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Innovative Teaching Method on the Patient Safety for Nursing Students: Escape Room

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Innovative Teaching Method on the Patient Safety for Nursing Students: Escape Room

Abstract

Objectives

Ensuring patient safety is a cornerstone of nursing practice, and its foundation is established during nursing education. This study aims to empower senior nursing students to develop self-efficacy in patient safety practices through the "Escape Room" teaching method.

Methods

The study was conducted with senior nursing students from February to May 2024. Data were collected using the Student Information Form, Patient Safety Self-Efficacy Questionnaire, and Satisfaction with Training Methods Scale. The escape room was structured in three phases—prebriefing, simulation, and debriefing—following INACSL standards.

Results

The average age of the participants was 23.5, and 43.5% had previously completed an elective course on patient safety. Analyses revealed that students spent the most time, averaging 2.59 minutes, in the room dedicated to information questions. The average self-efficacy score before the intervention was 61.26, which increased to 71.32 after the intervention, and participants reported a high level of satisfaction.

Conclusion

Our study's findings indicate that patient safety-themed escape room training significantly enhances students' self-efficacy in patient safety, as well as their overall satisfaction and motivation.

Keywords

Patient safety, escape room, nursing education, teaching methods.

Introduction

Everyone has the fundamental right to live in a healthy and safe environment (WHO, 2007). However, safety issues that arise within healthcare settings can compromise this right, posing significant risks to patient well-being. The US National Patient Safety Foundation (NPSF) underscores the critical nature of patient safety, defining it as "the prevention of errors related to healthcare and the reduction of patient harm caused by such errors" (NPSF, 2011). Ensuring patient safety is a cornerstone of nursing practice, and its foundation is established during nursing education (Mansour et al., 2018; WHO, 2011). Patient safety education has traditionally been delivered primarily through theoretical instruction, focusing on cognitive aspects. However, the integration of psychomotor skills and patient safety into laboratory applications has often been insufficient, leading to a potential gap in students' awareness and application of patient safety principles in clinical practice (DeBourgh & Prion, 2011).

In response to these challenges, Joint Commission International (JCI) (2011) has established "International Patient Safety Goals," which include correct patient identification, enhanced communication, improved safety of high-risk medications, correct-site and correct-procedure surgery, reduction of healthcare-associated infections, and minimization of patient harm from falls. To achieve these goals, JCI advocates for the adoption of active teaching methods that holistically address the cognitive, affective, and psychomotor dimensions of patient safety in health education (JCI, 2011; Aktaş & Göçmen Baykara, 2023).

Innovative teaching methods that actively engage students and cater to diverse learning styles are increasingly recognized as essential in nursing education (San Martin et al., 2021). Among these methods, gamification—transforming educational content into interactive and engaging experiences—has gained prominence. Gamification, such as the "Escape Room" approach, enhances learning by transforming passive students into active participants, thereby making the educational process more dynamic and effective (Aktaş & Göçmen Baykara, 2023; Culha,

2019; Wynn, 2021). In an escape room scenario, teams of 2-10 members work together to solve puzzles and complete tasks, progressing through multiple rooms with time constraints and optional hints for time management (Sánchez-Martín et al., 2020; Mullen & Seiler, 2019; Guckian et al., 2020). This method has been shown to improve students' cooperation, communication, critical thinking, and active learning, while also enhancing their motivation, knowledge acquisition, and team-building skills (Davis, 2022; Gómez-Urquiza et al., 2022).

The escape room approach is increasingly being utilized across various healthcare disciplines, including nursing, medicine, pharmacy, physiotherapy, and pharmacology (Satır et al., 2022). Research on its application in nursing education has demonstrated that simulation-based escape rooms help identify patient safety hazards, boost students' self-confidence, and provide valuable opportunities for inter-professional education by highlighting the shared responsibility of maintaining a culture of safety (Diemer et al., 2019). Moreover, studies have shown that nursing students not only increase their awareness of patient safety through active participation in escape rooms but also find the experience enjoyable and motivating (Garwood, 2020). For instance, Dacanay et al. (2021) reported that an escape room themed around sepsis care enhanced students' ability to retain and apply critical thinking skills, leading to positive outcomes in both knowledge retention and skill development. Similarly, Gracia et al. (2021) found that nursing students had fun and effectively acquired professional competencies while playing an escape room game during a community health course, validating the use of gamification as a teaching strategy.

This study aims to empower senior nursing students to develop self-efficacy in patient safety practices through the "Escape Room" teaching method.

Method

Design

The research was conducted in a quasi-experimental type with a one-group pretest-posttest design. The study complied with the TREND Checklist guidelines, and the research flow diagram created by the researchers was based on TREND (Figure 1).

