



“A STUDY TO ASSESS EFFECTIVENESS OF EDUCATION SESSION WITH MOCK-DRILL ON KNOWLEDGE AND SKILL REGARDING E-MOTIVE INTERVENTION FOR POSTPARTUM HAEMORRHAGE (PPH) PREVENTION AMONG NURSES IN SELECTED HOSPITALS.”

¹ Mrs. Jotsna Murkut, ² Dr. Anita Soni, ³ Mr. Sandip Murkut

¹ MSc Nursing/Nursing officer, IGGMC&H, Nagpur, Maharashtra, India.

² Assistant Professor & HOD, (Obstetrics and Gynecological Nursing) College of Nursing GMC Nagpur, Maharashtra, India.

³ MSc Nursing/Nursing officer, GMC&H, Nagpur, Maharashtra, India.

Corresponding author: Jotsna Sandip Murkut **Email:** jotsnamurkut@gmail.com

Abstract

Introduction: Postpartum haemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide¹. Early detection and prompt management are essential to prevent adverse maternal outcomes². The World Health Organization (WHO) recommends the E-MOTIVE intervention, which focuses on early blood loss measurement and timely implementation of a standardized treatment bundle for effective PPH prevention and management³. Nurses play a crucial role in early identification and management of PPH; therefore, strengthening their knowledge and clinical skills is vital. Despite improvements in obstetric care, challenges related to timely recognition and management of PPH continue⁴. The E-MOTIVE cluster randomized trial demonstrated a significant reduction in severe PPH cases, leading to updated WHO recommendations in 2023⁵. Simulation-based education, including mock drills, has been shown to improve healthcare providers' preparedness and clinical competence in obstetric emergencies⁶.

Objectives: To evaluate the effectiveness of an educational session with mock drill on nurses' knowledge and skills regarding the E-MOTIVE intervention for PPH prevention.

Methodology: A quantitative pre-experimental one-group pre-test and post-test design was adopted. The study included 44 nurses working in selected hospitals. Data were collected using a structured knowledge questionnaire and skill assessment checklist. Following the pre-test, participants received an educational session with mock-drill training on the E-MOTIVE intervention. Post-test assessment was conducted after the intervention. Data were analyzed using descriptive and inferential statistics.

Results: Knowledge and skill scores improved significantly following the intervention. The mean knowledge score increased from 6.79 ± 4.04 to 14.79 ± 2.70 , while the mean skill score increased from 5.90 ± 2.13 to 10.75 ± 1.39 . Paired t-test analysis showed statistically significant improvement in both knowledge and skill scores ($p < 0.001$). A positive correlation was observed between knowledge and skill scores.

Conclusion: Educational sessions with mock drills on the E-MOTIVE intervention effectively enhanced nurses' knowledge and skills, supporting improved obstetric emergency management and maternal health outcomes.

Keywords: E-MOTIVE intervention, Postpartum haemorrhage, Mock drill, Knowledge, Skill,

Introduction

Maternal health is a key indicator of a nation's health status and socioeconomic development.⁷ Despite advances in obstetric care, postpartum haemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide.⁸ According to the World Health Organization (WHO), approximately 70,000 women die annually from PPH, accounting for nearly 27% of maternal deaths globally, with the burden being greatest in low- and middle-income countries.^{9,10} In India, although maternal health outcomes have improved through initiatives such as Janani Suraksha Yojana (JSY) and the LaQshya Programme, PPH continues to be a major contributor to maternal mortality.¹¹

Clinically, PPH is defined as blood loss of ≥ 500 ml within 24 hours after vaginal birth or ≥ 1000 ml following caesarean delivery.¹² Its causes are commonly summarized as the "Four Ts": Tone, Tissue, Trauma, and Thrombin, with uterine atony accounting for most cases.¹³ The high prevalence and severe consequences of PPH highlight the need for effective prevention and management strategies.

