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ORIGINAL ARTICLE

Evaluating Nurses' Knowledge and Attitudes toward Inpatient Fall Prevention before and after a Targeted Simulation-Based Training Program in Saudi Arabia

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ABSTRACT

Background: Inpatient falls remain an important patient-safety concern because they may result in physical injury, functional decline, prolonged hospitalization, psychological distress, and increased healthcare utilization. Nurses have a central role in identifying fall risks and implementing preventive measures. Previous Saudi Arabian research has identified gaps in nurses' recognition of some fall risk factors despite generally positive attitudes toward prevention.[1,2] Simulation-based education provides an opportunity to practise clinical decision-making and preventive interventions in a safe, controlled environment.[3,4]

Aim: To evaluate the effect of a targeted simulation-based training program on nurses' knowledge and attitudes toward inpatient fall prevention in a hospital setting in Saudi Arabia.

Settings and Design: A quasi-experimental one-group pretest-posttest study conducted among registered nurses working in adult inpatient units.

Methods and Materials: A sample of 60 registered nurses will be recruited using convenience sampling. Participants will complete a structured knowledge questionnaire and an attitude scale before and immediately after a targeted simulation-based training program. The intervention will consist of a brief evidence-based orientation, risk-assessment practice, scenario-based simulation, hands-on prevention strategies, and structured debriefing. Descriptive statistics, paired t test or Wilcoxon signed-rank test, and effect-size estimates will be used.

Illustrative Results: In the model dataset, the mean knowledge score increased from 12.8 ± 3.1 before training to 17.6 ± 1.9 after training, while the mean attitude score increased from 48.7 ± 6.4 to 56.9 ± 4.8. Both changes were statistically significant ($p < 0.001$). These figures are illustrative and must not be reported as actual findings.

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Conclusion: A targeted simulation-based program has the potential to strengthen nurses' knowledge and attitudes regarding inpatient fall prevention. A rigorously implemented Saudi Arabian study could provide locally relevant evidence for competency-based patient-safety education.

KEYWORDS:

Attitudes • Fall prevention • Inpatient falls • Knowledge • Nurses • Patient safety • Saudi Arabia • Simulation training

INTRODUCTION

Inpatient falls are preventable adverse events that can cause substantial physical and psychosocial consequences for patients and place additional demands on healthcare services. The World Health Organization identifies falls as a major global public health problem, with older adults experiencing the greatest risk of serious injury and death. Risk is influenced by factors including impaired mobility and balance, visual or cognitive impairment, medications, underlying illness, and environmental hazards.[5]

Hospitalization can increase fall risk because patients encounter unfamiliar environments while simultaneously experiencing illness, weakness, altered mobility, medication effects, and changes in cognition. Effective prevention therefore requires systematic risk assessment followed by individualized interventions.[6] International patient-safety standards emphasize assessing fall risk, implementing interventions according to identified risks, educating healthcare personnel, and involving patients and families in prevention.[7]

Nurses are particularly important because they provide continuous bedside assessment and coordinate many components of fall prevention. Evidence indicates that nurse-led educational and multifactorial interventions can contribute to reductions in falls.[8] Nevertheless, knowledge of individual risk factors does not always translate into consistent clinical decision-making.

Saudi Arabian studies have identified important gaps. Innab reported that nurses recognized impaired balance, reduced muscle strength, limited mobility, and inability to follow safety instructions as important factors, but perceptions differed according to educational and professional characteristics.[1] A subsequent study involving 370 nurses in a large tertiary-care setting found high awareness of fall-prevention policies but lower recognition of specific intrinsic risk factors, including recurrent falls, depression, and lower-extremity numbness.[2] These findings suggest that conventional policy education alone may not sufficiently develop clinical reasoning related to fall prevention.

Simulation-based training allows nurses to encounter realistic clinical situations without exposing patients to risk. Participants can assess a patient's fall risk, identify environmental hazards, communicate with patients and colleagues, select individualized interventions, and respond to a simulated fall. Feedback and structured debriefing further support reflection and clinical reasoning.[3,4] Evidence from simulation research suggests that simulation can improve nurses' knowledge and clinical skills, although the magnitude of benefit varies among studies and methodological quality can be inconsistent.[3,9]

The present study therefore proposes a targeted simulation-based educational intervention specifically focused on inpatient fall prevention. The study is designed to address a practical gap between knowing fall-prevention policies and applying them during realistic clinical situations.

METHODS

Study Design

A quasi-experimental one-group pretest-posttest design will be used to determine whether targeted simulation-based training improves nurses' knowledge and attitudes toward inpatient fall prevention.

Study Setting and Participants

The study will be conducted in adult medical, surgical, and other eligible inpatient units of a hospital in Saudi Arabia. Registered nurses providing direct inpatient care will constitute the target population.

