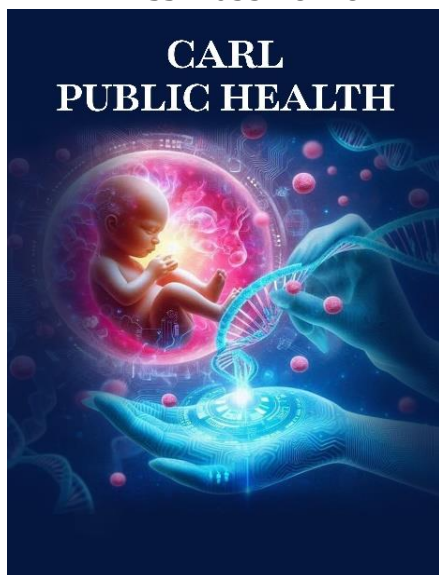


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Authors

^aNjobara, I. K. L., ^aEdet, O. B.,
^aIhudiebube-Splendor, C.

^aAfrica Centre of Excellence in Public Health and Toxicological research (ACEPUTOR), University of Port Harcourt

Correspondent

Njobara, I. K. L.
(kinkohian@yahoo.com)

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Effectiveness of Workplace Educational Intervention on Hegenberger Retractor Use for Perineal Tear Repair among Midwives in Cameroon

Abstract

Perineal trauma remains a significant contributor to postpartum morbidity, often resulting in complications such as pain, infection, dyspareunia, and anal incontinence. Inadequate visualization during repair and limited competency among midwives contribute to suboptimal outcomes. The Hegenberger retractor has been introduced to improve surgical exposure during perineal repair, yet its utilization remains low in many low-resource settings. This study evaluated the effectiveness of a workplace educational intervention on the knowledge, skills, and utilization of the Hegenberger retractor among midwives in Mboppi Baptist Hospital, Douala, Cameroon. A quasi-experimental pretest–posttest design without a control group was employed. A total of 144 registered midwives participated. The intervention consisted of structured didactic teaching, demonstration, simulation-based hands-on training, and supervised clinical practice over two days, followed by four weeks of practice reinforcement. Data were collected using a structured questionnaire, observational checklist, and practice audit tool. Pre- and post-intervention outcomes were analyzed using paired t-tests at a significance level of $p < 0.05$. The majority of participants were female (91.7%), with most (66.7%) having 3–10 years of clinical experience. Knowledge scores improved significantly from a pre-intervention mean of 56.2% to a post-intervention mean of 85.7% ($p < 0.001$). Similarly, clinical skills competency increased from 48.5% to 82.3% ($p < 0.001$). Utilization of the Hegenberger retractor rose markedly from 22.9% pre-intervention to 71.4% post-intervention, indicating substantial behavioral change. The workplace educational intervention was highly effective in improving midwives' knowledge, clinical competence, and utilization of the Hegenberger retractor in perineal tear repair. The findings underscore the value of structured, hands-on, workplace-based training in strengthening obstetric practice and improving maternal care outcomes in resource-limited settings.

Keywords: Cameroon, Hegenberger Retractor, Maternal Health, Midwives, Perineal Tear Repair, Workplace Education

Introduction

Perineal trauma during vaginal childbirth is a major contributor to postpartum morbidity, with significant implications for women's physical, psychological, and sexual health. A large proportion of women experience some degree of perineal injury, ranging from minor lacerations to severe obstetric anal sphincter injuries. When poorly managed, these injuries can result in complications such as infection, chronic perineal pain, dyspareunia, and anal incontinence, all of which negatively affect quality of life (World Health Organization [WHO], 2018; Kettle & Dowswell, 2012; Sultan, 1999). Accurate classification and effective repair of perineal tears are essential to preventing these adverse outcomes. Standardized classification systems guide appropriate repair techniques, while proper visualization and use of suitable instruments enhance precision during suturing. Evidence suggests that meticulous repair reduces the risk of wound breakdown, infection, and long-term pelvic floor dysfunction (Andrews et al., 2006). However, achieving optimal outcomes depends on both the clinical competence of the



provider and the availability of appropriate tools.

Despite advances in obstetric care, challenges remain pronounced in low- and middle-income countries. These include inadequate training of midwives, poor adherence to clinical guidelines, and limited access to essential instruments. Such constraints contribute to suboptimal perineal repair practices and increased maternal morbidity (Ameh & van den Broek, 2015; WHO, 2018). The Hegenberger retractor is a valuable instrument that enhances visualization of the vaginal canal and perineal structures during repair, thereby improving accuracy and outcomes. However, its use among midwives remains limited, largely due to insufficient training and lack of familiarity.