To address this challenge, the WHO introduced the **E-MOTIVE intervention**, a structured, evidence-based approach comprising **Early detection**, uterine **Massage**, administration of **Oxytocics**, **Tranexamic acid**, **Intravenous fluids**, and **Examination** to identify the source of bleeding.¹⁴ This bundle promotes early recognition and rapid treatment of PPH and has demonstrated substantial reductions in severe haemorrhage, with studies reporting up to a 60% reduction in severe PPH outcomes.¹⁵ Successful implementation of E-MOTIVE relies heavily on the competence and preparedness of frontline healthcare providers, particularly nurses, who are often the first to recognize and respond to postpartum bleeding.¹⁶ However, inadequate training and limited exposure to obstetric emergencies can hinder effective implementation.¹⁷ Educational sessions combined with simulation-based mock-drills have been shown to enhance knowledge, clinical skills, decision-making, teamwork, and confidence in managing obstetric emergencies.^{18,19}

Assessing the effectiveness of such training is essential to determine its impact on nurses' preparedness for PPH prevention and management.²⁰ Strengthening nurses' knowledge and skills through evidence-based education and simulation practice can contribute to improved maternal outcomes and support national and global efforts to reduce preventable maternal deaths.²¹ Therefore, this study aims to assess the effectiveness of education sessions with mock-drills on nurses' knowledge and skills regarding the E-MOTIVE intervention for the prevention and management of postpartum haemorrhage in selected hospitals.

Background of the Study

The WHO E-MOTIVE PPH Bundle intervention was developed in response to persistent maternal mortality despite technological advances, facility births, and clinical guidelines.²² In 2018, WHO and the Bill & Melinda Gates Foundation (BMGF) explored whether a standardized PPH (postpartum haemorrhage) intervention (E MOTIVE) bundle could improve care and outcomes.²³ In 2021 the cluster-randomized E-MOTIVE trial began its intervention phase in hospitals across Nigeria, Kenya, Tanzania, and South Africa.²⁴ In May 2023 the primary results of the E-MOTIVE trial were published in the New England Journal of Medicine, demonstrating that the bundle significantly reduced the risk of severe PPH.²⁵ In December 2023 based on the strong evidence from the trial, the WHO issued new recommendations for the assessment and use of the treatment bundle for PPH management.²⁶ A randomized cluster trial was designed across multiple countries, (Kenya, Tanzania, Nigeria, South Africa, Sri Lanka and India). Kenya, Nigeria, South Africa, and Tanzania, involving over 210,000 women. The results demonstrated a significant reduction in severe PPH cases—from 4.3% in the usual care group to 1.6% in the intervention group—indicating a 60% decrease in severe PPH incidence. The effectiveness of the E-MOTIVE intervention was evaluated through a cluster-

randomized trial conducted across 78 secondary-level hospitals, reinforcing its applicability in diverse health-system contexts.²⁵

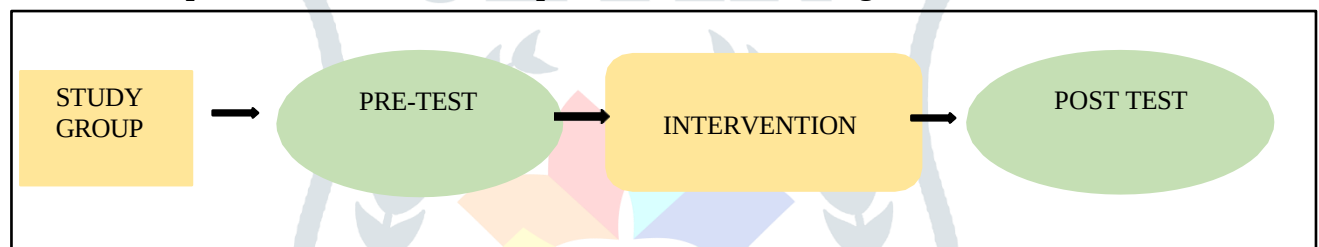
Objectives of the Study

1. To assess the knowledge and skill regarding E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention among Nurses in Selected Hospitals at baseline.
2. To assess Effectiveness of Education Session with Mock-Drill on Knowledge and Skill Regarding E-MOTIVE Intervention for Postpartum Haemorrhage (PPH) Prevention among Nurses in Selected Hospitals.
3. To find association of study findings with selected demographic variable.