- **Inclusion criteria** will be registered nurses who provide direct patient care, have worked in the selected inpatient units for at least three months, and consent to participate.
- **Exclusion criteria** will include nurses on extended leave during the study period and nurses who have previously completed the same simulation program within the preceding six months.

Sample Size

A minimum sample of 52 participants is proposed for a paired pretest-posttest comparison assuming a moderate standardized effect, a two-sided significance level of 0.05, and 80% statistical power. Allowing approximately 15% attrition, the recruitment target will be 60 nurses.

Study Instruments

A researcher developed structured questionnaire will be used after establishing its content validity and reliability.

- **Part I: Demographic and professional characteristics.** This section will collect age category, sex, educational qualification, years of nursing experience, clinical unit, previous fall-prevention education, and previous simulation experience.
- **Part II: Fall-prevention knowledge questionnaire.** Twenty multiple-choice items will assess knowledge of intrinsic and extrinsic risk factors, medication-related risks, risk assessment, environmental safety, mobility assistance, patient education, and post-fall management. Each correct answer will receive one point, with a possible score of 0–20. Higher scores will indicate greater knowledge.
- **Part III: Attitude toward fall prevention scale.** Fifteen statements will assess perceived responsibility, confidence in prevention, importance of risk assessment, multidisciplinary collaboration, patient involvement, and willingness to follow prevention protocols. Responses will use a five-point Likert scale. Higher scores will indicate more positive attitudes.

The instrument will be reviewed by at least five experts in nursing, patient safety, and clinical education. Content validity and internal consistency will be established before the main study. A pilot test will be conducted with nurses who will not participate in the main study.

Targeted Simulation-Based Training Program

The intervention will be delivered in a structured session lasting approximately 90 minutes.

- **Phase 1: Focused preparation.** Participants will receive a concise evidence-based review of inpatient fall epidemiology, intrinsic and extrinsic risk factors, risk assessment, medication-related risks, environmental safety, safe mobility, patient and family education, and post-fall response.
- **Phase 2: Simulation scenario.** A standardized adult inpatient scenario will be presented. The simulated patient will have multiple fall risks, such as impaired mobility, recent medication administration, urgency to use the bathroom, and environmental hazards.
- **Phase 3: Clinical performance.** Nurses will be required to assess fall risk, identify hazards, communicate with the patient, initiate appropriate precautions, obtain assistance for mobility, and document the prevention plan.
- **Phase 4: Debriefing.** A structured debriefing will encourage participants to identify what they noticed, explain their decisions, discuss missed risks, and develop strategies for improving practice.
- **Phase 5: Reinforcement.** Participants will receive a concise fall-prevention checklist emphasizing assessment, individualized intervention, communication, environmental safety, and patient/family participation.
- This approach is consistent with evidence-based fall-prevention models emphasizing assessment, individualized prevention planning, and consistent implementation.[6,8]

Data Collection Procedure

After institutional permission and ethical approval are obtained, eligible nurses will be invited to participate. Written informed consent will be obtained. Baseline demographic information, knowledge, and attitude scores will be collected immediately before the intervention. The same knowledge

and attitude instruments will be administered immediately after completion of the simulation and debriefing.

To reduce measurement bias, participants will be instructed not to discuss questionnaire responses during testing. Participant identification codes rather than names will be used for data management.

Statistical Analysis

Data will be analyzed using appropriate statistical software. Frequencies, percentages, means, and standard deviations will summarize participant characteristics and outcome scores. Normality will be assessed before inferential analysis. For normally distributed paired scores, the paired *t* test will be used; otherwise, the Wilcoxon signed-rank test will be applied. Effect size will be reported to describe the magnitude of change. Statistical significance will be established at $p < 0.05$.

Ethical Considerations

Ethical approval will be obtained from the relevant institutional research ethics committee before data collection. Participation will be voluntary, and participants may withdraw without penalty. Confidentiality and anonymity will be maintained. No patient will be exposed to the educational simulation or research procedures.

RESULTS

Note: The numerical results in this section are illustrative only and are provided to demonstrate the intended analysis and presentation. They must be replaced with the actual study findings before submission.

Participant Characteristics

In the illustrative dataset, 60 nurses completed both assessments. Most participants had a bachelor's degree, more than five years of nursing experience, and previous exposure to institutional fall-prevention policies.

Knowledge and Attitude Outcomes

The illustrative analysis demonstrated an increase in knowledge following simulation-based training. The mean knowledge score increased from 12.8 ± 3.1 before training to 17.6 ± 1.9 after training. The mean attitude score increased from 48.7 ± 6.4 to 56.9 ± 4.8.

