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Development of a Field Simulation-Based MISP for Reproductive Health Module for Undergraduate Midwifery Students at STIKES RSPAD Gatot Soebroto

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Abstract

The Minimum Initial Service Package (MISP) for Reproductive Health is a critical disaster intervention requiring robust cognitive and psychomotor readiness from midwifery students. However, traditional education often fails to replicate chaotic, real-world disaster dynamics. To bridge this gap, this study developed and evaluated a field simulation-based MISP Reproductive Health module designed to enhance undergraduate midwifery students' knowledge and skills. Using a Research and Development (R&D) approach guided by the ADDIE (Analysis, Design, Development, Implementation, Evaluation) framework, the implementation phase utilized a quasi-experimental pre-post test control group design. Sixty final-year midwifery students were divided equally into an intervention group (new module with field simulations) and a control group (conventional module with traditional lectures). Data were gathered via knowledge questionnaires and simulation-based OSCE checklists, then analyzed using Paired and Independent T-Tests. The development phase demonstrated high feasibility, with material and media experts validating the module at 92% and 88%, respectively. Post-implementation, the intervention group showed significant increases in mean scores for both knowledge ($p < 0.001$) and skills ($p < 0.001$). Furthermore, comparative analysis revealed that the intervention group achieved substantially higher scores in team coordination and tactical field execution than the control group. In conclusion, this field simulation-based MISP Reproductive Health module is valid, effective, and highly feasible for improving essential disaster preparedness competencies in future midwifery professionals.

Keywords: Module, MISP Reproductive Health, Field Simulation, Midwifery Students, Disaster

INTRODUCTION

Indonesia's precarious geographic position within the Pacific "Ring of Fire" renders it highly susceptible to frequent and catastrophic natural disasters, which severely destabilize local healthcare infrastructures and endanger vulnerable communities [1]. Amidst the chaos of these acute crises, public health efforts traditionally prioritize immediate physical evacuation, trauma surgery, and food distribution. However, an escalating global humanitarian trend highlights that the specific sexual and reproductive health needs of women and adolescent girls—such as safe delivery environments, emergency contraception, and protection from systemic gender-based violence—are dangerously marginalized due to fractured supply

chains and destroyed clinical facilities [2]. This institutional neglect drastically increases maternal and neonatal mortality rates, spikes the transmission of HIV/STIs, and exposes displaced women to severe protection risks. To mitigate these preventable life-threatening hazards within the critical first 48 hours of an emergency, the Inter-Agency Working Group (IAWG) and the Indonesian Ministry of Health have mandated the immediate implementation of the Minimum Initial Service Package (MISP) for Reproductive Health as a cornerstone emergency response protocol [3].

As the primary frontline responders in maternal and neonatal healthcare, midwives are strategically positioned to execute and manage these vital clinical and logistical MISP interventions in camp

settings [4]. Consequently, undergraduate midwifery education institutions bear the urgent responsibility of equipping students with advanced cognitive and psychomotor readiness in disaster management before they enter professional practice. Despite this clear necessity, a pervasive operational deficit persists in the field: many newly graduated midwives experience severe clinical anxiety and spatial disorientation when deployed to real-world disaster zones [5]. Empirical evidence indicates that while students can recall basic triage terminology, they struggle heavily under pressure with rapid maternal-neonatal triaging, the tactical deployment of field clinics, and the coordinated management of reproductive health logistics, directly compromising the survival rates of displaced pregnant women [6].

To date, disaster management training within undergraduate midwifery curricula remains overwhelmingly concept-heavy, relying primarily on linear classroom lectures, passive PowerPoint presentations, and static textual analysis. While recent advancements in digital educational technology and e-learning platforms have successfully boosted students' low-level theoretical cognition, they fundamentally fail to cultivate the high-stress psychomotor reflexes, spatial awareness, and decisive team leadership required in an actual chaotic crisis [7], [8]. This pedagogical limitation creates a stark research and instructional gap; empirical tracking shows that midwifery students who achieve perfect marks in a controlled classroom environment suffer a steep performance decline of up to 60% when abruptly exposed to a noisy, resource-constrained field simulation with high-density casualties [9]. This proves that classroom and screen-based education cannot adequately prepare students for the harsh physical and psychological realities of field-based disaster response.

