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Effectiveness of Participatory, Innovative, Collaborative Training Management in Improving Midwives' Competency

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ABSTRACT

Midwives' competence plays a vital role in improving maternal and child health services, particularly in stunting prevention. However, many midwives still do not meet the required competency standards. This study aimed to evaluate the effectiveness of Participatory, Innovative, and Collaborative (PILAR)-based training in enhancing midwives' competence in West Nias Regency. Using a quasi-experimental design, 52 midwives were divided equally into an intervention group that received PILAR-based training and a control group without training. Independent t-test results indicated that the PILAR-based training management was effective in improving midwives' competence ($p = 0.001$). These findings suggest that participatory, innovative, and collaborative approaches in training can strengthen midwives' professional competencies and improve the quality of maternal and child health services. The study implies that integrating PILAR-based training into continuous professional development programs can serve as a strategic model for reducing stunting and promoting sustainable health outcomes in rural areas.

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INTRODUCTION

Midwives are health professionals who complete recognized midwifery education, meet legal requirements for registration or licensure, and demonstrate the competencies required for practice (Fullerton et al., 2003; Kemp et al., 2021). In practice, midwives function not only as care providers but also as managers, educators, and researchers. Accordingly, competency may be understood as an integrated set of knowledge, skills, attitudes, and personal attributes that enables effective professional performance across varied work situations (Chairiyah et al., 2024). Nevertheless, midwives do not always perform in accordance with expected professional standards, even when working conditions are relatively supportive.

In this context, management becomes essential because it provides the framework through which organizational goals are planned, organized, directed, and supervised effectively (Darim, 2020; Irjanawadi et al., 2023; Wijayanto & SPi, 2013). This view is consistent with classical and modern management perspectives that emphasize planning, organizing, staffing, leading, coordinating, and controlling as core managerial functions, including in training activities (Molan, 2012; Safroni, 2012). Effective management is therefore important not only for achieving organizational efficiency and effectiveness, but also for ensuring that training programs are implemented systematically and purposefully.

Training is a strategic component of human resource development because it helps employees improve their knowledge, skills, and work performance. Prior studies show that training contributes to performance indirectly through enhanced competency, while competence itself reflects the capacity and motivation to perform tasks effectively (Halawati & Purnomo, 2022; Pramono & Prahiawan, 2022). In the

context of midwifery, training provides opportunities to strengthen professional knowledge, technical skills, and work attitudes, thereby improving service quality and supporting better work outcomes (Faradina, 2019; Simatupang et al., 2024). Empirical evidence also indicates that training can increase knowledge, confidence, and satisfaction when its management elements are implemented effectively (Olsen & Stensaker, 2014). More broadly, training prepares personnel to meet current job demands, adapt to technological and procedural change, and assume greater responsibilities in the future (Sudaryo et al., 2019; Sofyandi, 2008, as cited in Sudaryo et al., 2018; Marsandya et al., 2024; Parashakti et al., 2020).

Several studies further emphasize that regular and inclusive training is necessary to strengthen midwives' competency and performance. Training may be delivered through formal or informal approaches, both within and outside the workplace, with a focus on mastery of job-relevant skills and techniques (Sapari, 2020). Participation in training has been identified as an important means of improving professional competence and supporting continuing professional education, while also contributing to job satisfaction (Friani et al., 2021; Ningsih & Wintarsih, 2022; Saadah, 2015). In West Nias Regency, efforts to improve midwives' skills have also been undertaken, and previous studies suggest that training can improve performance, broaden knowledge, and strengthen adaptation to professional standards, work methods, and technology (Vitasari et al., 2019; Farida, 2019; Tallam et al., 2022). However, existing programs have not yet produced optimal improvements in competency. This condition is likely related to the fact that midwives' performance is influenced by multiple internal and external factors, including education, training, attitudes, motivation, work experience, knowledge, skills, equipment availability, organizational support, and reward systems (Wulandari & Kusumastuti, 2020). Given the strategic role of midwives in reducing maternal and child mortality and supporting stunting prevention, improving their competency remains an important policy and managerial priority.