Sample

The study population included senior students at XX Faculty of Nursing, University of XX, between February 2024 and May 2024 (N=95). Students who volunteered to participate were included in the sample without sample calculation. The inclusion criteria were (a) being 18 years of age or older, (b) being a fourth-year nursing student, (c) completing the data collection forms in full, and (d) volunteering to participate in the study. Being in the escape room for more than 6 minutes in each room was set as an exclusion criterion.

Hypothesis

H₁¹: Patient safety-themed escape room teaching method increases students' self-efficacy in patient safety practices in nursing students.

H₁²: Patient safety-themed escape room teaching method increases nursing students' satisfaction.

Data Collection Tools

As data collection tools in this research student Information Form, Patient Safety Self-Efficacy Questionnaire and Satisfaction with Training Methods were used. Informed consent was obtained from the students in the study, which was conducted on a voluntary basis.

Student Information Form

The form was developed by the researchers in line with the literature and consists of 5 questions to determine participants' demographic information, including age, gender, type of school they graduated from, and whether they have attended the elective course on patient safety.

Patient Safety Self-Efficacy Questionnaire

The structural content of the patient safety self-efficacy questionnaire created by the researchers was created with reference to Eskici et al. (Eskici et al., 2021). It includes a degree of competence between 0-75 (0=insufficient, 5=sufficient) for each goal. Fifteen headings were determined by matching the keywords in the ‘International Patient Safety Goals’ set by JCI (Table 1). These headings were finalised by consulting five experts in the field. A minimum score of 0 and a maximum score of 75 can be obtained from the questionnaire. High scores will indicate high self-efficacy for patient safety. Low scores would indicate low self-efficacy for patient safety.

Table 1. Patient Safety Self-Efficacy Headings

| |
|---|
| 1. I can establish safe communication that can ensure patient safety. |
| 2. I can cooperate with other disciplines for patient safety. |
| 3. I can use reporting systems for patient safety. |
| 4. I can make safe patient transfers. |
| 5. I can determine the safe site when practicing giving injections to the patient. |
| 6. I can calculate the safe dose range in drug applications. |
| 7. I can take the necessary security measures to verify patient identity. |
| 8. I can use colour codes (red-white-blue-pink) in the hospital. |
| 9. I can ensure patient privacy safely. |
| 10. I can take precautions for falls in patient safety. |
| 11. I can recognise the safe connections of medical materials given to the patient. |
| 12. I can recognise applications that may infect the patient. |
| 13. I can ensure the safety of medical supplies given to the patient in terms of infection. |
| 14. I can recognise situations that may threaten patient safety related to the patient’s environment. |
| 15. I can take precautions for pressure injuries in patient safety. |

Satisfaction with Training Methods Scale

The scale was developed by Gürpınar (Cronbach’s alpha: 0.84) and used in their studies. It contains 16 propositions, with each proposition scored on a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree). High average scores indicate that students' satisfaction with the education method is high. Low average scores indicate that

students' satisfaction with the education method is low. Students can rate their satisfaction with the training methods with a minimum of 16 and a maximum of 80 points.

Interventions

All participants who volunteered for the study were thoroughly briefed on the duration, flow, and expectations of the interventions. Both verbal and written consent were obtained from each participant. The date and time for the escape room activity were scheduled, and students were notified accordingly. Participants were required to assemble into teams of four to six members and report to the Nursing Simulation Laboratory within the designated time frame.

The Patient Safety Self-Efficacy Questionnaire was administered as a pre-test prior to the commencement of the escape room activity. The design and implementation of the escape room adhered to the 'Best Practice Standards' established by the International Nursing Association for Clinical Simulation and Learning (INACSL) Standards Committee and the INACSL Board of Directors (INACSL, 2016).

The intervention was structured in three phases: prebriefing, simulation training (Escape Room), and debriefing. Following the debriefing session, participants completed the Patient Safety Self-Efficacy Questionnaire and the Satisfaction with Training Methods Questionnaire.

Escape Room Design

The escape room was created in three stages: prebriefing, simulation and debriefing, under INACSL standards (INACSL, 2016).

A- Prebriefing

Prior to the commencement of the escape room simulation, students underwent a comprehensive orientation session. This session included:

- Introduction to the simulation environment and management procedures within the simulation laboratory.

- Provision of foundational information regarding patient safety principles that would be integrated into the escape room experience.
- Explanation of the objectives and expected outcomes for the students.
- Obtaining consent for video and photo documentation of the simulation.
- Emphasis on the importance of confidentiality concerning the escape room's design and content to prevent information leakage.
- Detailed description of the escape room setup: the laboratory was divided into three distinct rooms.

The first room featured four knowledge-based questions and one skill-based question, the second room addressed medication dosage calculations and patient safety issues related to mother-infant care, and the third room focused on patient safety concerns within an intensive care setting. Students were informed that they would have a maximum of six minutes in each room. Correct responses to the questions were assigned letters, and the completion of five correct answers would form the word "T-A-M-A-M" (Turkish for "OKAY"), which served as the key to proceed to the next room. Successful completion of all three rooms would be followed by evaluation based on the time spent in each room. A facilitator was available to provide hints if students exceeded the time limit of five minutes per room.