Study Design

In the present study, a pre-experimental one-group pre-test post-test design was adopted to assess the effectiveness of an educational session with a mock-drill on nurses' knowledge and skills regarding the E-MOTIVE intervention for the prevention of Postpartum Haemorrhage (PPH). In this design, all participants were included in a single experimental group.

Fig.1 Schematic Representation of One-Group Pre-test-Post-test Design



Methodology

The study was conducted in selected hospitals after obtaining permission from the concerned authorities. The study population comprised nurses working in these hospitals who met the inclusion criteria and were available during the data collection period. The sample size was calculated using the formula for comparing two proportions in a pre-test and post-test design. The required sample size was estimated to be 40, which was increased by 10% to account for possible attrition, resulting in a final sample size of 44 nurses. Participants were selected using a non-probability convenience sampling technique based on their availability and willingness to participate in the study. Nurses with prior PPH-focused training or mock drills are excluded.

Null Hypothesis (H₀):

There is no significant difference in pre and post knowledge and skill score of nurses regarding E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention before and after an education session with a mock drill in selected hospitals.

Alternative Hypothesis (H₁):

There is a significant improvement in pre and post knowledge and skill score of nurses regarding E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention after an education session with a mock drill in selected hospitals.

Assumption

Knowledge and skill score of nurses may improve after education session with mock-drill regarding E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention.

Description of the tool

Section A: Demographic data of nurses this section was designed to collect demographic information of the participating nurses. This section consisted of 4 items, including: Age, Gender, Clinical experience, educational qualification.

Section B: This section consisted of a structured questionnaire designed to assess knowledge regarding E-MOTIVE intervention for postpartum haemorrhage prevention and management.

Section C: This section consisted of an observational checklist developed to assess skill.

Validity of tool :

Content validity of the structured knowledge questionnaire and skill checklist was established through expert validation. The tool was reviewed by a panel of 15 experts comprising specialists in Obstetrics and Gynaecological Nursing, Obstetrics and Gynaecology, Medical-Surgical Nursing and Biostatistics. The overall Scale Content Validity Index (S-CVI) was 0.80, indicating acceptable content validity. Suggestions provided by the experts were incorporated before finalization of the tool.

Reliability of tool

Table 3.4: Reliability Analysis: Parallel Form method of reliability

	Knowledge Score	Skill Score
Pearson's Correlation Coefficient	0.965	0.957
Reliability (%)	0.9821	0.9780

Reliability of the tool was established through the parallel-form method on 12 nurses who were not included in the final study. Pearson's correlation coefficient was 0.965 for the knowledge questionnaire and 0.957 for the skill checklist. The reliability coefficients were 0.9821 and 0.9780 respectively, indicating excellent reliability of the instrument for data collection.

Ethical consideration:

1. Approval from ethical committee.
2. Prior permission was obtained from concerned authority.
3. Informed written consent was obtained from study subject.
4. Confidentiality and anonymity of subject was maintained.
5. Participants was protected from all type of harms.
6. Freedom to withdraw from the study at any point of time was assured.

Process of data collection

The plan for data collection in the present study was executed systematically in the following steps:

Step I: The investigator obtained formal permission from the respective authorities of the selected hospitals to conduct the study.

Step II: A total of 44 nurses were selected using a non-probability convenience sampling technique.

Step III: The investigator introduced herself to the selected participants, explained the purpose and procedures of the study, and obtained written informed consent from all participants.

Step IV: Baseline demographic data of the participants were collected, including Age, Gender, Clinical experience, educational qualification.

Step V: A pre-test was conducted to assess the existing knowledge and skill of the participant regarding the E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention.