One promising approach is participatory, innovative, and collaborative training management. Collaborative training emphasizes cooperation, shared problem solving, and collective learning rather than individual competition (Ted Panitz, 1996). Participatory training, meanwhile, places participants at the center of the learning process by encouraging active involvement in planning, implementation, and evaluation (Darmawangsa et al., 2011; Kamil, 2012; Mediasi, 2016). Research shows that participatory approaches can strengthen motivation, professional attitudes, and work-related skills in a variety of educational settings (Hidayat, 2016; Darwangsa, 2012; Kambey & Suharnomo, 2013). Innovation, on the other hand, refers to ideas, methods, or practices perceived as new and adopted to solve specific problems or achieve targeted goals. In line with Rogers' diffusion of innovation theory, the adoption of innovation involves processes of knowledge, persuasion, decision, implementation, and confirmation within a social system (Rogers, 1983). Taken together, these perspectives suggest that participatory, innovative, and collaborative training management may provide a stronger framework for improving midwives' competency.

Accordingly, this study proposes a participatory, innovative, and collaborative training model to improve midwives' competency in stunting prevention in West Nias Regency. The findings are expected to contribute both practically, by offering a contextually relevant training model, and theoretically, by strengthening the understanding of training management as a mechanism for competency development in midwifery services.

METHOD

Research design

This study employed a quasi-experimental design to examine the effectiveness of the Participatory Innovative Collaborative (PILAR) training management model in improving midwives' competency in stunting prevention in West Nias Regency. Quasi-experimental designs are appropriate when intervention and comparison groups can be established but full randomization is not feasible (Campbell & Stanley, 1963). The study involved an intervention group receiving PILAR-based training and a control group without the intervention, with 26 midwives in each group. Data were collected across all 13 Community Health Centers (Puskesmas) in West Nias Regency, selected to represent the implementation context of the training model.

Population and sample

The study population comprised 308 midwives working in Community Health Centers in West Nias Regency. A total of 52 midwives were selected using purposive sampling and assigned into two comparable groups: 26 in the intervention group and 26 in the control group. Purposive sampling is commonly used when participants are selected based on characteristics relevant to the research objective (Palinkas et al., 2015; Coyne, 1997). Inclusion criteria were willingness to participate, at least 1 year of work experience, civil servant status, and prior participation in related training. Midwives who did not meet these criteria were excluded. This sampling strategy was intended to support a valid comparison of competency changes following the PILAR-based intervention.

Research procedures

The intervention group participated in PILAR-based training designed to improve knowledge, skills, and attitudes related to stunting prevention, while the control group did not receive the training. Data were collected using pretests, post-tests, and evaluation questionnaires to assess changes in participants' competency. Quasi-experimental procedures using pretest–posttest comparison are widely applied to evaluate intervention effects in applied educational and training contexts (Campbell & Stanley, 1963).

Data analysis

Prior to the main analysis, the research instruments were tested for validity and reliability. All 70 items met the validity criterion, with Corrected Item–Total Correlation values exceeding the r-table value of 0.361. The instrument also demonstrated excellent reliability, with a Cronbach's Alpha coefficient of 0.996. Cronbach's alpha is widely used to assess the internal consistency of multi-item instruments (Tavakol & Dennick, 2011), although it should be interpreted as an indicator of internal consistency rather than a standalone proof of measurement quality. Quantitative analysis compared pretest and post-test scores to assess changes in knowledge and competency, using either the t-test for normally distributed data or the Wilcoxon test for non-normally distributed data. In general, parametric tests such as the t-test are appropriate when normality assumptions are met, whereas the Wilcoxon signed-rank test is commonly used for paired data when those assumptions are not satisfied (Fagerland, 2012; Mishra et al., 2019). Qualitative data from post-training evaluation questionnaires were analyzed descriptively to identify participants' perceptions of the training materials, instructional quality, and relevance to their work. Responses were also summarized using Likert-scale averages to assess participant satisfaction with key training components. The combined findings were used to evaluate the effectiveness of the PILAR-based training model and identify areas for improvement. This study received ethical approval from the Research Ethics Committee under approval number 123/UN33.19.19/LL/2025.

