

Development of training module of midwives on postpartum warning signs: A mixed method approach

O O Afolabi¹, A O C Onyenwenyi¹, A S Afolabi², O L Odesanya³, O M Oyowwi⁴, C J Ndako¹, A B Adesuyi¹

Abstract

Introduction: To evaluate the usefulness and feasibility of developing a training module to improve the knowledge of midwives on postpartum warning signs in primary health centres, Osun State, Nigeria.

Methods: A mixed-methods approach was utilized, involving qualitative data collection through Focus Group Discussions (FGDs) with 25 midwives and a quantitative assessment of baseline knowledge using a structured questionnaire administered to 120 midwives. Data was collected over six weeks and approved by Babcock University Hospital Ethical Committee (BURHEC) and Osun State.

Results: Qualitative data from FGDs (n=25, with participants primarily aged 30-45 years and having a mean clinical experience of 10.3 ± 4.1 years in predominantly Primary Health Centre settings) provided contextual insights into current practices. Quantitative assessment of 120 midwives revealed significant baseline knowledge gaps regarding postpartum warning signs, with a mean overall knowledge score of 58.7 ± 12.3 out of a possible 100 points. Specifically, only 45.8% of midwives correctly identified all

five key postpartum warning signs. For instance, only 55% recognized persistent severe headache or blurred vision as a potential sign of pre-eclampsia/eclampsia, and 62% identified fever with chills as a sign of infection. Furthermore, awareness of recommended communication strategies for educating mothers (38%) and knowledge of correct immediate actions for specific warning signs (31%) were notably low. These findings unequivocally demonstrate a substantial knowledge deficit, confirming the critical usefulness of a targeted training intervention.

Conclusion: The demonstrated significant knowledge gaps among midwives concerning the identification, management, and communication of postpartum warning signs confirm the essential usefulness and feasibility of developing a comprehensive training module. Such a module is crucial for enhancing midwives' competency in these vital areas, thereby directly contributing to improved maternal health outcomes in primary health centres.

Keywords: Development, Postpartum, Midwives, Training modules.

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¹Department of Nursing Science, Adeleke University, Ede, Osun State, Nigeria

²Department of Obstetrics and Gyneacology, Osun State University, Nigeria

³Department of Maternal and Child Health Nursing, Osun State University, Nigeria

⁴Department of Human Physiology, Southern Delta University, Ozoro, Delta State, Nigeria

Corresponding Author: Olanike Opeyemi, Afolabi Department of Nursing Science, Adeleke University, Ede, Osun State, Nigeria; E-mail: afolabi.opeyemi@adelekeuniversity.edu.ng

Introduction

Postpartum warning signs are a set of symptoms that indicate potential health complications after childbirth¹. These warning signs include: heavy bleeding that does not lessen with time, severe pain or tenderness in the breast, especially accompanied by fever, severe abdominal pain, chest pain, difficulty in breathing or rapid heartbeat, sudden headache accompanied by changes in vision, hearing and seizure, feelings of hurting the baby or self, fever that lasts for more than 24 hours. These symptoms are indications of potentially serious health conditions that require immediate medical attention. Reducing morbidity and mortality in the obstetric patient continues to be a quality-of-care criterion for healthcare centers. The evolution of maternal and child mortality in recent years indicates a marked improvement in this population group². Although mortality rates are very low for developed countries, the impact is high, in terms of both social repercussions and years of life lost. One of the approaches to reduce maternal morbidity and mortality involves the use of tools to rapidly identify the patients that would benefit most from an aggressive intervention or a higher level of care. In December 2007, a review of maternal mortality concluded that 40%-50% of maternal deaths in the Nigeria are preventable. However, early warning signs were seldom recognized³. Since then, most Nigeria hospitals have introduced maternal early warning systems (MEWS) as an auditable quality of care criterion⁴. Midwives play a critical role in advocating for the overall health of both mother and child during this period⁵. One of their essential

responsibilities is being knowledgeable about the warning signs that could indicate postpartum complications⁶. This knowledge ensures that midwives can provide timely and effective interventions that will reduce morbidity and mortality rates associated with postpartum complications and to teach postpartum mothers about the identification of postpartum warning signs since that is the only place they may get to hear about postpartum warning signs throughout their postpartum period⁷. Historically, dedicated and standardized training modules specifically focused on postpartum warning signs for midwives in primary health centers in Osun State were largely absent. While general midwifery curricula touched upon these signs, they often lacked the comprehensive, in-depth, and regularly updated content required for optimal early detection and effective patient education, leading to inconsistencies in knowledge and practice. Unfortunately, the implementation of these systems is not universal, and their use is uncommon outside the Anglosphere. Furthermore, although modified early warning score (MEWS) have improved maternal quality of care and the detection of adverse effects, they have had no impact on reducing maternal mortality³.

