinatal care.

Pre-test and Post-test Evaluation Results

Aspects Evaluated	Average Pre-test Score	Average Post-test Score	Increase (%)
Knowledge of maternal emergencies	65	85	30.8%
Knowledge of neonatal emergencies	60	82	36.7%
Interprofessional collaboration (IPC)	58	80	37.9%
Interprofessional communication skills	62	84	35.5%
Maternal perinatal case management skills	63	86	36.5%

The pre-test and post-test evaluation results showed significant improvement in all aspects evaluated. The highest improvement occurred in interprofessional collaboration (37.9%), indicating that the training not only improved technical competence but also strengthened teamwork in handling emergency cases.

Simulation Observation and Participant Feedback

Aspects of Interprofessional Collaboration	Average Score (Scale 1-5)	Description
Effective interprofessional communication	4.3	Good
Coordination in decision-making	4.1	Good
Division of roles and responsibilities	4.2	Good
Team reflection and evaluation	4.0	Good enough
Responsiveness in emergency situations	4.4	Very good

Based on observations during the simulation, effective communication and responsiveness in emergency situations received the highest scores. However, team reflection and evaluation still require more attention to ensure each team member is able to identify weaknesses and improve performance together.

The results of the interprofessional collaboration training showed a significant increase in participants' knowledge and skills, as reflected in the comparison of pre-test and post-test scores. The average score of participants increased between 30-38%, with the highest improvement seen in the aspects of interprofessional collaboration and handling maternal perinatal cases related to non-communicable diseases. This indicates that the simulation-based approach not only enriches the clinical insight of health workers but also strengthens their ability to work together effectively as an interprofessional team.

In addition to the quantitative results, observations during the simulation also provided an in-depth picture of the dynamics of interprofessional cooperation. Participants were able to demonstrate more effective communication and better coordination in making decisions during emergency case scenarios. The small teams formed randomly practised a clear division of roles, ensuring each member understood their respective responsibilities. However, team reflection after the simulation still requires further strengthening, particularly in terms of evaluating the decision-making process and identifying strategies that can improve collaborative performance in the future.

On the subjective side, participants' feedback was generally very positive. Many participants stated that they felt more confident in managing maternal perinatal cases, especially those related to non-communicable diseases such as hypertension, gestational diabetes, and cardiovascular disorders. Some participants also appreciated how the training provided space to practice interprofessional communication, something that is often a challenge in the field.

Considering these findings, the interprofessional collaboration training proved to be effective in improving the competence of health workers on Bawean Island. To maintain this positive momentum, future recommendations include organising regular follow-up trainings and establishing interprofessional collaborative teams in each health facility. This will ensure that the principles of collaboration and effective communication continue to be applied in daily practice, thereby contributing to the reduction of maternal mortality in the region. The training further emphasised that solid interprofessional collaboration is key to providing the best care for patients and building a more resilient health system.

Discussion

Maternal mortality due to non-obstetric pathologies, such as cardiovascular disease, diabetes and hypertension, is a major challenge in maternal perinatal health. Although advances in obstetrics

have significantly reduced maternal mortality, non-communicable diseases (NCDs) are now the leading cause of maternal death in many countries, including Indonesia. To address this issue, interprofessional collaboration training involving simulated maternal perinatal care is a promising solution. This approach allows health workers from different disciplines, such as doctors, midwives, nurses, and nutritionists, to work together in managing complex cases involving NCDs during pregnancy and the perinatal period (World Health Organization, 2019; Augenstein, 2024).

Interprofessional collaboration training aims to improve communication, coordination and shared understanding between health professionals. In the context of maternal perinatal care, this collaboration is particularly important as cases involving NCDs often require a multidisciplinary approach. For example, a pregnant woman with a history of diabetes requires care that involves an endocrinologist, midwife, and nutritionist to ensure a healthy pregnancy. Through simulation, healthcare workers can practice handling real scenarios, identify knowledge gaps, and correct mistakes without risk to real patients. Simulations also allow participants to develop clinical and non-clinical skills, such as effective communication and collaborative decision-making (Foronda, MacWilliams, & McArthur, 2020; MacLennan, Minehart, Vasco & Eley, 2023).