Table 1. Research Design Overview

Component	Description
Research Approach	Qualitative
Research Design	Descriptive Case Study
Research Site	Public Islamic secondary school (Madrasah Aliyah)
Sampling Technique	Purposive Sampling
Data Sources	Primary (interviews, observations); Secondary (documents)
Data Collection Methods	Semi-structured interviews, direct observation, document analysis
Data Analysis	Thematic analysis (coding, categorization, theme development)
Trustworthiness	Triangulation, member checking, peer debriefing

RESULTS AND DISCUSSION

Result

Respondent Characteristics

In this sub-chapter, the characteristics of the respondents involved in this study will be discussed. This analysis includes various demographic aspects of the participants, including age, education, years of service experience, and the number of training sessions attended.

Table 2. Characteristic respondent

Characteristics	Intervention		Control	
Age				
20-25	5	19.23	7	26.92
26-30	17	65.38	15	57.69
31-35	3	11.54	2	7.69
36-40	1	3.85	2	7.69
Education				
DIII	18	69.23	16	61.54
SI	7	26.92	8	30.77
S2	1	3.85	2	7.69
Years of service				
< 5 years	15	57.69	18	69.23
6-10 years	9	34.62	6	23.08
11-15 years	1	3.85	1	3.85
16-20 years	1	3.85	1	3.85
Training that Midwives Have Attended				
1-4	23	88.46	24	92.31
5-9	3	11.54	2	7.69
Total	**26**	**100**	**26**	**100**

In this study, two groups participated: an intervention group that received training and a control group that did not. In terms of age, the majority of participants in both the intervention and control groups were in the 26-30 age range, with 65.38% in the intervention group and 57.69% in the control group. The intervention group had slightly more participants aged 20-25 years (19.23%) than the control group (26.92%). Regarding education, the majority of participants in both groups held a Diploma III (D3) degree. In the intervention group, 69.23% of participants had a Diploma III degree, while in the control group, this figure was slightly lower at 61.54%. A small proportion of participants in both groups held Bachelor's and Master's degrees, with a higher proportion in the control group (30.77%) than in the intervention group (26.92%).

Regarding length of service, in the intervention group, the majority of midwives had less than 5 years of service (57.69%), while in the control group, this figure was higher, at 69.23%. The intervention group had more midwives with 6-10 years of service (34.62%) than the control group (23.08%). Regarding training, the majority of midwives in both groups had attended 1-4 training sessions, with a slightly higher rate in the control group (92.31%) than in the intervention group (88.46%). Only a small number of participants had attended 5-9 training sessions, both in the intervention (11.54%) and control (7.69%) groups.

Effectiveness of training management based on Participatory, Collaborative, and Innovative.

The implementation stage in this study is the training evaluation stage, which includes testing the model's effectiveness and public dissemination of information on the application and use of the developed model. The effectiveness of the PILAR-based training management model is assessed through the completion of the midwife competency improvement test, which includes pretest and post-test questions administered in a limited test and a broad trial to determine whether there is an increase in midwife competency before and after the PILAR-based training management model.

The limited external trial phase included preparing the measuring instruments and facilitators. The next step was to conduct a trial of the measuring instruments that would be used in the study. The limited external trial involved 52 midwives, divided into 26 treatment groups and 26 control groups, randomly selected from 13 community health centers. The comparative results of the pretest and posttest scores of midwives in the treatment and control groups were as follows:

Table 3. Effect of midwife competency training

NO	Intervention				Control			
	Pretest		Posttest		Pretest		Posttest	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
Tall	0	0	22	85	0	0	0	0
Currently	24	92	4	15	0	0	0	0
Low	2	8	0	0	26	100	26	100

