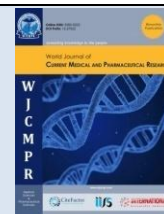




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EFFECTIVENESS OF NURSE-LED EDUCATION ON KNOWLEDGE REGARDING MIRROR THERAPY IN THE MANAGEMENT OF PHANTOM PAIN AND PHANTOM SENSATION IN AMPUTEES AMONG NURSING OFFICERS WORKING IN ORTHO WARDS OF SELECTED HOSPITALS, KANPUR, UTTAR PRADESH

ASMITA SINGH¹ , ASTHA KUMARI¹ , AYUSHIJ ADON¹ , AYUSHI SINGH¹ , AYUSHI YADAV¹ , SNEH DIXIT²

¹BSC Nursing Students, Faculty of Nursing, Rama University, Mandhana, Kanpur, 2025-2026.

²Assistant Professor, Department of Community Health Nursing, Faculty of Nursing, Rama University, Mandhana, Kanpur, 2025-2026.

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ARTICLE HISTORY	ABSTRACT
Received on: 14-08-2026 Revised on: 24-09-2026 Accepted on: 11-10-2026	Amputation is a major surgical procedure that may lead to complications such as phantom limb pain and phantom sensation, adversely affecting rehabilitation and quality of life. Mirror therapy is a simple, cost-effective, non-pharmacological intervention used to manage these conditions. However, its implementation in clinical practice may be limited by inadequate knowledge among nursing professionals. This study aimed to evaluate the effectiveness of nurse-led education in improving knowledge regarding mirror therapy among nursing officers working in selected hospitals in Kanpur, Uttar Pradesh. A quantitative, pre-experimental, one-group pre-test–post-test design was adopted. A total of 60 nursing officers were selected using convenience sampling. The findings revealed that, during the pre-test, 66.67% of participants had inadequate knowledge, while 33.33% had moderate knowledge. Following the educational intervention, 83.33% of participants demonstrated adequate knowledge, and 16.67% demonstrated moderate knowledge. The mean knowledge score increased from 13.5 in the pre-test to 24.12 in the post-test, indicating an improvement in knowledge following the intervention. The study concluded that nurse-led education is effective in improving nursing officers' knowledge regarding mirror therapy. Such educational interventions may encourage the appropriate use of mirror therapy in managing phantom limb pain and phantom sensation among amputees, potentially contributing to improved patient care and rehabilitation outcomes.
Keywords: Nurse-led education, mirror therapy, phantom limb pain, phantom sensation, amputees, nursing officers, orthopaedic wards, knowledge, amputation, pain management.	
Corresponding Author Dr. Sneh Dixit	

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INTRODUCTION

Amputation is a significant surgical procedure in which a limb or a part of a limb is surgically removed, usually because of severe trauma, diabetes mellitus, vascular disorders, malignancy, infection, or other irreversible conditions. Although amputation may be necessary to save life and prevent further complications, it can lead to several physical and psychological challenges. Among the commonly reported problems after amputation are phantom limb sensation and phantom limb pain, which may adversely affect rehabilitation and quality of life [1].

Phantom limb sensation is the perception that the amputated limb is still present and may be experienced as feelings of movement, pressure, warmth, itching, or tingling. In contrast, phantom limb pain is the experience of painful sensations in the absent limb, which may be described as burning, stabbing, shooting, cramping, or electric shock-like pain. These symptoms may occur soon after amputation or

develop later and, in some individuals, may persist for a prolonged period [2]. Management of phantom limb pain remains challenging. Pharmacological treatment may provide relief but can have limitations and adverse effects. Therefore, non-pharmacological interventions have gained importance in the rehabilitation of amputees. Mirror therapy is a simple, economical, non-invasive technique in which a mirror is positioned to create the visual illusion of the missing limb. Nursing officers have an important role in postoperative care, pain management, patient education, and rehabilitation. Adequate education and training can improve their knowledge and confidence in applying evidence-based interventions such as mirror therapy. Hence, nurse-led education regarding mirror therapy may support its appropriate incorporation into routine orthopaedic nursing practice and contribute to better

management of phantom pain and phantom sensation among amputees [3].