Step VI: The investigator implemented the educational intervention, which consisted of an education session combined with a mock-drill focusing on the knowledge and practical skills required for the E-MOTIVE intervention in PPH management.

Step VII: A post-test was conducted on the 7th day following the completion of the intervention to assess changes in knowledge and skill among the nurses.

Description of intervention

The present study intervention consisted of a pre-test assessment, followed by an educational session with demonstration on a manikin, a simulation-based mock drill, and a post-test assessment after seven days.

Phase I: Pre-test Assessment

Before implementation of the intervention, baseline assessment of participants was conducted. Knowledge regarding E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention was assessed using a structured questionnaire. Practical skill related to management of postpartum haemorrhage was assessed using an observational checklist.

Phase II: Educational Session with Demonstration

Following the pre-test, an educational session was conducted to improve nurses' knowledge regarding E-MOTIVE intervention for prevention and management of postpartum haemorrhage. The session was interactive and was delivered by the researcher using PowerPoint presentation. The session included introduction to postpartum haemorrhage, importance of early identification, and detailed explanation of E-MOTIVE intervention components. Demonstration was performed using a low-fidelity obstetric manikin to show assessment techniques, recognition of excessive bleeding, uterine tone assessment, and initial management measures. Participants were encouraged to ask questions and clarify their doubts during the session. The duration of the educational session with demonstration was approximately 40 minutes.

intervention components. Demonstration was performed using a low-fidelity obstetric manikin to show assessment techniques, recognition of excessive bleeding, uterine tone assessment, and initial management measures. Participants were encouraged to ask questions and clarify their doubts during the session. The duration of the educational session with demonstration was approximately 40 minutes.

Phase III: Simulation-Based Mock Drill

After completion of the educational session, participants underwent simulation training through a mock drill using a low-fidelity obstetric manikin. A realistic clinical scenario of a mother developing postpartum haemorrhage after delivery was created. Participants were placed in a simulated clinical environment where they performed assessment and management as per standard clinical practice. The simulation included recognition of postpartum haemorrhage through assessment of blood loss, maternal vital signs, uterine tone, and overall maternal condition. Immediate management steps such as uterine massage, administration of uterotonic drugs, maintenance of intravenous access, fluid replacement, and team coordination were performed. After completion of the mock drill, a debriefing session was conducted to discuss performance, identify errors, and reinforce correct clinical practices.

Phase IV: Post-test Assessment

Seven days after the intervention, post-test assessment was conducted to evaluate improvement in knowledge and clinical skill. Knowledge was assessed using the same structured questionnaire and skill was assessed using the same observational checklist. The effectiveness of the intervention was determined by comparing pre-test and post-test scores.

Organization of findings

The analysis and interpretation of the observations are given in the following section:

Section A: Distribution of Nurses with regards to demographic variables.

Section B: Assessment of level of pre-test and post-test knowledge and skill regarding E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention among nurses in selected hospitals.

Section C: Assessment of effectiveness of Education Session with Mock-Drill on knowledge and skill regarding E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention among nurses in selected hospitals.

Section D: Association of pre- test knowledge and skill regarding E-MOTIVE intervention for postpartum haemorrhage (PPH) prevention among nurses in selected hospitals with their selected demographic variables.

Section A

Table 1: Percentage wise distribution of Nurses according to their demographic characteristics.

n=44

Demographic Variables	No. of Nurses	Percentage (%)
Age(years)		
22-30 yrs	8	18.2
31-40 yrs	11	25.0
41-50 yrs	19	43.2
51-60 yrs	6	13.6
Gender		
Male	0	0
Female	44	100
Other	0	0
Educational Status		
GNM	37	84.1
BSc Nursing	6	13.6
MSc Nursing	1	2.3
PhD Nursing	0	0
Clinical Experience(years)		
6 mths-5 yrs	11	25.0
6-10 yrs	8	18.2
11-15 yrs	4	9.1
≥16 yrs	21	47.7

18.20% of nurses were in the age group of 22-30 years, 25% 31-40 years, 43.20% in 41-50 years and 13.60% of nurses were in the age group of 51-60 years. All (100%) of nurses were females.