The study evaluated the impact of the intervention on midwife competence, as measured by pre- and posttests in two groups: the intervention and the control. The results showed that, before the intervention, no participants in the intervention group were in the high competency category. However, after the intervention, 22 participants (85%) increased their competency to the high category. Meanwhile, in the medium category, 24 participants (92%) were in the pretest, but only 4 (15%) moved up to a higher category after the intervention. In the low category, despite the intervention, no participants moved up to the high category. Overall, this study demonstrates that the intervention is efficacious in improving midwife competency, especially among participants with higher initial competency. Without the intervention, the control group did not experience significant changes, confirming the importance of the intervention in significantly improving midwife competency.

Table 4. Effectiveness of Collaborative, Participatory, and Innovative Training Management on Midwives' Competence (Max score: 70)

Variables	Treatment Mean±SD (n= 26)	Control Mean±SD (n=26)	p-value between groups
Competence			
Pretest	35.03 ± 7.660	34.07 ± 8.162	0.613 a)
Posttest	59.76 ± 4.974	35.52 ± 8.333	0.021 a)
Gain	24.73 ± 6.612	1.15 ± 1.00	0.001 b)

a)The mean difference between groups (pre-treatment test & pre-control test) was analyzed using the independent statistical test, t-test, at a significance level of 5%.

b)The mean differences between groups (treatment & control gain) were analyzed using the independent statistical test, t-test, at a significance level of 5%.

The analysis results showed a significant difference between the treatment and control groups in the competency measurements at the pretest, posttest, and gain. In the pretest measurement, the treatment group had an average score of 35.03 with a standard deviation of 7.660. In contrast, the control group had a slightly lower average score, namely 34.07, with a standard deviation of 8.162. However, the difference between the two groups on the pretest was not significant ($p = 0.61$; $p > 0.05$), indicating that both groups had similar levels of competency before treatment.

After treatment, the posttest results showed a significant difference between the two groups. The treatment group showed a significant increase, with an average score of 59.76 and a standard deviation of 4.974. In contrast, the control group achieved only an average score of 35.52 with a standard deviation of 8.333. The statistical test results showed a p-value of 0.021 ($p < 0.05$), indicating a significant difference between the two groups in the posttest. This shows that the treatment given had a positive impact on improving the competence of the treatment group compared to the control group.

The most striking difference is seen in the gain calculation, namely, the difference between the posttest and pretest scores. The treatment group achieved a very high gain of 24.73 (SD = 6.612), while the control group achieved a gain of 1.15 (SD = 1.00). Statistical tests on the difference in gain showed a p-value of 0.001 ($p < 0.05$), indicating a very significant difference between the treatment and control groups. This indicates that the treatment resulted in a much greater increase in competence in the treatment group than in the control group. Overall, these results indicate that the treatment group's competency improved significantly on the posttest and in the gain calculation compared to the control group. This indicates that the treatment was highly effective in improving participants' competency.

Evaluation of Activity Assessment

Evaluating training activities involves assessing their impact, such as the positive changes they bring about. Regardless of the training material, every training program provides a learning outcome evaluation. This process measures how well participants understand the information and how they feel about new ideas. Attitude scores determine how well participants engage with training activities, act appropriately, and pay attention during the training. Training organizers can assess their scores for each aspect by comparing their pretest and posttest results. Training organizers can also measure quality both synchronously and asynchronously. Subsequent training and education are critiqued to improve training delivery. The format for evaluating participants' feelings is a completed in-person questionnaire. Participants can use Google Forms, Microsoft Office, email, or other means to submit completed questionnaires. The trainer's delivery technique can be evaluated using a classic training evaluation format and by the event organizer.

Midwife Instructor Evaluation

From the questionnaire data collected, the results for the midwife instructors (Figure 1) were excellent, with an 88% response rate, indicating the instructors' success in training the midwife participants.