NEED FOR THE STUDY

Amputation is a major surgical intervention that may result in persistent physical, psychological, and social challenges. Phantom limb pain and phantom limb sensation are frequently experienced following amputation and may adversely affect rehabilitation, functional independence, daily activities, and overall quality of life. Effective management of these post-amputation complications continues to be an important concern in clinical practice [4].

Pharmacological interventions are commonly used for the management of phantom limb pain; however, they may provide inadequate relief and may be associated with undesirable adverse effects. Consequently, non-pharmacological interventions such as mirror therapy have gained importance as a safe, simple, economical, and non-invasive approach for managing phantom pain and phantom sensations [5].

Nursing officers have a significant role in the postoperative care, pain management, education, and rehabilitation of individuals following amputation. Adequate knowledge and appropriate skills are essential for the effective implementation of mirror therapy. However, limited awareness and insufficient structured training among nursing personnel may restrict its appropriate use in clinical practice.

Therefore, the present study is undertaken to assess the effectiveness of nurse-led education on knowledge regarding mirror therapy in the management of phantom pain and phantom sensation among nursing officers working in orthopaedic wards of selected hospitals in Kanpur, Uttar Pradesh. The findings of the study may contribute to strengthening evidence-based nursing practice and promoting the appropriate integration of mirror therapy into the care and rehabilitation of amputee patients [6].

PROBLEM STATEMENT

“Effectiveness of Nurse-Led Education on knowledge Regarding Mirror Therapy in the Management of Phantom Pain and Phantom Sensation in Amputees among nursing officers working in Ortho Wards of selected hospitals, Kanpur, Uttar Pradesh.”

OBJECTIVES OF THE STUDY

1. To assess the pretest level of knowledge regarding mirror therapy in the management of phantom pain and phantom sensation in amputees among nursing officers working in orthopaedic wards.
2. To evaluate the effectiveness of nurse-led education on knowledge regarding mirror therapy in the management of phantom pain and phantom sensation in amputees among nursing officers working in orthopaedic wards.
3. To find out the association between pre-test knowledge score of nursing officers and selected socio-demographic variables.

HYPOTHESES

(It will be tested at 0.05 level of significant)

- H₁: The mean post-test knowledge score of nursing officer regarding mirror therapy is significantly higher than the mean pre-test knowledge score.

- H₂: There is a significant association between the pre-test knowledge scores of staff nurses and selected demographic variables such as age, gender, religion, educational qualification, marital status, previous knowledge, source of information, average duration of duty, and total years of clinical experience.
- H01: There is no significant difference in the knowledge level of nursing officer regarding mirror therapy before and after the implementation of an informational guide.
- H02: There is a significant association between the pre-test knowledge scores about mirror therapy nursing officer with their selected demographic variables.

Research Approach

A quantitative evaluative research approach was selected for the study. This approach was considered appropriate as it enables measurement and comparison of knowledge scores before and after the educational intervention.

Research Design

The study employed a pre-experimental one-group pre-test and post-test design. In this design, the knowledge level of participants was assessed prior to the educational programme and reassessed after the intervention to determine its effectiveness.

Variables

Independent variable: Nurse-led educational programme on mirror therapy

Dependent Variable: Knowledge of nursing officers regarding mirror therapy

Demographic Variables: Age, gender, professional qualification, years of clinical experience, and previous exposure to mirror therapy training

Research Setting

The research was carried out in selected hospitals located in Kanpur, Uttar Pradesh, specifically within the orthopaedic wards where nursing officers are directly involved in the care of amputee patients.

Population

Target Population: All nursing officers working in orthopaedic units.

Accessible Population: Nursing officers who were present and available during the period of data collection in the selected hospitals.

Sample

The selected group represented the accessible population for evaluating the effectiveness of the nurse-led educational intervention.

Sample Size

A total of 60 nursing officers were included in the study. The sample size was determined based on feasibility and availability of participants.

Sampling Technique

Participants were selected using a non-probability convenience sampling technique. This method allowed the researcher to include subjects who met the eligibility criteria and were willing to participate.

Criteria for Sample Selection

Inclusion Criteria

- Nursing officers currently working in orthopaedic wards.
- Willing to participate in the study
- Available during the data collection period

Exclusion Criteria

- Nursing staff that was on leave.
- Those who had previously undergone formal training on mirror therapy.