Table 1: Illustrative Participant Characteristics

Characteristic	Category	n	%
Age	<30 years	22	36.7
	30–39 years	25	41.7
	≥40 years	13	21.6
Educational level	Diploma	12	20.0
	Bachelor's degree	42	70.0
	Postgraduate	6	10.0
Nursing experience	<5 years	18	30.0
	5–10 years	24	40.0
	>10 years	18	30.0
Previous fall training	Yes	51	85.0
	No	9	15.0

Note: Illustrative values only

Table 2: Illustrative Pre-test and Post-test Outcome Scores

Outcome	Pretest Mean ± SD	Post-test Mean ± SD	Mean Change	*p* value
Knowledge (0–20)	12.8 ± 3.1	17.6 ± 1.9	+4.8	<0.001
Attitude (15–75)	48.7 ± 6.4	56.9 ± 4.8	+8.2	<0.001

Note: Illustrative values only; statistical values must be recalculated from the actual dataset.

Table 3: Graphical Presentation of Illustrative Mean Scores

Outcome	Before Training	After Training
Knowledge	12.8	17.6
Attitude	48.7	56.9

Figure-style graphical table; illustrative values only.

DISCUSSION

The proposed study addresses an important patient-safety and nursing-education issue in Saudi Arabia. The illustrative findings demonstrate the expected direction of change following targeted simulation-based training, with improvement in both knowledge and attitudes.

The emphasis on simulation is justified because fall prevention requires more than memorizing policies. Nurses must recognize interacting patient-specific risks, prioritize interventions, communicate effectively, and adapt prevention strategies to the clinical situation. Simulation allows these activities to be practised repeatedly without placing

actual patients at risk. Previous evidence suggests that simulation can improve nursing knowledge and skills, although variation in intervention design and study quality means that effects should be interpreted carefully.[3,9]

The proposed intervention also responds directly to findings from Saudi Arabian research. Innab reported that nurses identified several major fall-risk factors but recommended formal fall-prevention education to improve awareness and prevention strategies.[1] In another Saudi study, nurses demonstrated high awareness of policies while showing weaker knowledge of selected intrinsic risk factors.[2] This discrepancy is important because a nurse may know that a fall-risk assessment is required but still fail to identify an individual patient's specific risks.

A simulation scenario can bridge this gap by transforming abstract information into clinical decision-making. For example, a patient with weakness, urgency, an unfamiliar environment, and medication-related dizziness requires a coordinated set of interventions rather than a single precaution. The nurse must assess, communicate, assist, modify the environment, and evaluate whether the prevention plan remains appropriate.

The proposed training is also consistent with established hospital fall-prevention approaches that recommend individualized risk assessment followed by tailored interventions.[6,7] The Fall TIPS model similarly emphasizes assessment, development of a personalized prevention plan, and consistent execution.[6]

Positive changes in attitude would be clinically relevant because fall prevention depends partly on nurses' perception of responsibility, confidence, teamwork, and willingness to engage patients and families. Nevertheless, improved attitudes alone should not be interpreted as evidence of improved clinical practice. Future studies should therefore include direct observation, audit of fall-prevention practices, and patient-level fall outcomes.

The Saudi context adds further relevance. Existing local evidence has primarily examined nurses' knowledge, perceptions, and practices using cross-sectional designs.[1,2] A pretest-posttest simulation study can contribute intervention-based evidence and may help nursing education departments determine whether simulation should complement routine policy-based education.

LIMITATIONS

Several limitations should be anticipated. The one-group design does not provide a concurrent control group, so improvements may partly reflect testing effects or other influences. Convenience sampling may limit generalizability. Immediate post-training assessment may overestimate sustained learning because knowledge retention was not measured over a longer period. Self-reported attitudes may also be affected by social desirability. Finally, the study evaluates nurse-level educational outcomes rather than establishing a direct causal reduction in patient falls.

CONCLUSION

Targeted simulation-based training represents a promising educational strategy for strengthening nurses' knowledge and attitudes toward inpatient fall prevention. The proposed study is particularly relevant to Saudi Arabian hospitals because previous local evidence has demonstrated strong awareness of general fall-prevention policies alongside gaps in recognition of selected patient-specific risk factors.[1,2] A rigorously conducted pretest-posttest evaluation can determine whether simulation improves these outcomes and provide evidence for integrating scenario-based fall-prevention competency training into continuing nursing education.

PRACTICAL IMPLICATIONS

Hospital nursing education departments should consider simulation as a complement to conventional fall-prevention lectures and policy dissemination. Training should emphasize patient-specific risk recognition, clinical decision-making, safe mobility, environmental assessment, communication, documentation, and patient/family participation. Repeated simulation or refresher sessions may be considered to support retention.

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Conflict of Interest: The authors declare no conflict of interest.

Ethical Approval: Ethical approval will be obtained from the relevant Institutional Review Board/Research Ethics Committee before commencement of data collection.

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