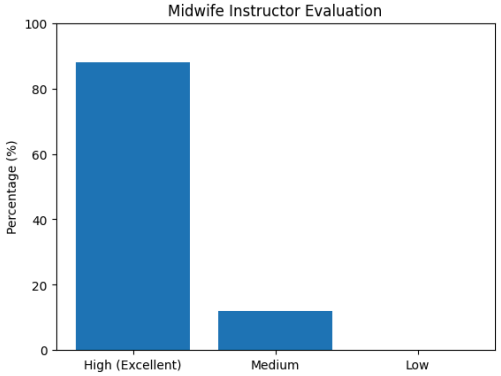

Figure 1. Midwife Instructor Evaluation.

Midwife Training Organizer

Based on the observation data, the questionnaire results were perfect for the organizers of the Midwife training management, as shown in Figure 2, with a 75% success rate in training the Midwife participants.

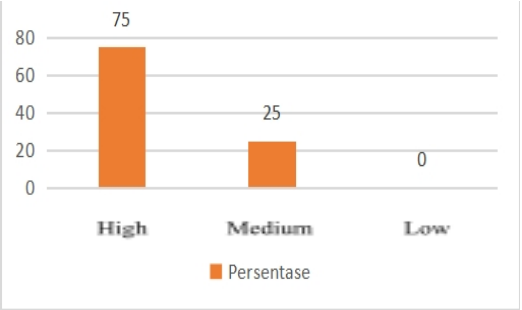

Figure 2. Evaluation of training participants

From the questionnaire data collected during the observation, the evaluation results of the training participants in the Midwife training management were obtained: very good, with 75% understanding and the ability to carry out the training.

Evaluation of Midwife Training Participants

From the questionnaire data collected, the evaluation results of training participants in midwife training management were obtained, namely, as shown in Figure 3, which was very good, with a percentage of 62.50% in understanding and being able to carry out the training.

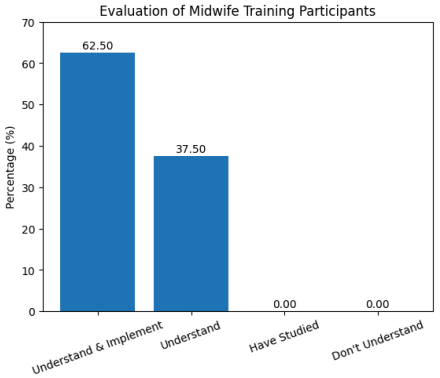

Figure 3. Evaluation of Midwife participants.

Evaluation of the Midwife Training Pillars

From the questionnaire data collection, the evaluation results of the training participants in the Midwife training management were obtained, as shown in Figure 4, and were very good, with a 100% score. Then, the participants understood and implemented this training at the Community Health Center where they work. So the success of the participant evaluation in training Midwife participants.

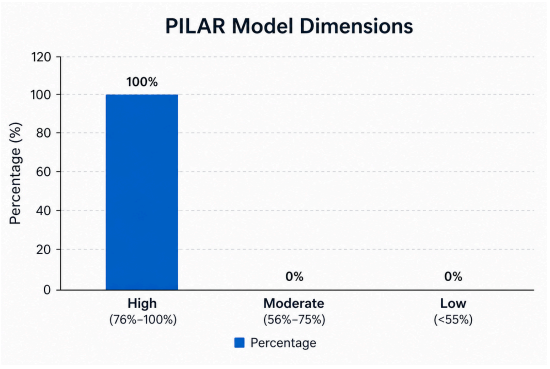

Figure 5. Evaluation of Midwifery Pillars based on Participatory, Innovative, Collaborative

Table 1. Summary of Inventory Management Findings

Aspect	Current Practice	Strengths	Limitations	Implications
Planning & Recording	Manual recording based on annual planning	Basic system established	Not digitally integrated	Limits data accuracy and speed
Implementation	Distribution based on needs	Clear task division	Limited coordination	Affects efficiency
Monitoring	Periodic inspection	Early detection	Weak documentation	Reduces maintenance effectiveness
Utilization	Used for planning and budgeting	Supports decisions	Data not always updated	Limits optimization

Discussion

The implementation aimed to demonstrate the influence of the competency-based training model on improving midwife competency. Subsequently, an analysis of differences in average pretest and post-test scores and the mean gain in observation scores before and after the implementation of the midwife training model was carried out. To assess the significance of differences in items, a statistical analysis of the difference in mean gain was conducted using the F test to assess homogeneity of variance, and a two-tailed t-test with $\alpha = 0.05$ (Sugiyono, 2007).