Workplace educational interventions have proven effective in addressing such gaps by combining theoretical instruction with hands-on practice. These interventions promote context-specific learning, immediate application, and sustained improvement in clinical competence. This study therefore evaluates the effectiveness of a structured workplace educational intervention in improving midwives' use of the Hegenberger retractor for perineal tear repair.

Literature Review

Perineal trauma is a common obstetric complication associated with vaginal delivery and remains a significant contributor to short- and long-term maternal morbidity. Studies consistently show that up to 85% of women experience some degree of perineal injury during childbirth, with severity ranging from superficial skin lacerations to obstetric anal sphincter injuries (OASIS) (Sultan, 1999; Andrews et al., 2006). The consequences of poorly managed perineal trauma include wound infection, chronic pelvic pain, sexual dysfunction, and fecal incontinence, all of which significantly impair quality of life (Kettle & Dowswell, 2012).

Perineal Tear Classification and Repair Practices

Accurate classification of perineal tears is fundamental to effective management. The Royal College of Obstetricians and Gynaecologists (RCOG) classification system remains widely used, categorizing tears into first through fourth degrees based on tissue involvement. Evidence suggests that correct identification of tear severity is directly associated with improved repair outcomes and reduced complications (Fernando et al., 2006). However, studies from low- and middle-income countries (LMICs) indicate frequent misclassification and inconsistent repair techniques due to inadequate training and limited supervision.

Challenges in Low-Resource Settings

In LMICs, the quality of perineal repair is often compromised by systemic constraints, including inadequate staffing, insufficient continuing professional development, and lack of essential obstetric instruments. Ameh and van den Broek (2015) emphasize that gaps in emergency obstetric training significantly affect clinical competence among midwives. Furthermore, poor adherence to standardized guidelines contributes to variability in practice and suboptimal maternal outcomes.

Role of Visualization and Instrumentation

Effective perineal repair requires optimal visualization of the vaginal canal and perineal tissues. Poor lighting and inadequate exposure are recognized barriers to accurate suturing. Surgical instruments that improve visualization, such as specialized retractors, are therefore critical in enhancing repair precision and reducing missed injuries. Improved exposure allows for better anatomical alignment, which is essential for tissue healing and functional recovery.

Workplace Educational Interventions

Workplace-based training has been identified as an effective strategy for improving healthcare worker performance. Frenk et al. (2010) argue that competency-based, context-specific training significantly enhances clinical outcomes by integrating learning with real practice environments. Similarly, Ameh et al. (2019) report that simulation-based and on-the-job training improves both knowledge retention and procedural skills among maternity care providers. These interventions are particularly valuable in resource-limited settings where access to formal continuing education may be restricted.

Method and Materials

Study Design

A quasi-experimental pretest–posttest design without a control group was adopted to evaluate the effect of a workplace educational intervention on midwives' knowledge, skills, and utilization of the Hegenberger retractor. This design was considered appropriate because it allows measurement of change in outcomes within the same group before and after an intervention, particularly in real-world clinical settings where randomization may not be feasible.

Study Setting

The study was conducted at Mboppi Baptist Hospital, Douala, Cameroon. The hospital is a secondary-level healthcare facility that provides comprehensive maternal and child health services, including antenatal care, intrapartum management, and postnatal care. The maternity unit serves a high volume of deliveries, making it an appropriate setting for evaluating obstetric practice interventions.

Study Population

The study population comprised all registered midwives working in the maternity unit of the hospital during the study period. A total of 144 midwives met the inclusion criteria, which included being actively involved in maternity care and willingness to participate. All eligible participants consented, resulting in a complete enumeration (census) sampling approach.

Intervention

The intervention was a structured workplace educational program aimed at improving competence in perineal tear repair using the Hegenberger retractor. It included:

1. Didactic sessions: Focused on perineal anatomy, classification of perineal tears, and principles of effective repair based on standard obstetric guidelines.
2. Demonstration: Practical demonstration of correct handling and application of the Hegenberger retractor to enhance visualization during suturing.
3. Hands-on training: Simulation-based exercises and supervised practice in clinical settings to reinforce procedural skills and improve confidence.
4. Educational materials: Provision of manuals, step-by-step guides, and visual aids to support continuous learning and reference.

The intervention was delivered over a two-day intensive training period, followed by a four-week supervised clinical practice phase to reinforce skill acquisition and encourage routine application.