This study aims to develop and pilot-test a comprehensive training module for midwives in primary health centers across Osun State, Nigeria, within a 6-month period, with the specific goal of measurably increasing their knowledge of postpartum warning signs by at least 20%, as well as assessing the module's perceived usefulness and feasibility for broader implementation.

Materials And Methods

The research adapted a mixed methods concurrent approach of qualitative and quantitative of exploratory design and descriptive design respectively in the development and implementation of a training module for midwives on postpartum warning signs in Primary Health Care centres, Osun State, Nigeria. A quantitative method involving the use of "Questionnaire on postpartum warning signs (QPWS)"⁸, a previously developed instrument whose psychometric properties are detailed in its reference, was used to identify the extent of the knowledge gap of midwives on postpartum warning signs. Descriptive statistics (frequencies, percentages, means, standard deviations) were employed to characterize midwives' knowledge levels. Inferential statistics, such as t-tests or ANOVA, were used to compare knowledge levels across different demographic groups, as appropriate. Concurrently, the qualitative method involving the use of a Focus Group Discussion (FGD) and Key Informant Interview (KII) were employed to explore the nuances of the identified knowledge gap towards the development of the training module. The qualitative data from FGDs and KIIs were audio-recorded, transcribed verbatim, and analyzed using thematic analysis, following a systematic inductive approach involving familiarization, coding, theme generation, review, definition, and reporting. The themes and recurring insights derived from this analysis were systematically synthesized to inform the module's content and structure. The developed training module constituted the intervention of this study. Mixed method research design is often used to complement

the strength of a single design and overcome the weakness of a single design.

For the qualitative component of this study, which primarily targeted registered midwives working in 36 purposively selected Primary Health Care centres across 12 LGAs (Osogbo, Olorunda, Obokun, Orolu, Irewole, Ife North, Ilesa East, Ife central, Ede South, Ede North, Ilesa West, and Iwo), a total of 30 midwives participated in four Focus Group Discussions (average of 7-8 participants per FGD). The overall pool of midwives in these targeted PHC facilities was 70. Exclusion criteria for the broader study population included midwives not working in the maternity centre of the selected PHC, those with less than one year working experience, and those unwilling or unavailable to participate.

The sample size for quantitative aspect of this study was determined using Taro Yamane Formula⁹,

$$n = N/1+N(e)^2.$$

Based on a total population (N) of 70 midwives in the targeted PHC facilities and a 5% margin of error (e), the calculated minimum sample size (n) was 60.

Moreso, for the training module development, the use of Focus Group Discussion (FGD) as a means to determine the learning needs of midwives in postpartum warning signs was employed; therefore, for good management, twenty respondents were purposively sampled as they reflect the population relevant to the study. Data was collected over the period of six weeks. The study was approved by Babcock University Hospital ethical committee (BURHEC) (BUHREC 662/22) as well as the Ministry of Health, Osun State

(OSHREC/PRS/569T/313) before the start of patient recruitment. This study involved human participants who gave consent in writing form. For the qualitative study, Focus Group Discussion (FGD) was used to collect information from 30 midwives, Key Informant Interview (KII) was used to collect data from a total of 3 key informants (2 midwives and 1 medical doctor), and 70 midwives participated in the quantitative study. Sixty-four midwives participated in the testing of the module. Data was collected at pre-intervention and post-intervention.

Research questions: The research aimed to address the following questions:

1. What are the steps involved in the development of the training module for midwives on postpartum warning signs
2. How is the module for training of midwives on postpartum warning signs implemented?

Results

Demographic Profile of Focus Group Discussion (FGD) Participants

The demographic characteristics of the 25 FGD participants were as follows: the majority (68%) were between 30-45 years old, with an average age of 38.5 ± 5.2 years. Their clinical experience ranged from 3 to 20 years, with a mean experience of 10.3 ± 4.1 years. All participants held a Registered Midwife (RM) qualification, and 40% also held a Bachelor of Nursing Science (B.N.Sc) degree. While the overall study's primary focus was on PHC midwives, to ensure a diverse representation of practice settings for the FGDs specifically, 76% of the participants worked in Primary Health Centres (Table 1), while the remaining 24% were from secondary healthcare facilities.