Section B

Table 2: Assessment with level of knowledge score

Level of knowledge Score	Score Range	Level of Knowledge Score	
		Pre Test	Post Test
Poor	0-6	26(59.09%)	0(0%)
Average	7-12	12(27.27%)	11(25%)
Good	13-18	6(13.64%)	33(75%)
Minimum score		1	10
Maximum score		16	18
Mean Knowledge score		6.79±4.04	14.79±2.70
Mean % Knowledge score		37.75±22.49	82.19±15.04

The table 2 shows that 59.09% of nurses had poor knowledge in the pre-test, compared with 0% in the post-test. Good knowledge increased from 13.64% pre-test to 75% post-test. The mean knowledge score increased from 6.79 ± 4.04 ($37.75 \pm 22.49\%$) to 14.79 ± 2.70 ($82.19 \pm 15.04\%$) post-test.

Table 3: Assessment with level of skill score

n=44

Level of skill Score	Score Range	Level of Skill Score	
		Pre Test	Post Test
Poor	0-4	17(38.64%)	0(0%)
Average	5-8	19(43.18%)	4(9.09%)
Good	9-12	8(18.18%)	40(90.91%)
Minimum score		3	7
Maximum score		10	12
Mean Skill score		5.90 ± 2.13	10.75 ± 1.39
Mean % Skill score		49.24 ± 17.77	89.58 ± 11.66

The table 4.3 shows that 38.64% of nurses had poor skill in the pre-test, which improved to 90.91% having good skill in the post-test. The mean skill score increased from 5.90 ± 2.13 ($49.24 \pm 17.77\%$) to 10.75 ± 1.39 ($89.58 \pm 11.66\%$), indicating marked improvement after the intervention.

Section C

The effectiveness was assessed by comparing pre-test and post-test mean scores using paired 't' test at 5% level of significance.

Table 4.4: Significance of difference between Knowledge Score in pre and post test of Nurses

n=44

Overall	Mean	SD	Mean Difference	t-value	p-value
Pre Test	6.79	4.04	8 ± 4.31	12.30	0.0001 S, $p < 0.05$
Post Test	14.79	2.70			

The table 4 shows a significant increase in knowledge scores from pre-test to post-test among nurses. The calculated paired 't' value (12.30) was higher than the tabulated value (2.00) at 5% level of significance, indicating that the educational session with mock drill was effective. Hence, H_1 was accepted.

Table 5: Significance of difference between Skill Score in pre and post-test of Nurses

Overall	Mean	SD	Mean Difference	t-value	p-value
Pre Test	5.90	2.13	4.84 ± 2.12	15.12	0.0001 S, $p < 0.05$
Post Test	10.75	1.39			

This table shows the comparison of pretest and post-test skill score among nurses from selected hospitals. Mean, standard deviation and mean difference values are compared and student's paired 't' test is applied at 5% level of significance. The tabulated value for $n=44-1$ i.e. 43 degrees of freedom was 2.00. The calculated 't' value i.e. 15.12 are much higher than the tabulated value at 5% level of significance for overall skill score of Nurses which is statistically acceptable level of significance. Hence it is statistically interpreted that Education Session with Mock-Drill on skill regarding E-MOTIVE intervention for Postpartum Haemorrhage (PPH) prevention among nurses from selected hospitals was effective. Thus, the H_1 is accepted.

Discussion

The present study was conducted to assess the effectiveness of an education session with mock-drill on knowledge and skill regarding the E-MOTIVE intervention for prevention of postpartum haemorrhage (PPH) among nurses in selected hospitals. A pre-experimental one-group pre-test and post-test design was used among 44 nurses. Knowledge and skill were assessed before and after the intervention using a structured knowledge questionnaire and skill assessment checklist.