Data Collection Tools

Data were collected using three main instruments:

1. A structured questionnaire to assess knowledge of perineal tear classification, repair principles, and instrument use.

2. An observational checklist used to evaluate clinical skills and competency during perineal repair procedures.
3. A practice audit form designed to measure the frequency and consistency of Hegenberger retractor utilization in routine clinical care.

Validity and Reliability

Content validity of the instruments was established through expert review by specialists in midwifery and obstetric care. Reliability testing of the questionnaire and checklist yielded a Cronbach's alpha coefficient of 0.82, indicating good internal consistency.

Data Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics summarized participant characteristics and outcome variables. Paired sample t-tests were used to compare pre- and post-intervention scores. Statistical significance was determined at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the hospital's research and ethics review board prior to commencement of the study. Written informed consent was obtained from all participants. Confidentiality and anonymity were strictly maintained throughout the study, and participation was voluntary with the right to withdraw at any time without penalty.

Results and Discussion

Socio-Demographic Characteristics

Table 1 presents the socio-demographic characteristics of the 144 participants. The findings show that the majority of respondents were female (91.7%), reflecting the predominance of women in the midwifery profession. In terms of age distribution, half of the participants (50.0%) were within the 30–39 years age group, indicating a relatively young and economically active workforce. Regarding professional experience, Table 1 shows that most respondents (66.7%) had between 3–10 years of clinical experience, suggesting a moderately experienced group with sufficient exposure to maternity care practices but still within a phase where skill enhancement interventions are highly impactful. Overall, Table 1 indicates a workforce that is predominantly female, mid-career, and actively engaged in clinical practice, making them suitable for targeted capacity-building interventions.

Knowledge Improvement

Table 2 demonstrates a marked improvement in midwives' knowledge following the educational intervention. The mean pre-test score of 56.2% increased significantly to 85.7% in the post-test assessment. This improvement was statistically significant ($t = 14.82, p < 0.001$), indicating that the observed change was not due to chance. The large increase in mean scores reflects the effectiveness of the workplace-based educational intervention in enhancing theoretical understanding of perineal tear classification and the use of the Hegenberger retractor. The reduction in standard deviation post-intervention also suggests more uniform knowledge acquisition among participants, indicating improved consistency in understanding across the cohort.

Table 1: Socio-Demographic Profile of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	132	91.7
	Male	12	8.3
Age (years)	<30	38	26.4
	30–39	72	50.0
	≥40	34	23.6
Years of Experience	<3 years	18	12.5
	3–10 years	96	66.7
	>10 years	30	20.8

Table 2: Pre- and Post-Intervention Knowledge Scores

Measure	Mean (%)	Standard Deviation	t-value	p-value
Pre-test knowledge	56.2	8.4	14.82	<0.001
Post-test knowledge	85.7	6.1		

Table 3: Pre- and Post-Intervention Skills Performance

Measure	Mean (%)	Standard Deviation	t-value	p-value
Pre-intervention skills	48.5	7.9	16.41	<0.001
Post-intervention skills	82.3	5.8		

Utilization of Hegenberger Retractor

Table 4 shows a substantial increase in the utilization of the Hegenberger retractor following the intervention. Prior to training, only 22.9% of participants reported or demonstrated routine use of the instrument. Post-intervention, utilization increased significantly to 71.4%,

Skills Competency

Table 3 presents the clinical competency scores before and after the intervention. The mean skills score improved substantially from 48.5% at baseline to 82.3% after the intervention. This improvement was statistically significant ($t = 16.41, p < 0.001$), confirming the effectiveness of the training in enhancing procedural competence. The findings indicate that participants transitioned from moderate to high competency levels in perineal repair techniques. This suggests that the combination of didactic teaching, demonstration, and hands-on simulation effectively strengthened psychomotor skills. The reduced variability in post-test scores further indicates improved standardization of clinical performance among midwives.

reflecting a 48.5% absolute improvement. This sharp increase demonstrates successful translation of knowledge and skills into clinical practice. It suggests that the intervention not only improved cognitive and technical competencies but also influenced behavioral change in instrument adoption. The findings highlight

the effectiveness of workplace-based training in promoting evidence-based practice and improving uptake of clinical tools in maternity care settings.