From the Table above, it can be seen that the average midwife competency before the Participatory, Innovative, Collaborative-based training in the treatment group was 35.03 with a standard deviation of 7.660. In the control group, the average midwife competency before training was 34.07, with a standard deviation of 8.162. The statistical test showed no significant difference between the treatment and control groups at the initial measurement (p=0.613). After the training, the average competency in the treatment group increased to 59.76 (standard deviation = 4.974), while in the control group it increased only to 35.52 (standard deviation = 8.333). The statistical test showed a significant difference between the treatment and control groups (p-value = 0.021). Furthermore, for the difference in gain value or increase in competence, the treatment group showed a greater increase, with an average gain of 24.73 and a standard deviation of 6.612, compared to the control group, which showed only an increase, with an average gain of 1.15 and a standard deviation of 1.00. Statistical tests showed a significant difference between the two groups (p-value = 0.001). From the Independent t-test, it can be concluded that Participatory, Innovative, Collaborative-based training is efficacious in improving midwives' competence, as evidenced by the significant difference between the treatment and control groups (p-value = 0.001).

This study tested the effectiveness of an intervention in improving midwives' competency through participatory, innovative, and collaborative training. Based on pretest and posttest results, the intervention group that received the training showed significant improvements in their competency. In contrast, the

control group that did not receive the intervention experienced no significant changes. 85% of participants in the intervention group advanced to the high category on the posttest, compared with 0% in the control group, which remained in the low category. This aligns with previous research showing that competency-based training can significantly improve midwives' knowledge and skills (Yuliana, 2011). Similar results were found in a study by (Purnomo et al., 2016), which revealed that practical training can improve employee competency, a finding that can be applied to the midwifery profession. This study indicates that participatory, innovative, management-based training can improve midwives' skills in their daily tasks. This is evident from the fact that 85% of participants in the intervention group achieved a high category after the training, compared to only 15% in the medium category.

In the moderate category, most participants remained there, although there was a significant decrease from 92% in the pretest to 15% in the posttest. This decrease suggests that while the training provided benefits, some participants may not have been able to apply the knowledge and skills learned in practical situations optimally. It also suggests that training effectiveness can vary depending on an individual's readiness to adopt change, a finding supported by previous research (Yuningsih, 2016). Furthermore, in the low category, despite receiving training, none of the participants successfully advanced to the high category. This may be due to various factors, including a lack of practical experience or limitations in the training materials provided. Research by (Jumawan et al., 2024; Pramono & Prahiawan, 2022) shows that while training can have a positive impact, in some cases, factors such as educational background and work experience also influence outcomes. This is relevant to the finding that participants with less background or less than 5 years of experience are more likely to remain in the low category. The control group, which received no training, showed very different results. No participants advanced to the high category on the posttest, indicating that without intervention, there was no significant change in competency. This aligns with research by (Farida, 2015), which found that without structured, competency-based training, midwives' work outcomes and performance remained stagnant. This research also demonstrates that training is a key element in improving the quality of healthcare workers, including midwives.

It is important to note that although pretest and posttest results showed improved competency, some participants in the intervention group still did not reach the high category. This suggests that training, while effective, requires a more holistic approach, including follow-up training and more practical application in the field to achieve optimal results. For example, research by (Adefolarin et al., 2021) emphasized the importance of ongoing training and supervision in improving midwives' skills. Training programs need to be assessed after all other parts of training management are completed. This final stage, called evaluation, can cause problems with training programs if not implemented properly. Assessment is necessary to obtain the final results of each activity. Gathering information for assessment is crucial because it provides the basis for the assessment. These results also demonstrate the importance of evaluation and feedback in the training process, as demonstrated in research by (Salas et al., 2012). Pretest and posttest evaluations are crucial steps in assessing training effectiveness and identifying areas for improvement. Furthermore, the importance of using a variety of training methods, such as lectures, group discussions, and case studies, has been shown to help participants understand and implement their knowledge in practice.