One of the main benefits of interprofessional collaboration training is improved quality of patient care. The study by Reeves et al. (2017) showed that interprofessional collaboration can reduce medical errors, increase patient satisfaction, and improve health outcomes. In the maternal perinatal context, this is particularly relevant as errors in NCD management can be fatal for both mother and foetus. Interprofessional simulation allows health workers to understand the role of each profession, thereby providing more integrated and holistic care. In addition, the training also helps to reduce fragmentation of health services, which is often a problem in complex health systems (Dow, Zhu, Sewell, Banas, & Mishra, 2019).

The implementation of interprofessional collaboration training requires a systematic and structured approach. Firstly, there needs to be a curriculum specifically designed to integrate knowledge and skills from different disciplines. This curriculum should include realistic simulation scenarios, such as the management of pregnant women with hypertension or diabetes, as well as competency-based assessments. Secondly, adequate simulation facilities, such as state-of-the-art mannequins and environments that resemble real clinical situations, are needed to ensure effective training. Third, periodic evaluations should be conducted to measure the impact of training on participants' competence and patient health outcomes (Liaw, Zhou, Lau, Siau & Chan, 2021).

Although interprofessional collaboration training has great potential, there are several challenges in its implementation. One of them is resistance from health workers who may feel comfortable with traditional uniprofessional practice. In addition, limited resources, such as budget and time, can be an obstacle in organising quality training. Overcoming these challenges requires commitment from policy makers, educational institutions and health professional organisations. Financial support and policies that support interprofessional collaboration are also important to ensure the sustainability of training programmes (World Health Organization, 2010).

The positive impact of interprofessional collaboration training has been supported by various studies. For example, a study by the World Health Organisation (WHO) in 2010 stated that interprofessional collaboration can improve the effectiveness of health teams and reduce gaps in patient care. In addition, a study by Baker et al. (2018) showed that interprofessional simulation can improve health workers' confidence and clinical skills in handling complex cases. In the

maternal perinatal context, this training can be an effective strategy to reduce maternal mortality from NCDs, especially in resource-limited countries (Cockburn et al., 2024).

Interprofessional collaboration training through simulated maternal perinatal care is an innovative approach to prevent maternal deaths from non-obstetric pathologies. By involving various health professions, this training not only improves individual competence but also strengthens teamwork, which ultimately has a positive impact on the quality of patient care. Maximising this potential requires commitment from all parties, including the government, educational institutions and health workers. Thus, this training can be a strategic step in achieving the global goal of reducing maternal mortality and improving overall maternal perinatal health (Ward et al, 2023; van den Broek, 2020).

Conclusion

Interprofessional collaboration training through maternal perinatal care simulation has shown significant potential in addressing the complex challenges of non-obstetric pathologies that contribute to maternal mortality in remote areas such as Bawean Island, Gresik Regency. By enhancing communication, coordination and shared decision-making among health workers, the training successfully improved participants' ability to manage high-risk cases. The simulation-based approach not only improved knowledge and skills but also identified critical gaps in interdisciplinary cooperation, providing a practical framework for addressing maternal health issues in resource-limited areas. The findings confirm the importance of integrating interprofessional education into routine training programmes to build a more resilient and collaborative health workforce.

In addition, this study highlights the far-reaching implications of such training in reducing maternal mortality, particularly in under-resourced settings. The success of this intervention suggests that similar programmes can be scaled up to improve maternal health outcomes, especially in cases involving non-communicable diseases. Policymakers and health institutions should consider this model as part of a comprehensive strategy to strengthen maternal health services. Further research should explore the long-term impact of interprofessional collaboration training on maternal mortality and its applicability in different cultural and geographical contexts. Ultimately, this approach is a critical step towards achieving equitable and sustainable maternal health outcomes globally.

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