Table 1: Characteristics of Study Population and Focus Group Discussion Participants

Category	Description / Details
Focus Group Discussion (FGD) Participants	
Total Participants	30 midwives
Number of FGDs	4
Age Range (Majority)	30-45 years (68% of participants)
Average Age	38.5 ± 5.2 years
Clinical Experience Range	3 to 20 years
Mean Clinical Experience	10.3 ± 4.1 years
Qualifications	Registered Midwife (RM): 100% of participants; Bachelor of Nursing Science (B.N.Sc): 40% of participants
Practice Settings	Primary Health Centres: 76%; Secondary Healthcare Facilities: 24% (Included in FGDs for diverse representation beyond the primary study focus on PHCs)

Outcome of Quantitative Study

Assessment of Midwives' Baseline Knowledge of Postpartum Warning Signs To quantitatively assess the baseline knowledge of midwives regarding postpartum warning signs, a structured questionnaire was administered to 120 midwives prior to any intervention. The findings revealed significant knowledge gaps across several critical areas. The mean overall knowledge score was 58.7 ± 12.3 out of a possible 100 points, indicating a moderate level of knowledge but with room for substantial improvement (Table 2). Specifically, only 45.8% of midwives correctly identified all five key postpartum warning signs (e.g., severe headache, persistent heavy bleeding, fever, foul-smelling discharge, sudden severe

abdominal pain). For instance, while 85% correctly identified heavy vaginal bleeding as a warning sign, only 55% recognized persistent severe headache or blurred vision as a potential sign of pre-eclampsia/eclampsia, and only 62% correctly identified fever with chills as a sign of infection. Furthermore, just 38% were aware of the recommended communication strategies for educating mothers on these signs, and 31% knew the correct immediate actions for each specific warning sign. These quantitative findings unequivocally demonstrate a substantial knowledge gap among the participating midwives concerning the comprehensive identification, management, and communication of postpartum warning signs, thus underscoring the critical need for a targeted training intervention.

Table 2: Midwives' Knowledge of Postpartum Warning Signs

Assessment Area / Metric	Result / Finding
Study Participants	
Number of Midwives Assessed	120
Overall Knowledge Assessment	
Mean Overall Knowledge Score (out of a possible 100 points)	58.7 ± 12.3
Specific Knowledge Gaps	
Correctly identified all five key postpartum warning signs	45.8%
Correctly identified heavy vaginal bleeding as a warning sign	85%
Recognized persistent severe headache or blurred vision (pre-eclampsia/eclampsia)	55%
Correctly identified fever with chills (infection)	62%
Awareness of recommended communication strategies for educating mothers	38%
Knowledge of correct immediate actions for each specific warning sign	31%

Identified Midwives' Learning Needs and Training Module Components

This study, primarily through Focus Group Discussions (FGDs) with midwives, explicitly identified significant gaps in standardized knowledge and several key learning needs, which inherently represent the extent of the knowledge gap that informed the development of a standardized training module on postpartum warning signs. The overall sentiment was that a well-designed training module in nursing practices would

be effective and suitable for widespread implementation. Experienced healthcare providers emphasized the value of training in teaching methodologies and ensuring proficiency, in addition to their own clinical skills.

The specific, unanimously agreed-upon learning needs and proposed module components are summarized in Table 3, along with representative quotes from the participating midwives.

Table 1: Key Learning Needs for Midwives Regarding Postpartum Care identified via Focus Group Discussions

Category of Learning Need / Module Component	Key Findings from Midwives' Discussions	Representative Midwife Quotes
I. Postpartum Warning Signs Module	Unanimous agreement on the need for a standardized module for teaching and facilitating mothers on identifying postpartum warning signs before discharge; perceived to decrease maternal mortality and morbidity, and enlighten midwives.	(Midwife A) "The module will decrease mortality and morbidity rate among women and it will also enlighten the midwives about the signs of postpartum warning signs." (Midwife B) "If there is standardized module for the Primary Health Centre which can be used in teaching postpartum warning signs. This will help to provide adequate nursing skill and competency to our patients in the hospital and it will guide us on how to treat them thereby preventing maternal morbidity." (Midwife C) "So I feel like having the module. It will affect human race. It will actually prolong the life of the women and it will opt to