The findings of the study demonstrated an improvement in the knowledge of nurses following the education session with mock-drill. In the pre-test, 59.09% of nurses had poor knowledge, 27.27% had average knowledge and 13.64% had good knowledge. Following the intervention, none of the nurses remained in the poor knowledge category, 25% had average knowledge and 75% had good knowledge. The mean knowledge score increased from 6.79 ± 4.04 in the pre-test to 14.79 ± 2.70 in the post-test. The mean percentage score increased from 37.75% to 82.19%. These findings indicate a substantial improvement in knowledge following the educational intervention.

The improvement in knowledge was further supported by the paired t-test. The mean difference between pre-test and post-test knowledge scores was 8.00, with a calculated t value of 12.30 and $p < 0.05$. This indicates a statistically significant difference between the pre-test and post-test knowledge scores. Therefore, the findings support the effectiveness of the education session with mock-drill in improving nurses' knowledge regarding the E-MOTIVE intervention for PPH prevention.

The study also demonstrated improvement in nurses' practical skills. Before the intervention, 38.64% of nurses had poor skill, 43.18% had average skill and 18.18% had good skill. After the intervention, none of the nurses were classified as having poor skill, 9.09% had average skill and 90.91% demonstrated good skill. The mean skill score increased from 5.90 ± 2.13 in the pre-test to 10.75 ± 1.39 in the post-test, while the mean percentage score increased from 49.24% to 89.58%.

The paired t-test showed a statistically significant improvement in skill, with a reported t value of 15.12 and $p < 0.05$. These findings suggest that combining theoretical education with demonstration and mock-drill can facilitate the development of practical skills required for recognition and management of PPH using the E-MOTIVE approach.

The association analysis showed that pre-test knowledge was significantly associated with age, educational status and clinical experience. In contrast, pre-test skill was not significantly associated with age or clinical experience. Educational status showed a statistically significant association with pre-test skill. These findings suggest that baseline knowledge and skill levels may vary according to selected demographic characteristics. However, these associations should be interpreted cautiously because some demographic categories contained very few participants.

Overall, the findings indicate that the education session combined with mock-drill was associated with substantial improvement in both knowledge and practical skill related to E-MOTIVE intervention for PPH prevention. The improvement in both domains supports the use of structured educational and simulation-based approaches for strengthening nurses' preparedness for PPH prevention and management.

Conclusion

The present study concluded that an education session with mock-drill was effective in improving nurses' knowledge and skill regarding the E-MOTIVE intervention for prevention of postpartum haemorrhage. Following the intervention, there was a marked increase in the proportion of nurses achieving good knowledge and good skill levels.

The mean knowledge score increased from 6.79 ± 4.04 in the pre-test to 14.79 ± 2.70 in the post-test, while the mean skill score increased from 5.90 ± 2.13 to 10.75 ± 1.39 . The paired t-test demonstrated statistically significant improvements in both knowledge and skill scores ($p < 0.05$).

The findings indicate that combining structured education with mock-drill can provide nurses with an opportunity to strengthen both theoretical understanding and practical skills related to E-MOTIVE-based PPH prevention. Regular educational sessions, demonstrations and simulation-based practice may therefore be incorporated into continuing nursing education and in-service training related to obstetric emergencies.

Limitations of present study

1. Non-probability convenience sampling technique was used.
2. The sample size was limited which may affect the external validity of the study results.
3. The study included only nurses working in selected hospitals therefore finding may not be generalizable.

4. The study assessed only short-term effectiveness of the intervention.

Recommendations

On the basis of the finding of the study, it is recommended that the following studies can be conducted.

1. A similar study can be replicated on a larger population.
2. A comparative study can be done between traditional training and mock-drill-based training on knowledge and skill of staff nurses working in government hospital verses private hospitals regarding E-MOTIVE intervention for Postpartum Haemorrhage (PPH) prevention.
3. A comparative study to find out the effect of different teaching methods in improvement of knowledge and skill of Nursing students regarding E-MOTIVE intervention for Postpartum Haemorrhage (PPH) prevention.

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