Development of Data Collection Tool

The instrument was prepared after an extensive review of literature, consultation with experts, and consideration of the objectives of the study.

The tool consisted of two parts:

- PART A: Demographic information of participants
 - PART B: A structured knowledge questionnaire containing multiple-choice questions related to:
 - Concept of phantom pain and sensation
 - Principles of mirror therapy
 - Indications and benefits
 - Procedure and nursing responsibilities
- The level of knowledge of nursing officers regarding mirror therapy in the management of phantom pain and phantom sensation was categorized based on the total score obtained in the structured knowledge questionnaire.

RESULTS AND FINDINGS

Section A: Frequency and Percentage Distribution of Demographic Variables

The demographic characteristics of the 60 nursing officers were analyzed using frequency and percentage distributions. The major findings were as follows:

1. The largest age group consisted of nursing officers aged 21–25 years, comprising 26 (43.33%) participants.
2. The majority of participants were female, accounting for 42 (70.00%).
3. A total of 51 (85.00%) participants were married, if this is the category represented by the reported frequency.
4. Regarding educational qualifications, 34 (56.67%) participants had completed the General Nursing and Midwifery (GNM) course.
5. A total of 50 (83.33%) participants reported having previously cared for an amputee patient.
6. The largest group in terms of professional experience comprised 28 (46.67%) participants with 6–10 years of experience.
7. Regarding the area of work, 32 (53.33%) participants were working in orthopaedic wards.
8. A total of 31 (51.67%) participants reported working 8-hour shifts.
9. Regarding previous knowledge of mirror therapy, 36 (60.00%) participants reported having no previous knowledge.
10. Among participants who had previous information about mirror therapy, the internet and books were reported as sources of information by 10 (41.67%) participants, assuming the denominator for this item was 24.

Note: The denominator for the source of information must be confirmed. If only the 24 participants with previous knowledge were asked this question, $10/24 = 41.67\%$. If all 60 participants were included, the percentage would be 16.67%.

Section B: Distribution of Nursing Officers According to Pre-test and Post-test Knowledge Levels

The pre-test and post-test knowledge levels of nursing officers regarding mirror therapy in the management of phantom limb pain and phantom sensation among amputees were assessed. The findings are presented in Table 1.

Table 01: Distribution of participants according to pre-test and post-test knowledge levels (N = 60)

S. No.	Level of knowledge	Score range	Pre-test f (%)	Post-test f (%)
1	Inadequate knowledge	0–14	40 (66.67%)	0 (0.00%)
2	Moderate knowledge	15–22	20 (33.33%)	10 (16.67%)
3	Adequate knowledge	23–25	0 (0.00%)	50 (83.33%)
	Total		60 (100%)	60 (100%)

Major findings

- In the pre-test, 40 (66.67%) participants had inadequate knowledge, while 20 (33.33%) had moderate knowledge. None of the participants demonstrated adequate knowledge.
- In the post-test, 50 (83.33%) participants achieved an adequate level of knowledge, while 10 (16.67%) demonstrated moderate knowledge.
- No participants remained in the inadequate knowledge category after the educational intervention.
- These findings indicate a substantial improvement in the knowledge levels of nursing officers following the nurse-led educational intervention.

Section C: Comparison of Pre-test and Post-test Knowledge Scores

The mean, standard deviation, and mean percentage scores were compared to assess changes in knowledge following the educational intervention.

Table 02: Comparison of pre-test and post-test knowledge scores (N = 60)

S. No.	Assessment	Mean score	Standard deviation	Mean percentage
1	Pre-test	13.50	2.92	54.00%
2	Post-test	24.12	1.72	96.48%
	Mean difference	10.62	—	42.48 percentage points

Correction applied: The mean percentage scores above are calculated assuming that the maximum possible questionnaire score was 25. The calculations are:

- Pre-test: $13.5/25 \times 100 = 54.00\%$ $13.5/25 \times 100 = 54.00\%$
- Post-test: $24.12/25 \times 100 = 96.48\%$ $24.12/25 \times 100 = 96.48\%$
- Mean score difference: $24.12 - 13.50 = 10.62$ $24.12 - 13.50 = 10.62$

Major findings

The mean knowledge score increased from 13.50 in the pre-test to 24.12 in the post-test, with a mean difference of 10.62 points. Assuming a maximum score of 25, the mean

percentage increased from 54.00% to 96.48%, representing an improvement of 42.48 percentage points.