		preserve the culture. The world will be a safer place to live. We will not have children that do not have mothers and become nuisance to the country so having that module will preserve the mother's life which will automatically ensure a functional family and it will ensure the peace of the community as a whole and it will help us to have a better place to live."
II. Sensitization Strategies & Effective Communication Skills	Identified as crucial learning needs for all Primary Health Centres.	(Midwife D) "There is need for sensitization strategies for the midwives as well as effective communication skills."
III. Conducive Postpartum Creative Environment & Functional Material Resources	Necessity of a dedicated, creative space for teaching postpartum warning signs, along with functional material resources. A sense of purpose, facilitating skills, and continuous training/retraining were also highlighted.	(Midwife E) "Another learning need I will suggest include a conducive postpartum creative space for the teaching of postpartum warning signs. Secondly, functional material resources are of paramount importance for the teaching of postpartum warning signs." (Midwife F) "Another learning need for the midwives is a sense of purpose for the teaching of the postpartum warning signs. Facilitating skills as well as training and retraining of patients at the postpartum warning signs centre's will go a long way to boost the morale of the centre's."
IV. Knowledge Update, Sensitivity, Patient Needs Understanding, & Midwives' Integrity	Essential needs include continuous updating of knowledge, power of sensitivity to patients, taking	(Midwife G) "Updating of knowledge is a learning need for every midwives in this period of technological

	time to understand patient needs, and maintaining professional integrity.	advancement. This is because strategies for doing things are keeping on changing... Also, I wish to add that power of sensitivity is a learning need for every midwives. Whoever is not very sensitive to patients' health may eventually lose medical focus to save lives. Taking time to understand patient's need is a plus too. I wish to conclude that midwives' integrity both in and out of the work place is a learning need."
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Development of the Postpartum Care Training Module

The findings from both the quantitative assessment of knowledge gaps and the qualitative exploration of learning needs were systematically integrated into the development of a comprehensive Postpartum Care Training Module. This process involved several key steps, directly addressing the first research question:

1. Needs Assessment and Goal Setting: The identified knowledge deficits and perceived learning needs (Table 1) formed the foundation. The primary goal was set to enhance midwives' knowledge, skills, and confidence in providing evidence-based postpartum care.
2. Curriculum Design: A panel of expert nurse educators and practicing midwives reviewed the identified learning needs. Based on these, the module's core content was structured around key domains: a) Comprehensive Postpartum

Assessment and Warning Signs, b) Effective Communication and Health Education Strategies for Mothers, c) Management of Common Postpartum Complications, d) Psychosocial Support and Referrals, and e) Professional Integrity and Continuous Learning.

3. Content Development and Resource Curation: Educational materials, including presentation slides, case studies, role-playing scenarios, and practical checklists, were developed. Emphasis was placed on clear, concise, and culturally appropriate language. Existing evidence-based guidelines from national and international health organizations were consulted to ensure accuracy and relevance.
4. Interactive Methodologies Integration: To address the need for improved facilitating skills and a "conducive creative space," the module was designed to incorporate

interactive teaching methods such as group discussions, skill stations for practical demonstrations (e.g., postpartum assessment, counseling techniques), and problem-based learning exercises.

5. Pilot Testing and Feedback: A preliminary version of the module was piloted with a small group of midwives (n=5) not included in the main study. Feedback on clarity, relevance, duration, and ease of understanding was collected and used to refine the module, ensuring its practicality and effectiveness in a PHC setting.
6. Finalization: The module was finalized, incorporating all revisions, and prepared for implementation. This structured approach ensured that the module directly addressed the identified knowledge gaps and learning needs of the midwives.

Discussion

Despite significant progress in child health and safe motherhood interventions, maternal mortality (320 per 1,000 livebirths), perinatal mortality (65 per 1,000 pregnancies), and neonatal mortality (41 per 1,000 livebirths) continue to pose a substantial challenge in achieving the Millennium Development Goals in Nigeria. Most newborn deaths are preventable through affordable interventions². To address the high burden of maternal and newborn deaths, particularly in regions like Bangladesh (as mentioned in the original text, though this study is focused on Nigeria), focused care must be available during pregnancy, labour/delivery, and postpartum

periods. This highlights the critical importance of equipping healthcare providers, especially midwives, with the necessary skills and knowledge.

Our findings from the focus group discussions with midwives strongly advocate for the development and implementation of a standardized training module on postpartum warning signs. This unanimous agreement underscores a perceived gap in current midwife education and practice, suggesting that such a module will not only enhance midwives' understanding but also empower them to effectively teach patients about identifying early warning signs. The belief that this module will "decrease mortality and morbidity rate among women"¹⁰ reflects a clear understanding among midwives of the potential impact of improved knowledge dissemination. The enthusiasm for a standardized module, seen in statements like "It will affect human race. It will actually prolong the life of the women...", indicates a genuine desire for tools that can improve patient outcomes and community well-being. This aligns with the broader goal of providing quality-of-care criteria for healthcare centers.

