

Flipped Education Method For Registered Nurses On Prevention Of Medication Administration Error: Evaluating The Effectiveness Of Teaching Pedagogy

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Abstract

Medication administration error remains a critical component of nursing practice and healthcare quality improvement. Medication errors contribute significantly to adverse patient outcomes, increased healthcare costs and reduced patient trust. Traditional lecture-based educational approaches often provide limited opportunities for active participation and practical application among registered nurses. The flipped education method, a learner-centered pedagogical approach, reverses conventional teaching by delivering theoretical content before classroom sessions and utilizing face-to-face time for interactive learning activities. This article examines the implementation of flipped education for registered nurses in Prevention of Medication Error and evaluates its effectiveness as a teaching pedagogy. Existing evidence suggests that flipped learning enhances knowledge acquisition, critical thinking, learner engagement, clinical reasoning and retention of medication safety principles. The findings indicate that the flipped educational approach may improve nursing competence and promote prevention of medication error in healthcare settings.

Keywords: Flipped learning, medication administration error, registered nurses, nursing education, teaching pedagogy, patient safety

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I. Introduction

Medication administration is one of the most frequent and high-risk responsibilities of registered nurses. Medication errors can occur during prescribing, transcribing, dispensing, administration and monitoring. According to the World Health Organization, medication errors cause substantial preventable harm globally and are a major patient safety concern.

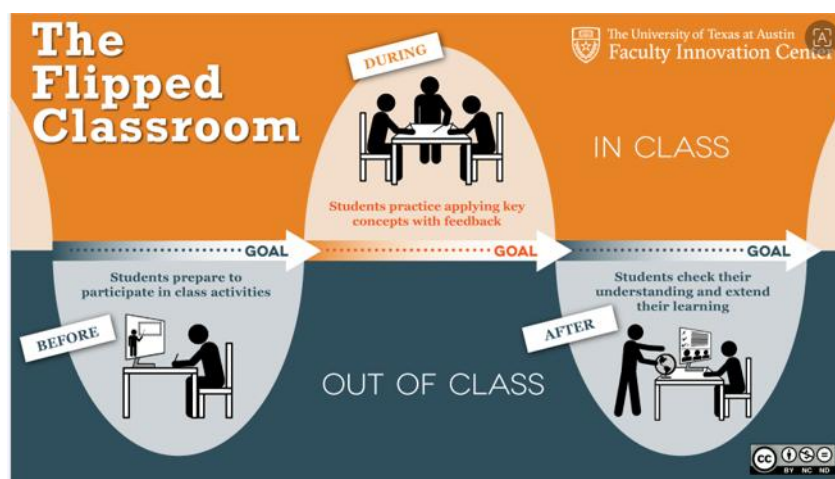
Nurses are the final checkpoint before medication reaches the patient, making their knowledge and competence essential in preventing adverse drug events. Common causes of medication errors include:

- Inadequate pharmacological knowledge
- Poor communication
- Workload and fatigue
- Incorrect drug calculations
- Failure to follow medication administration protocols

Traditional teaching methods commonly rely on passive lectures, where learners receive information with limited interaction. Such methods may not sufficiently enhance critical thinking, clinical reasoning or practical decision-making.

The Flipped Education Method

Flipped education commonly referred to as flipped classroom learning, is an instructional approach in which traditional teaching components are reversed. Educational content such as video lectures, readings, online modules and recorded presentations is completed before classroom participation.



Need for the Study

Safe medication administration is fundamental to quality nursing care. Despite regular in-service education, medication administration errors continue to occur in hospital settings. Traditional educational methods may not effectively address practical challenges encountered by nurses during medication administration.

Flipped education may provide a more effective approach by combining digital learning with interactive clinical application. However, limited studies have examined its effectiveness specifically for Safe medication administration among practicing registered nurses.

Therefore, this study was undertaken to assess whether flipped education improves knowledge and practice on Prevention of medication administration error.

Problem Statement

A Study to Assess the Effectiveness of the Flipped Education Method on Knowledge and Practice Regarding Prevention of Medication Administration Error Among Registered Nurses in a Tertiary Care Hospital

Objectives:

- To assess baseline knowledge of nurses regarding prevention of Medication administration errors.
- To implement flipped education training on prevention of Medication administration errors.
- To evaluate the effectiveness of flipped education on nurses' knowledge and practices.
- To assess nurses' satisfaction with flipped education on medication safety practices.