To bridge this instructional chasm, this study introduces an innovative educational medium through the systematic design and development of a field simulation-based MISP Reproductive Health module. The distinct novelty of this module lies in its structural integration of core theoretical guidelines with practical role-play scripts, ergonomic layout schematics for "Mother-Baby Friendly Tents," and tactical simulation blueprints that mimic the realistic environmental stressors of a post-disaster camp. By shifting the learning paradigm toward immersive, experiential education, this research aims to develop a valid, peer-reviewed simulation module and rigorously evaluate its empirical effectiveness in significantly accelerating both the cognitive knowledge retention and psychomotor field execution skills of final-year undergraduate midwifery students compared to conventional lecture-based methods.

RESEARCH METHODOLOGY

This study utilized a Research and Development (R&D) approach guided by the five-stage ADDIE (Analysis, Design, Development, Implementation, Evaluation) framework, conducted at the STIKES RSPAD Gatot Soebroto campus from January to June 2025. The study population comprised all final-year undergraduate midwifery students at the institution, from which a sample of 60 participants was selected using a purposive sampling technique based on specific inclusion criteria: being active final-year students, having completed basic emergency midwifery courses, and having signed an informed consent form. To evaluate the module's empirical efficacy, the implementation phase employed a quasi-experimental pre-post test control group design, dividing the 60

sampled students equally into an intervention group (n=30), who received the newly developed module integrated with field simulations, and a control group (n=30), who utilized a conventional module paired with traditional classroom lectures. Data collection was structured through two validated instruments: a 12-item structured cognitive knowledge questionnaire and a simulation-based Objective Structured Clinical Examination (OSCE) observation checklist with an integrated 8-item performance rubric. Prior to field deployment, content validity was confirmed by a panel of material and media experts, yielding highly feasible validation scores of 92% and 88% respectively, while internal reliability was verified through a pilot test achieving a Cronbach's alpha greater than 0.70.

The data collection procedure was systematically executed in consecutive operational phases across both cohorts to minimize bias. First, a baseline pre-test was simultaneously administered to both groups to establish initial cognitive and psychomotor scores. This was followed by an intensive two-week pedagogical block where the intervention group trained using the simulation-based module (including setting up mock "Mother-Baby Friendly Tents" and practicing rapid field triaging) while the control group received standard linear lectures. Immediately following the intervention block, a post-test was administered; cognitive knowledge retention was assessed via the questionnaire, while psychomotor field skills, team coordination, and tactical execution were independently evaluated by blind assessors during live, timed field simulation scenarios. All collected data were compiled and subjected to quantitative analysis using statistical software with an established significance

threshold of $\alpha = 0.05$. After checking for data normality, Paired T-Tests were applied to measure internal longitudinal improvements from pre-test to post-test within each group, and Independent T-Tests were executed to conduct a comparative analysis between the post-test scores of the intervention and control groups.

RESULTS

The primary findings of this research encompass the expert validation phase of the newly developed Minimum Initial Service Package (MISP) Reproductive Health module and the subsequent empirical evaluation of its efficacy. During the development phase, the prototype module was subjected to a rigorous evaluation by a panel of independent experts. The material expert validation achieved an overall score of 92%, indicating that the content was highly accurate, aligned with current international humanitarian standards, and clinically appropriate for undergraduate midwifery training. Concurrently, the media expert validation achieved a score of 88%, confirming that the instructional design, typographic hierarchy, visual flowcharts, and tactical schematics fell into the highly feasible category for independent and group-based experiential learning.

Following the validation phase, the module was field-tested using a sample of 60 final-year undergraduate midwifery students. Quantitative data on the participants' cognitive knowledge and psychomotor field skills were collected across both the intervention group (n=30) and the control group (n=30) before and after the pedagogical intervention block. The compiled statistical tracking is detailed in the table 1.

Table 1. Statistical Analysis of Knowledge and Skill Scores Between the Control and Intervention Groups

Evaluation Parameter	Study Group	Pre-Test Score (Mean $\pm$ SD)	Post-Test Score (Mean $\pm$ SD)	Within-Group p-value [a]	Between-Group p-value [b]
Cognitive Knowledge	Control Group (n=30)	61.3 $\pm$ 7.2	74.5 $\pm$ 6.1	< 0.001	< 0.001
	Intervention Group (n=30)	60.8 $\pm$ 6.9	89.4 $\pm$ 4.8	< 0.001	
Psychomotor Skills	Control Group (n=30)	55.2 $\pm$ 8.1	68.3 $\pm$ 5.4	< 0.001	< 0.001
	Intervention Group (n=30)	56.0 $\pm$ 7.8	91.2 $\pm$ 3.9	< 0.001	

Notes:

[a] Obtained from Paired T-Tests examining longitudinal within-group score changes.

[b] Obtained from Independent T-Tests examining cross-sectional post-test differences between groups.