B- Simulation - Escape Room

First Room (Patient Safety - Knowledge Notes):

Upon entering the room, the timer was activated. Students were tasked with answering five patient safety-related questions:

1. List three practices that ensure safe communication in patient safety.
2. Identify three practices for effective inter-disciplinary collaboration in patient safety.

3. Name three reporting systems used for patient safety.
4. Describe three practices that ensure safe patient transfer.
5. Demonstrate the safe injection site in the gluteal area (ventrogluteal area) using a skill model.

Second Room (Mother-Infant Room):

In this room, students were required to perform a medication dosage calculation relevant to patient safety and identify four patient safety threats:

1. Calculation of a safe drug dose range.
2. Identification of different mother-infant patient wristbands.
3. Utilization of color codes (red, white, blue, pink) in the hospital setting.
4. Ensuring maternal privacy.
5. Addressing safety concerns with open incubator edges.

Third Room (Adult Intensive Care Unit):

- Students were asked to identify five practices that pose threats to patient safety:
 1. Incorrect connection of medical equipment (e.g., intravenous treatment administered through a nasogastric catheter).
 2. Presence of bloody and dirty peripheral catheter dressing.
 3. Oxygen mask tip exposed and in contact with the floor.
 4. Sharp objects present on the patient's bed.
 5. Patient cables and connections passing under the patient, risking pressure injuries.

C- Debriefing

- The debriefing phase utilized the Promoting Excellence and Reflective Learning in Simulation (PEARLS) method (Eppich & Cheng, 2015). This method encompasses four stages: reaction, definition, analysis, and summarization.

- During this phase, students engaged in reflective discussion about their experiences, including their practices, decision-making processes, and the outcomes of the simulation exercise. The aim was to facilitate a thorough understanding and learning from their simulation experience.

Legal and Ethical Aspects of the Research

Permission dated 18.04.2024 and numbered 27424 was obtained from XX University, XX Scientific Research Ethics Committee, as well as from the institution where the research was conducted. Informed Consent Forms were obtained from the participants. Permission to use the scale was granted.

Statistical Methods

The data obtained in the study were evaluated by using IBM SPSS Statistics for Windows, Version 22.0 (SPSS INC., Chicago, IL, USA) statistical software. Frequency and percentage analyses were used to determine the descriptive characteristics of the participants. Kurtosis and Skewness values were analysed to determine whether the research variables were normally distributed. Since the variables showed normal distribution, parametric methods were used in the analysis. Dependent groups t-test was used for the comparison of intragroup measurements. Independent groups t-test was used to compare quantitative continuous data between two independent groups.

Results

According to participant information, the average age of the students was 23.5 years, with 69.6% being female. 84.8% graduated from Anatolian high schools, 8.7% from science high schools, and 6.5% from health vocational high schools. 43.5% had previously taken a patient safety course.

It was observed that students spent the most time in the escape room with information questions, averaging 2.59 minutes. They spent an average of 1.18 minutes in the second room

and 1.12 minutes in the third room. The average time for students to complete the escape room was 5.29 minutes (Table 2).

Table 2. Duration of Stay in Rooms

| Rooms | Mean \pm SD |
|-------------|----------------|
| First room | 2.59 \pm .85 |
| Second room | 1.18 \pm .21 |
| Third room | 1.12 \pm .32 |
| Total time | 5.29 \pm 1.4 |

Note. SD: Standard Deviation

The mean score of the Patient Safety Self-Efficacy Questionnaire before the application was 61.26. After the application, the score was 71.32, showing an increase of 10.06 points. The increase in score after the application was significant ($p < .05$). Students reported high satisfaction with the escape room training method, with a satisfaction score of 73.71 (Table 3).

Table 3. Comparison of Score Averages from Patient Safety Self-Efficacy Questionnaire Before and After the Escape Room

| Groups | Mean \pm SD | t* | p |
|----------------|-------------------|--------|--------|
| PSSE pre-test | 61.26 \pm 13.43 | -5.176 | < .001 |
| PSSE post-test | 71.32 \pm 4.7 | | |

Note. *: Paired sample t-test, PSSE: Patient Safety Self-Efficacy n: Number of participants, SD: Standard Deviation

When analyzing the effect of taking a patient safety course on self-efficacy evaluations in the patient safety-themed escape room training method, it was found that whether or not students had taken the patient safety course did not create a significant difference in self-efficacy pre-test and post-test scores ($p > .05$). In intragroup comparisons, a significant increase of 12.05 points was observed in students who had taken the patient safety course ($p < .05$). Similarly, a significant increase of 8.54 points was observed in students who had not taken the patient safety course ($p < .05$) (Table 4).