II. Materials And Methods

Research Design

Quasi-experimental one-group pretest–post-test design.

Setting

The study was conducted in a tertiary care hospital.

Population

Registered nurses involved in direct patient care.

Sample Size

50 Registered Nurses.

Sampling Technique

Convenience sampling.

Inclusion Criteria

- Registered nurses who had at least 6 months of clinical experience
- Registered nurses who were involved in medication administration

Exclusion Criteria

- Registered Nurses who were on leave during study period
- Registered Nurses who were in administrative roles without direct patient care

Intervention: Flipped Education Program

The intervention was delivered over 4 weeks.

Prevention of Medication Administration Error Through Flipped Learning

Prevention of Medication administration error requires knowledge, clinical judgment, communication skills and adherence to evidence-based practice standards. Flipped education offers several mechanisms that may enhance these competencies.

Pre-class preparation allows nurses to independently review Medication administration principles at their own pace. Learners can revisit complex concepts repeatedly, promoting understanding and self-regulated learning.

Pre-Class Learning

Participants received digital learning materials including video lectures, drug calculation modules, medication administration safety guidelines, reading handouts, Clinical case scenarios.

Topics included:

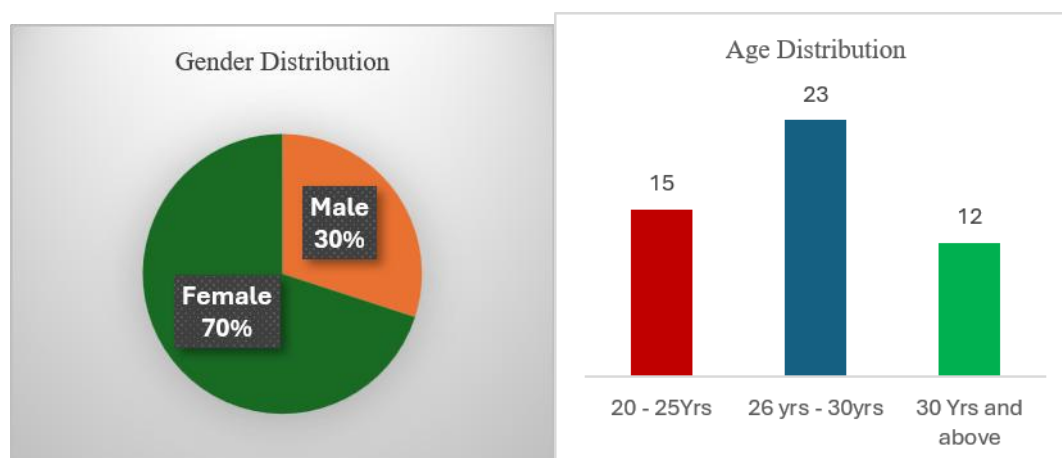
- Rights of medication administration
- High-alert medications
- LASA drugs (Look-Alike Sound-Alike)
- Drug calculations
- Adverse drug reaction reporting
- Near-miss reporting
- Safe infusion practices