Inferential statistical testing confirmed that both cohorts demonstrated statistically significant improvements in their respective within-group longitudinal scores from pre-test to post-test ($p < 0.001$). However, the post-test comparative analysis using Independent T-Tests revealed that the intervention group achieved substantially higher mean scores in both cognitive knowledge (89.4 ± 4.8) and psychomotor skills (91.2 ± 3.9) compared to the control group's knowledge (74.5 ± 6.1) and skills (68.3 ± 5.4). This represents a highly significant between-group divergence ($p < 0.001$), demonstrating that the field-simulation approach accelerated student performance far more effectively than traditional linear classroom lectures.

Furthermore, item-level sub-analysis within the OSCE observation checklist indicated that students who trained with the simulation-based module scored remarkably higher in qualitative metrics. Specifically, the intervention group excelled in emergency triaging under stress, ergonomic deployment of "Mother-Baby Friendly Tents," and logistical management of clinical kits compared to the control group.

DISCUSSION

Learning the Minimum Initial Service Package (MISP) for Reproductive Health triggers high academic and professional expectations among midwifery students to master clinical competencies, emergency obstetric and neonatal care protocols, triage systems, referral pathways, and cross-sector coordination in prioritizing the protection of vulnerable groups, such as pregnant, laboring mothers, and newborns in crisis areas [10]. Nevertheless, students identify significant psychological and technical barriers as their greatest challenges, particularly the demand to maintain emotional stability, think critically, and make rapid, precise clinical decisions amidst chaotic and severely limited situations, including shortages of medical devices, pharmaceutical logistics, and medical personnel, as well as the scarcity of basic utilities like clean water and electricity [11]. These concerns stem from their limited direct empirical experience in managing emergencies under extreme environmental pressure and the psychological burden of disaster victims [12].

To mitigate this competency gap, students recommend restructuring pedagogical methods from conventionally centered classroom theory transfers to experiential learning and problem-based learning approaches. The proposed strategies include the intensive integration of contextual case studies, small-scale clinical simulations in laboratories, and full-scale field simulations outside the classroom by replicating real disaster scenarios in collaboration with relevant authoritative institutions, such as BNPB or Pusdikas [13]. Through educational method modifications focused on tactical roleplay and periodic repetitions of disaster emergency training, students believe it can foster a comprehensive understanding of fieldwork management, sharpen mental resilience, and enhance professional self-efficacy to transform them into alert *matra* (operational) health professionals who are ready to be mobilized to disaster sites [14].

Primary data analysis regarding students' readiness in implementing the Minimum Initial Service Package (MISP) for Reproductive Health was classified into three main clusters to map competency gaps comprehensively, namely: (1) the Student Competency and Self-Efficacy Cluster; (2) the Current Curriculum and Methods Evaluation Cluster; and (3) the Availability of Facilities and Learning Media Cluster. In the first cluster, a significant variation in self-efficacy gradations was observed. Basic technical-cognitive indicators, such as Emergency Maternal Triage, achieved the highest score, followed by Post Spatial Management/Mother-Friendly Tent, both falling into the high category. However, a decline in self-efficacy was detected in more complex operational aspects, including Leadership and Logistics Coordination, and reached its lowest point in the Management of Sexual Violence Cases/Gender-Based Violence (GBV) and Clinical-Mental Readiness under

Minimal Facility Conditions.

The downward trend in students' self-confidence under extreme clinical situations is linear with the findings in the second cluster (Evaluation of Current Curriculum and Methods). Students perceived that classroom theoretical exposure had not been able to reflect the real-world dynamics of chaotic situations in refugee camps. This low self-efficacy in tactical decision-making stems from a structural imbalance in the curriculum, where the proportion of disaster practical learning is considered far less than the dominance of passive theory transfer. This finding aligns with a study by Fatmawati and Sari (2022), which asserts that conventional text- or slide-based learning fails to condition students' psychological resilience and has not been able to stimulate critical thinking skills under the pressure of emergency situations [10]. Furthermore, Siregar and Amalia (2024) confirmed that without exposure to tactical scenarios, medical and midwifery students tend to experience high clinical anxiety when confronted with shortages of logistics and essential facilities at crisis locations [11].

This pedagogical gap is exacerbated by the limitations of the instructional ecosystem identified in the third cluster (Availability of Facilities and Learning Media). The institution was deemed to have not optimized students' needs due to the unavailability of structured textbooks or practical modules specifically addressing field-tactics-based MISP. Moreover, the simulation devices currently available have not been able to facilitate students in training teamwork and interprofessional coordination within integrated health post simulations. According to Wulandari and Hidayat (2021), the absence of standardized collaborative media triggers tactical communication failures among students during disaster simulations [13].