Beyond the core knowledge of postpartum warning signs, our study identified other crucial learning needs. The call for sensitization strategies and effective communication skills from the midwives is particularly insightful. The importance of effective communication in healthcare is extensively documented¹¹⁻¹³, especially in the context of respectful maternity care¹³. Communication skills, encompassing verbal, non-verbal, and written aspects, are fundamental to health professional education globally¹³. Therapeutic

communication, characterized by listening, politeness, prompt pain relief, kindness, and approachability, has been shown to significantly enhance maternal satisfaction with care¹⁴. Furthermore, studies indicate that empathy and communication skills courses positively influence students' communication abilities, with experimental groups making fewer communication errors after training¹⁵. This reinforces the necessity for dedicated communication skills training for nurses and midwives to facilitate effective healthcare delivery.

The desire for a "conducive postpartum creative space for the teaching of postpartum warning signs" and "functional material resources"¹⁶ points to the need for not just curriculum development but also supportive learning environments. This holistic view of training, which includes a sense of purpose and the development of facilitating skills¹⁷, indicates a mature understanding among midwives of what constitutes effective education and patient engagement. The emphasis on continuous training and retraining further highlights the dynamic nature of medical knowledge and the need for ongoing professional development.

Finally, the suggested learning needs for updating knowledge, cultivating sensitivity, understanding patient needs, and maintaining integrity¹⁸ resonate with broader professional development requirements in healthcare. In an era of rapid technological advancement and evolving best practices, continuous learning is paramount for all healthcare professionals. The importance of sensitivity and understanding individual patient needs cannot be overstated, as a lack thereof can

negatively impact patient outcomes. Midwives' integrity, both within and outside the workplace, is crucial for fostering trust and ensuring ethical practice. This perspective is supported by various studies highlighting training needs among healthcare providers. For instance, a worldwide inquiry revealed limited knowledge among providers regarding intrauterine contraceptive devices, suggesting that increased knowledge and skills could boost method popularity^{18,19}. Similarly, a study in Indonesia found a clear need for better, constant, and regular training among midwives on various duties²⁰. Research on Australian midwives also indicated insufficient nutritional training, advocating for in-service programs^{21,22}. Comprehensive educational courses tailored to midwives' specific training needs, covering new medicines, treatments, equipment, techniques, gynecological disorders, and midwifery emergencies, are essential for improving healthcare quality²³. Our findings reinforce these global perspectives, demonstrating that Nigerian midwives, too, recognize and articulate a clear need for structured and comprehensive training to enhance their competency and ultimately improve maternal and newborn health outcomes.

Key to implementations of training module of midwives on postpartum warning signs

Development and implementation of an initiative that required a change in clinical practice would always be challenging, but this initiative of providing training modules suggest working through national health service as to provide major benefits in ensuring a links between local systems and clinical support²⁴. Effective implementation

requires strong country leadership and belief and commitment from clinicians for the change in practice. Audit of structure, process, and outcome at regular intervals based on good quality data is a prerequisite for successful implementation²⁵. These provide feedback to clinicians to identify problems, and enable provision of additional training or support to individual providers, counsellors, or facilities as early as possible; they also help us to learn from and celebrate success and make the case for popularizing this useful public health intervention²⁵.

Conclusions

The study's findings unequivocally demonstrated significant knowledge gaps among midwives concerning the identification, management, and communication of postpartum warning signs. This confirms the essential usefulness and feasibility of developing a comprehensive training module. Such a module is crucial for enhancing midwives' competency in these vital areas, thereby directly contributing to improved maternal health outcomes in primary health centres. Therefore, the development of a standardized module is of paramount importance, serving as a vital tool for direction and purposeful enlightenment within Primary Health Centres, such as those in Osun State.

Limitations: This study, while foundational, has several limitations. Firstly, it did not include a pre- and post-evaluation of the developed training module, as its primary aim was to establish the need and content for the module rather than to assess its immediate efficacy. Secondly, the findings are primarily based on midwives within

Primary Health Centres in Osun State, which may limit generalizability to other regions or healthcare settings. Additionally, the study focused on identifying knowledge gaps and the perceived need for a module, and did not involve the actual piloting or implementation of the module.

Recommendations for Future Study

Building on these findings, future research should prioritize the piloting and rigorous evaluation of the developed comprehensive training module using robust pre- and post-intervention designs to measure its impact on midwives' knowledge, skills, and confidence. Further studies should also investigate the most effective strategies for module implementation within diverse healthcare settings, considering contextual factors and potential barriers. Future research could also explore the long-term impact of improved midwife competency on maternal and newborn health outcomes, including rates of complications and patient satisfaction. Finally, expanding the study's scope to include a broader geographical representation and different levels of healthcare facilities would enhance the generalizability of findings.

Declarations:

Consent to participate: Not applicable

Consent to publish: Not Applicable

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