In-Class Sessions

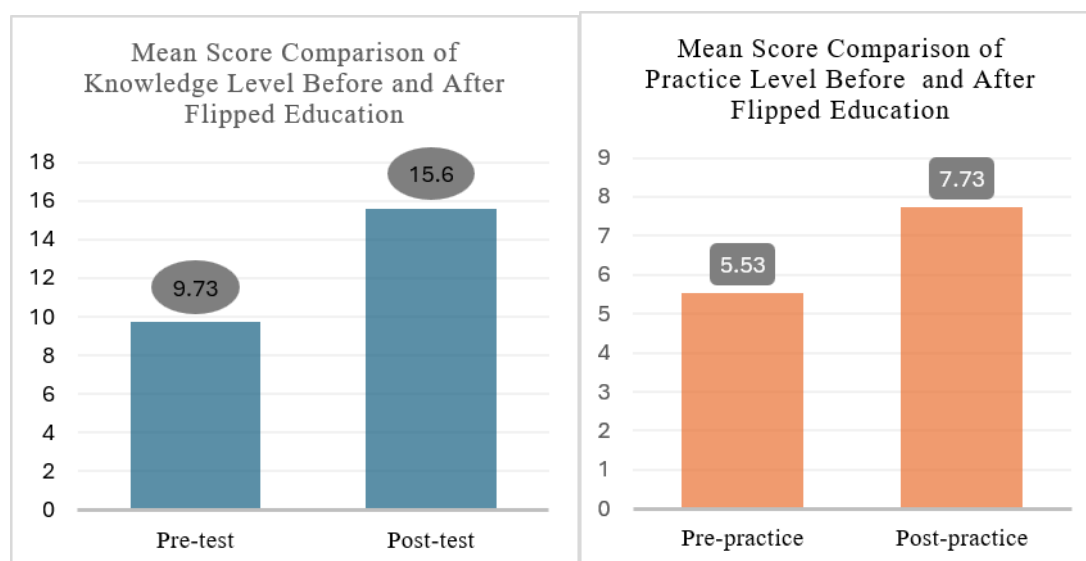
Nurses are divided into small groups, each group consists of 4 to 5 members

Classroom sessions are focused on:

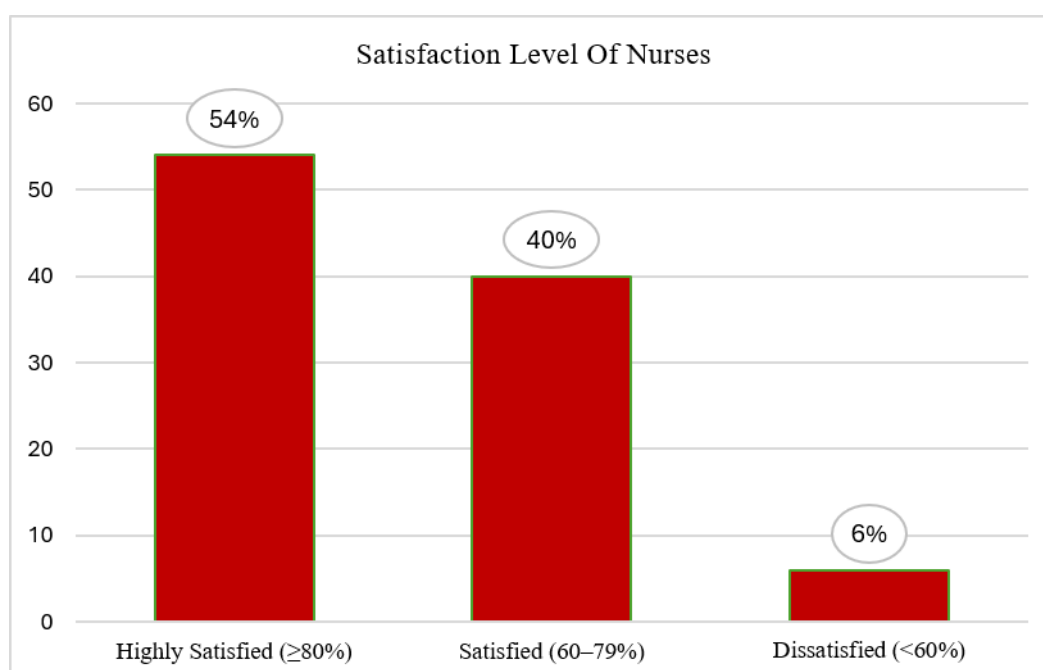
- Group discussions
- Case analysis
- Simulation
- Medication calculation exercises
- Error identification drills
- Reflective learning



In this study around 50 Nurses were selected 15 (30%) Male Nurses and 35 (70%) Female Nurses respectively within the age group of 20 – 25 yrs (15RN), 26 – 30 yrs (23RN), 30yrs and above (12 RNs) respectively.



The above graphs illustrate the Mean Comparison of knowledge level and Practice level increased when compared to before and after implementation of Flipped Education on Prevention of medication administration error



The above graph illustrates satisfactory level of Nurses highly satisfied (>80%) is 54%, Satisfied (60 – 79%) is 40% and Dissatisfied (< 60%) is 6%.