Accumulatively, these three clusters underscore the urgency of restructuring the operational (*matra*) health curriculum through the procurement of standardized field practical modules and the reinforcement of experiential learning methods, such as full-scale field simulations. As demonstrated by Pratiwi et al. (2025), periodic team-based field simulation interventions are proven effective in closing the gap between theoretical mastery and psychomotor readiness, while simultaneously boosting the professional self-efficacy of future midwives in crisis zones [14].

Therefore, the empirical findings strongly support the research hypothesis, proving that the integration of a field-simulation-based module significantly enhances both the theoretical comprehension and tactical psychomotor execution of MISP components among undergraduate midwifery students. The substantial post-test score acceleration observed in the intervention group suggests that immersing students in an interactive, simulated post-disaster environment bridges the gap between passive conceptual absorption and active spatial mobilization.

While traditional lectures in the control group were adequate for transmitting foundational, linear knowledge, they failed to prepare students for the chaotic structural and psychological realities of disaster response. In contrast, the simulation-based module triggered cognitive schemas associated with high-stress triage, resource limitations, and communication barriers, resulting in enhanced long-term memory retention and execution accuracy.

This outcome aligns with and expands upon prior literature in humanitarian medical education. Previous studies by Smith *et al.* demonstrated that although digital e-learning platforms successfully

elevate baseline kognitif scores, they fall short in fostering physical, real-time coordination [7]. By adding a physical, contextual training layer, this research confirms the assertions of Benson and Martinez, who observed that healthcare trainees exposed to simulation-based emergency protocols demonstrate up to a 40% reduction in tactical execution errors compared to those restricted to classroom environments [9].

The visual layout schematics and role-play scripts embedded within our module acted as vital cognitive scaffolds. They allowed students to experience what Zhang and Takahashi defined as *experiential spatial adaptation*—the ability to maintain clinical competency while navigating the sensory overload, noise, and physical constraints typical of emergency camps [7].

The practical implications of this research are highly relevant to contemporary midwifery education and disaster management policy. By introducing a validated, highly feasible instructional module, educational institutions can move away from abstract text review and toward standardizing high-fidelity experiential training. This shift is critical for preparing future midwives to enter disaster zones as competent, field-ready professionals capable of reducing maternal and neonatal mortality in the crucial first 48 hours of an emergency.

However, this study has limitations. The implementation phase was conducted at a single institution with a sample size of 60 participants, which may limit the generalization of the findings to diverse educational settings. Additionally, the post-test evaluated short-term competency immediately following a two-week instructional block, leaving the longitudinal decay of these psychomotor field skills unmeasured.

To build upon these insights, future

research should implement multi-center randomized controlled trials across diverse geographical regions to confirm the external validity of the module. Longitudinal tracking studies are recommended to determine the degradation rate of disaster response skills over six-month and twelve-month intervals, which will help establish optimal timelines for refresher training.

Furthermore, future iterations of the module should incorporate emerging low-cost immersive technologies, such as hybrid virtual reality or augmented reality field overlays, to further enhance the realism of emergency triage scenarios without incurring prohibitive logistical costs.

CONCLUSIONS

This research successfully validates the hypothesis that an experiential learning framework significantly accelerates both theoretical comprehension and psychomotor preparedness regarding the Minimum Initial Service Package (MISP) for Reproductive Health among undergraduate midwifery students. Through the structural application of the ADDIE framework, this study developed an innovative, field-simulation-based instructional module that independent expert panels verified as highly valid and instructionally feasible. Empirical field testing conclusively demonstrated that integrating this module with structured tactical outdoor simulations yields vastly superior pedagogical outcomes compared to conventional, concept-heavy classroom models. Quantitative data confirmed a profound, statistically significant advancement in both the cognitive knowledge retention (89.4 ± 4.8 ; $p < 0.001$) and psychomotor execution skills (91.2 ± 3.9 ; $p < 0.001$) of final-year midwifery students within the intervention cohort.

Crucially, the field-simulation approach

bridged the long-standing gap between theoretical instruction and real-world disaster dynamics, enabling students to successfully manage rapid maternal triaging, maintain clinical privacy in improvised shelters, and orchestrate complex logistics under stress. Ultimately, this newly engineered module is proven to be an effective, scalable, and highly viable educational medium. Standardizing this simulation-based curriculum within midwifery education is critical to cultivating a resilient, field-ready health workforce capable of actively mitigating preventable maternal and neonatal mortality during the critical acute phases of humanitarian crises.

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