These results suggest that the educational intervention was associated with a marked improvement in the participants' knowledge regarding mirror therapy.

Section D: Significance of the Difference Between Pre-test and Post-test Knowledge Scores

A paired *t*-test was used to compare the pre-test and post-test knowledge scores of the 60 nursing officers.

Table 03: Comparison of pre-test and post-test knowledge scores using a paired *t*-test

Assessment	Mean score	Standard deviation	Mean difference	Paired t-value
Pre-test	13.50	2.92		
Post-test	24.12	1.72	10.62	24.80*

The paired *t*-value of 24.80 is retained from the supplied data but requires verification against the original statistical output.

Major findings

The mean post-test knowledge score (24.12) was higher than the mean pre-test knowledge score (13.50), indicating an improvement of 10.62 points following the educational intervention.

If the reported paired *t*-value of 24.80 is confirmed by the original analysis, the difference would be statistically significant at the 0.05 level (two-tailed, 59 degrees of freedom). The corresponding *p*-value should be reported from the verified statistical output.

The findings support the effectiveness of the educational intervention in improving knowledge, provided that the test statistic is verified.

Section E: Association between Pre-test Knowledge Scores and Selected Demographic Variables

The association between pre-test knowledge scores regarding mirror therapy in the management of phantom limb pain and phantom sensation among amputees and selected demographic variables was examined. The variables included age, gender, marital status, educational qualification, previous experience caring for an amputee patient, professional experience, area of work, shift duration, previous knowledge of mirror therapy, and sources of information.

Major findings

The association between pre-test knowledge scores and selected demographic variables was analyzed to determine whether knowledge levels were related to participants' demographic characteristics.

The original findings indicate that no statistically significant association was observed with the other selected sociodemographic variables. However, the specific variables showing a statistically significant association have not been provided and must be identified from the original statistical analysis.

Hypothesis Decision

- If at least one selected demographic variable showed a statistically significant association with pre-test knowledge scores at the 0.05 significance level, the research hypothesis (H2) may be supported and the corresponding null hypothesis (H02) rejected, subject to the prespecified hypothesis and analysis.

- If none of the selected demographic variables showed a statistically significant association, H02 should not be rejected. The absence of statistical significance does not establish that no association exists.

The study assessed the effectiveness of nurse-led education in improving knowledge regarding mirror therapy among 60 nursing officers working in selected hospitals in Kanpur, Uttar Pradesh.

The major findings were as follows:

- During the pre-test, 66.67% of participants had inadequate knowledge, and 33.33% had moderate knowledge.
- Following the educational intervention, 83.33% of participants achieved adequate knowledge, while 16.67% had moderate knowledge.
- The mean knowledge score increased from 13.50 in the pre-test to 24.12 in the post-test, yielding a mean difference of 10.62 points.
- Assuming a maximum questionnaire score of 25, the mean percentage score increased from 54.00% to 96.48%.
- The reported paired *t*-value of 24.80 suggests a substantial difference between pre-test and post-test scores, but the value must be verified against the original statistical output.
- The association between pre-test knowledge and selected demographic variables requires confirmation using the original association table and statistical test results.
- The findings suggest that nurse-led education can improve nursing officers' knowledge regarding mirror therapy and may support its appropriate application in the management of phantom limb pain and phantom sensation among amputees.

CONCLUSION

The study findings indicate that nurse-led educational intervention improved nursing officers' knowledge regarding mirror therapy in the management of phantom limb pain and phantom sensation among amputees. Mirror therapy is a simple, non-pharmacological, and relatively low-cost intervention that may be incorporated into rehabilitation and patient care practices when clinically appropriate. Educating nursing professionals about mirror therapy can help improve their knowledge and preparedness to support amputees experiencing phantom limb pain and phantom sensations. Therefore, nurse-led educational programmes should be encouraged to strengthen nursing knowledge and promote evidence-informed rehabilitation practices. However, further research is needed to evaluate whether improved knowledge translates into the effective implementation of mirror therapy and better patient outcomes.

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AUTHOR CONTRIBUTION

All Authors are Contributed Equally.

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