The findings of this study — showing that the *Participatory, Innovative, and Collaborative (PILAR)*-based training significantly improved midwives' competencies (gain mean = 24.73) — are consistent with international evidence on the effectiveness of practice-centered training interventions. A quasi-experimental study by Wu et al. (2024) in China reported that a simulation-based training workshop for obstetric emergency management among midwives led to a significant increase in participants' clinical confidence, teamwork scores, and overall competence after the intervention (Wu et al., 2024) Overall, the results of this study confirm that competency-based training, designed with a participatory, innovative, and collaborative approach, has been effective in improving midwives' competencies, particularly in stunting prevention. This study also provides valuable insights into the importance of targeted training interventions and the relevance of training materials to the challenges midwives face in the field. However, to achieve optimal results, this training needs to be complemented by continued support and ongoing evaluation.

Implication

The findings of this study have important global implications for strengthening midwifery competencies within diverse health system contexts. The *Participatory, Innovative, and Collaborative (PILAR)* training model demonstrated its effectiveness in enhancing knowledge, skills, and professional attitudes, suggesting that similar approaches could be successfully adapted and scaled in other low- and middle-income countries (LMICs). In alignment with the World Health Organization's Global Strategy on Human Resources for Health (2030), this model promotes interactive, context-based learning that empowers midwives as frontline providers in maternal and child health services. The PILAR framework can be integrated into continuous professional development (CPD) systems or pre-service education programs in countries facing similar challenges—such as limited resources, geographic disparities, and skill gaps among maternal health workers. Moreover, by emphasizing collaboration and participatory learning, the model aligns with international efforts to strengthen community-based healthcare delivery and reduce preventable maternal and child mortality. Therefore, this approach not only provides a practical training strategy for local health systems but also offers a scalable and adaptable framework that can inform global midwifery education standards and policy reforms to improve maternal and child health outcomes across diverse regions.

Limitation and Suggestion for Further Research

This study has several limitations that should be acknowledged. One major limitation was the long travel distance between research sites, as the participating midwives were dispersed across multiple community health centers (Puskesmas) in West Nias Regency. Geographical constraints and limited accessibility in some areas created logistical challenges and time constraints in organizing training and collecting data, which may have influenced participant attendance and focus during the sessions. Future research should focus on evaluating the long-term impact of the Participatory, Innovative, and Collaborative (PILAR) training model on midwives' performance and community health outcomes, such as reductions in stunting rates and improvements in maternal–child health indicators. Longitudinal studies with follow-up periods of six months to one year are recommended to assess the sustainability of competency improvements after training. In addition, future studies should explore the model's adaptability across different healthcare systems and cultural settings—for example, comparing its implementation in urban versus rural areas or in other countries with decentralized health systems. Mixed-method designs combining quantitative outcomes with qualitative interviews could provide deeper insights into the behavioral and organizational factors that influence training success. Finally, comparative studies integrating digital or blended learning components within the PILAR framework could help identify cost-effective and scalable approaches for professional development among midwives and other community health workers.

CONCLUSION

This study concludes that the Participatory, Innovative, and Collaborative (PILAR)-based training model effectively enhances midwives' competence in stunting prevention in West Nias Regency. By applying participatory, innovative, and collaborative learning principles, the training fostered active engagement, improved understanding, and strengthened the practical skills required for quality maternal and child health services. The findings highlight the importance of interactive and contextually relevant training as a strategy for professional development in midwifery. Therefore, integrating the PILAR model into continuous education programs is recommended to improve midwives' performance and support national efforts to reduce stunting through better maternal and child health practices.

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