Table 4. Comparison of Score Averages from Patient Safety Self-Efficacy Test Before and After the Escape Room According to Patient Safety Course

| Groups | Course taken (n=20) | Course not taken (n=26) | <i>t^a</i> | <i>p</i> |
|----------------------|---------------------|-------------------------|----------------------|----------|
| | Mean ± SD | Mean ± SD | | |
| PSSE pre-test | 59.80 ± 16.96 | 62.38 ± 10.16 | -.642 | .524 |
| PSSE post-test | 71.85 ± 3.26 | 70.92 ± 5.64 | .654 | .516 |
| <i>t^b</i> | -3.412 | -4.01 | | |
| <i>p</i> | .003 | < .001 | | |

Note. ^a T-Test in Independent Groups; ^b T-Test in Dependent Groups, PSSE: Patient Safety Self-Efficacy, n: Number of participants, SD: Standard Deviation

Discussion

In contemporary healthcare services, the cultivation and application of critical thinking, problem-solving, and clinical decision-making skills are crucial for ensuring patient safety (Noviyanti et al., 2021). The implementation of innovative teaching strategies, such as the escape room approach in nursing education, has been shown to significantly enhance these essential skills, thereby promoting optimal and safe patient care. Additionally, this method encourages collaborative learning among students (Barker et al., 2020; Vestal et al., 2021; Edwards et al., 2019). Our study sought to evaluate the effectiveness of a patient safety-themed escape room applied to senior nursing students, and the results were compelling.

The findings indicate that the approach increased students' knowledge levels and provided clinical experience. This approach reduces the risk of patient harm by engaging with clinical scenarios in a controlled environment. As a result, students have improved their clinical decision-making abilities, enhanced their practical skills, and increased their awareness of patient safety. Previous studies have reported similar positive outcomes, such as increased confidence and shifts in perspective among nursing and medical students engaged in patient safety-themed escape room activities (Zhang et al., 2019; Diemer et al., 2019; San Martin et al., 2021).

Our study demonstrated a statistically significant increase in the mean scores of the Patient Safety Self-Efficacy Test following the escape room intervention. Notably, the most challenging aspect for students was the task of sorting anatomical structures, with all groups spending the most time in the first room, where they answered questions related to patient safety and identified the ventrogluteal injection site. This finding aligns with the results of Molina-Torres et al. (2022), where students described the escape room as a game-based approach that offered a realistic and effective resource for anatomy learning.

Studies have observed that nursing students who participated in escape room activities reported higher retention of information, increased motivation, and greater satisfaction (Darby et al., 2020; Gomez-Urquiza et al., 2019; Kinio et al., 2018; Gutiérrez-Puertas et al., 2020; Smith & Paul, 2021). Similarly, our study found that student satisfaction levels were high.

Moreover, research has established that innovative educational approaches—including active learning, simulation, concept mapping, reflective learning, inverted classrooms, and escape rooms—are effective in developing critical thinking, communication, problem-solving, teamwork, and creative thinking skills (Gutiérrez-Puertas et al., 2020; Hursman et al., 2022; Soares et al., 2023; Antón-Solanas et al., 2022; Shatto et al., 2019). Anguas-Gracia et al. (2021) found that students enjoyed game-based learning, were motivated to study more, and believed that such games should be more widely incorporated into nursing education. They also reported that these games helped them retain theoretical knowledge and apply it in practice (Antón-Solanas et al., 2022). In line with these findings, our research revealed that students valued the escape room method for its emphasis on teamwork and communication skills. They reported that the activity was enjoyable, informative, and memorable, with potential for practical application.

This study substantiates that the escape room approach effectively enhances students' knowledge and skills related to patient safety practices. Furthermore, based on student

feedback, the game was not only engaging and motivating but also contributed to the development of critical thinking and communication skills. We conclude that the escape room can be a valuable tool for identifying and addressing patient safety concerns, providing students with an enjoyable and motivating learning experience.

Conclusion

In the 21st century, lifelong learning, innovation, and digital literacy are essential competencies for educators. As such, it is imperative to employ diverse teaching and learning strategies, along with continual curriculum development, to prepare students to excel in creativity, problem-solving, clinical decision-making, communication, and critical thinking (Taraldsen et al., 2020). The escape room approach is an innovative pedagogical tool that not only heightens learners' motivation but also enhances the engagement with the subject matter.

Our study demonstrated that integrating patient safety-themed escape room training into the curriculum significantly enhances nursing students' self-efficacy in patient safety, while also boosting their satisfaction and motivation. The adoption of such innovative educational practices has the potential to not only improve the competency of nursing graduates but also to instill a heightened awareness of patient safety, ultimately contributing to safer healthcare environments

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