Table 4: Frequency of Retractor Use

Measure	Pre-intervention (%)	Post-intervention (%)	Improvement (%)
Use of Hegenberger retractor	22.9	71.4	+48.5

Barriers Identified

- Lack of prior training
- Limited availability of instruments
- Resistance to change in established practices

Discussion of Findings

The findings of this study demonstrate that a structured workplace educational intervention significantly improved midwives’ knowledge, clinical skills, and utilization of the Hegenberger retractor for perineal tear repair. These improvements are consistent with existing evidence emphasizing the effectiveness of targeted, practice-based training in strengthening obstetric competencies, particularly in low-resource settings.

The substantial increase in knowledge scores (56.2% to 85.7%) aligns with the findings of Ameh and van den Broek (2015), who reported that structured emergency obstetric training significantly enhances theoretical understanding and decision-making capacity among maternity care providers. Similarly, Frenk et al. (2010) highlighted that competency-based education, particularly when delivered in the workplace, promotes deeper learning and long-term retention compared to traditional didactic methods. The present study reinforces this perspective by demonstrating that midwives rapidly acquired and retained knowledge when training was contextualized within their clinical environment.

Improvements in clinical skills competency (48.5% to 82.3%) further support the effectiveness of simulation-based and hands-on training approaches. This finding is consistent with Ameh et al. (2019), who observed that simulation and supervised clinical practice significantly

improve procedural competence among midwives and nurses in maternal health care. Similarly, Kirkpatrick-based evaluations of clinical training programs have consistently shown that skills acquisition is highest when learners engage in repeated practice under supervision, as was implemented in this study. The marked improvement observed in Table 3 suggests that combining demonstration with guided practice enhances psychomotor skill development in perineal repair procedures.

The significant increase in utilization of the Hegenberger retractor (22.9% to 71.4%) demonstrates successful translation of knowledge and skills into clinical practice. This behavioral change is particularly important, as evidence suggests that adoption of improved obstetric tools is often hindered by lack of exposure and confidence rather than unavailability alone. This finding aligns with WHO (2018) recommendations, which emphasize that improving intrapartum care quality requires not only knowledge enhancement but also practical reinforcement of essential clinical tools and techniques.

Despite these improvements, baseline findings suggest underutilization of evidence-based instruments prior to the intervention, reflecting broader systemic challenges in low- and middle-income countries. Similar gaps have been documented by Kettle and Dowswell (2012), who noted variability in perineal repair practices and limited adherence to standardized guidelines across maternity units. Such inconsistencies are often attributed to inadequate continuing professional development opportunities and weak clinical mentorship structures.

Above all, the results suggest that workplace-based educational interventions are highly effective in bridging the gap between knowledge and practice. The integration of didactic teaching, demonstration, simulation, and supervised clinical application proved essential in achieving sustained improvements across cognitive, psychomotor, and behavioral domains. These findings support the argument that strengthening midwifery capacity through context-specific training is critical to improving maternal health outcomes in resource-constrained settings.

Conclusion

The study demonstrates that a structured workplace educational intervention is highly effective in improving midwives' knowledge, clinical skills, and utilization of the Hegenberger retractor for perineal tear repair in Mboppi Baptist Hospital, Douala, Cameroon. The significant improvements observed in knowledge (56.2% to 85.7%), skills competency (48.5% to 82.3%), and retractor utilization (22.9% to 71.4%) indicate that targeted, context-specific training can produce measurable and meaningful changes in both clinical competence and practice behavior. The findings further confirm that workplace-based learning, which integrates didactic instruction with hands-on simulation and supervised practice, is an effective strategy for strengthening midwifery performance. This approach not only enhances theoretical understanding but also promotes the translation of knowledge into improved clinical practice. Overall, the intervention contributed to closing critical gaps in obstetric care delivery and supports the broader goal of improving maternal health outcomes in resource-limited settings.

1. Institutionalization of Continuous Training: Hospital management should adopt regular workplace-based training programs to sustain and update midwives' competencies in perineal tear classification and repair techniques.
2. Integration into Continuing Professional Development (CPD): Training on the use of the

Hegenberger retractor and other essential obstetric instruments should be incorporated into mandatory CPD programs for midwives.

3. Provision of Essential Equipment: Health facilities should ensure the consistent availability of the Hegenberger retractor and other necessary tools to facilitate proper clinical application and reinforce training outcomes.
4. Strengthening Clinical Mentorship: Establish structured mentorship and supervision systems within maternity units to support continuous skill reinforcement and adherence to best practices.
5. Policy Support for Skill-Based Training: Health authorities and nursing councils should promote competency-based, simulation-driven training approaches as part of national maternal health improvement strategies.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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