The present study demonstrated that flipped education significantly improved both knowledge and clinical practice of prevention of medication errors among registered nurses.

Effectiveness of Flipped Education:

Research evaluating flipped learning in healthcare education demonstrates several potential benefits.

- Improved knowledge acquisition

Studies indicate that learners exposed to flipped learning frequently achieve improved post-intervention knowledge scores compared with traditional lecture-based methods. Pre-class exposure enhances preparedness and comprehension.

- Enhanced critical thinking

Interactive learning activities encourage analysis and clinical reasoning. Medication administration often requires interpretation of patient-specific information and assessment of risk factors; therefore, critical thinking is essential.

- Increased learner engagement

Flipped classrooms promote active participation and responsibility for learning. Learners are encouraged to contribute to discussions and problem-solving exercises rather than serving as passive recipients of information.

- Greater knowledge retention

Active learning strategies are associated with improved long-term retention and application of information.

Challenges and Limitations

Despite potential advantages, implementation of flipped learning presents several challenges like technological barriers, preparation burden, learner resistance, variation in participation

Implications for Nursing Practice

The application of flipped learning in Prevention of Medication administration error may contribute to improved nursing practice and patient outcomes. Enhanced knowledge and clinical reasoning may reduce medication-related errors and strengthen patient safety culture.

Healthcare organizations should consider integrating flipped education into continuing professional development programs for Registered Nurses. Combining digital resources with simulation and collaborative learning activities may support competency development and lifelong learning.

Recommendations

Based on the findings of the study, the following recommendations are proposed to prevent medication administration errors among registered nurses

- Conduct multicentre studies with larger sample sizes
- Compare flipped education with other active learning strategies
- Evaluate long-term knowledge retention and skill sustainability
- Assess the impact on actual medication administration error rates
- Integrate flipped education into continuing nursing education programs
- Strengthen medication error reporting and safety culture
- Focus on high-risk clinical areas and high-alert medications

III. Conclusion

Flipped education represents an innovative pedagogical approach with significant potential for Prevention of medication administration error among Registered Nurses. By shifting theoretical instruction outside the classroom and emphasizing active learning during face-to-face sessions, the approach promotes knowledge acquisition, critical thinking, learner engagement and retention. Although implementation challenges exist, evidence suggests that flipped learning may enhance educational outcomes and strengthen medication safety practices in healthcare settings. Continued research and institutional support are necessary to optimize its application within nursing education and clinical practice.

References

- [1]. Bergmann J, Sams A. Flip Your Classroom: Reach Every Student in Every Class Every Day. Washington, DC: International Society for Technology in Education; 2012.
- [2]. Betihavas V, Bridgman H, Kornhaber R, Cross M. The evidence for 'flipping out': A systematic review of the flipped classroom in nursing education. Nurse Education Today. 2016;38:15–21.
- [3]. Bishop, J. L., & Verleger, M. A.. (2013). The flipped classroom: A survey of the research. In 2013 ASEE Annual Conference & Exposition Proceedings (pp. 23.1200.1–23.1200.18). American Society for Engineering Education. <https://doi.org/10.18260/1-2--22585>
- [4]. Chen F, Lui AM, Martinelli SM. A systematic review of the effectiveness of flipped classrooms in medical education. Medical Education. 2017;51(6):585–597.
- [5]. Hew, K. F., & Lo, C. K. (2018). Flipped classroom improves student learning in health professions education: A meta-analysis. BMC Medical Education, 18, Article 38. <https://doi.org/10.1186/s12909-018-1144-z>
- [6]. McLaughlin JE, Roth MT, Glatt DM, et al. The flipped classroom: A course redesign to foster learning and engagement in a health professions school. Academic Medicine. 2014;89(2):236–243.
- [7]. O'Flaherty, J., & Phillips, C.. (2015). The use of flipped classrooms in higher education: A scoping review. The Internet and Higher Education, 25, 85–95. <https://doi.org/10.1016/j.iheduc.2015.02.002>
- [8]. World Health Organization. Medication Without Harm: Global Patient Safety Challenge on Medication Safety. Geneva: WHO; 2017.