**Journal of Practical Emergency Medicine. 2023; 10(1): e22**

ORIGINAL RESEARCH

# Nursing Student Satisfaction with a Crisis Management Game-Based Training; a Quasi-experimental Study

**Mohsen Masoumian Hosseini[1], Seyedeh Toktam Masoumian Hosseini[2]* Karim Qayumi[3]**

1. Department of E-learning in Medical Sciences, Tehran University of Medical Sciences, Tehran, Iran.

2. Department of Nursing, School of Nursing and Midwifery, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran.

3. Centre of Excellence for Simulation Education and Innovation, Department of Surgery, University of British Columbia, Vancouver, BC, Canada.

*Received: July 2023; Accepted: JulyJune 2023; Published online: 24 August 2023*

**Abstract:** **Background:** This study was conducted to investigate nursing student satisfaction and anxiety with an emergency and crisis management game-based training (GBT) course. **Methods:** This quasi-experimental study included 60 third-year nursing students who had completed their clinical clerkships. The majority were single females, with no significant age differences, disaster experience, or crisis management training. The participants were randomly assigned to two equal group. The intervention group used disaster-themed games, while the control group received case-based training. The study comprised a four-week internship, and a self-reported anxiety levels was assessed before and after their first clinical experience. In addition, a self-report questionnaire was used to measure students' satisfaction with the Game-based Training program. The reliability of these questionnaires was assessed by a panel of ten faculty members and using Cronbach's alpha. The reliability of both the anxiety and satisfaction questionnaires was found to be 87%. The satisfaction questionnaire's alpha coefficients for realism, transferability, and value were 0.52, 0.79, and 0.74, respectively. Additionally, the face validity of these questionnaires was evaluated. **Results:** Participants felt that the experiences recreated real-life situations, tested their clinical decision-making, prepared them for the "real-life" clinical setting, and increased their confidence while in the clinical setting. In comparison to students who did not take part in the preclinical GBT, students who engaged in disaster-themed games showed significantly lower self-reported anxiety scores. **Conclusion:** Nursing students are increasingly utilizing game simulators for learning, practicing, and enhancing their skills. They experience positive satisfaction and reduced anxiety through GBT. These simulations offer realistic clinical scenarios, opportunities for decision-making, and confidence-building.

**Keywords:** Triage; Simulator, Game; Nursing; Satisfaction; Anxiety; Training

Cite this article as: Masoumian Hosseini M, Masoumian Hosseini ST, Qayumi K. Nursing Student Satisfaction with a Crisis Management Game-Based Training; a quasi-experimental study. J Pract Emerg Med. 2023; 10(1): e22. https://doi.org/10.22037/jpem.v10i1.42407.

## 1. Introduction

Given that nurses constitute the largest healthcare workforce, they hold a pivotal role in disaster response. Consequently, each nurse must possess the capability to actively engage in disaster response and navigate through the disaster care (1). Students undergoing nursing education have limited exposure to disaster situations, which constrains their imaginative capacities (2).

Nurses have vital responsibilities in responding to public health emergencies and preparing for disasters. Their roles encompass community education, community engagement, health promotion, and taking measures to ensure the safety of individuals during and after disasters. The readiness of nurses assumes significance in caring for and safeguarding the most vulnerable members of society. A heightened emphasis on disaster preparedness and proficiency in public health is anticipated to enhance nurses' resilience during disasters, augment practical and theoretical knowledge, offer a more comprehensive viewpoint on clinical and organizational challenges, and mitigate the psychological impact of abrupt transitions to different clinical settings. Nurses must possess the appropriate skills and competencies to respond

* **Corresponding Author:** Seyedeh Toktam Masoumian Hosseini, Department of Nursing, School of Nursing and Midwifery, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran, Email address: masoumiant99@gamil.com. ORCID ID: 0000-0003-3093-8799- TEL: 09158279655.

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

efficiently to emergencies and disasters (3).

The advancement of technology over the past decade has influenced the learning patterns and behaviors of students (4). A training program centered around simulation is an effective means of acquiring competencies in this domain. Assessments based on simulations can be employed to gauge leadership skills like strategic thinking, team management, and conflict resolution (5). Simulation-based training can enhance caregivers' self-efficacy in responding during the initial phases of disasters (6). Through simulation-based training, nurses can refine their practical and theoretical skills, cultivate leadership attributes, and bolster their self-efficacy in managing initial disaster scenarios (7). Nurses can also cultivate a broader perspective encompassing both clinical and organizational aspects through simulation-based training, which is pivotal for robust disaster response (8). This type of training equips nurses with the requisites to respond adeptly to disasters and emergencies within intricate communities. Consequently, nursing skills emerge as crucial elements in emergency and crisis management, with simulation-based training proving to be a potent approach for fostering these skills.

Simulation technologies have become more affordable and thus accessible to educational facilities. According to Alinier et al., while the use of simulation as an educational tool is not new, its adoption has increased over the years due to its potential to enhance patient safety (9). Medley and Horne have pointed out that simulation is underutilized in the nursing education (10). The mounting evidence supports the inclusion of this effective strategy in the toolkit of nurse educators as a means to bridge theory and clinical practice (11), nurture student confidence (12), and foster safe patient care (13), despite barriers associated with simulation, such as cost (14), faculty education or training gaps (15), space constraints (16), and the time required for both preparation and implementation (17). Even considering these sometimes-substantial hurdles, the use of simulation as a teaching strategy offers significant benefits.

The types of patients that students encounter during their clinical placements significantly influence their patient care experiences. In some nursing degree programs, simulators are employed to replicate patient care scenarios (18). These simulated patients come in various forms, including computerized mannequins, standardized patients, interactive computer games, and more. Using patient simulators, instructors can demonstrate a range of patient problems to students and ensure they acquire the skills to provide appropriate care (19). By combining patient simulator experiences with clinical practice, nursing students can acquire the knowledge and skills essential for a successful career (20). While the utilization of patient simulators in nursing schools has grown in recent years, there remains a gap in their application for students, particularly in the realm of virtual games. Despite the increasing availability of game-based simulators, this technology has not been seamlessly integrated into medical simulation curricula (21).

The lack of integration of game simulators into medical simulation curricula can be attributed to a few factors (22). Firstly, simulator technology is still relatively new, and many institutions lack the necessary infrastructure for its use. Additionally, the cost of simulator technology might be prohibitive for some schools, especially those with limited budgets. Lastly, there's a scarcity of training materials to educate students on how to effectively use simulator technology in a medical context (23). Compounding these issues, there is currently limited research on the use of simulators in the medical simulation (24). While numerous studies have evaluated the effectiveness of simulators in educational contexts, more research is needed regarding their application in medical settings (17). Moreover, additional studies are required to assess the potential of simulators in medical simulation in terms of their ability to meet students' needs (12).

Furthermore, infrequently encountered clinical scenarios can be incorporated into simulation scenarios to expose all students to such events, ultimately leading to reduced anxiety and better preparation for managing adverse outcomes in real clinical settings (25).

However, only a few studies have addressed students' perceptions of patient simulations in nursing education (26).

This study aimed to investigate nursing students' satisfaction and anxiety levels in an emergency and crisis management Game-Based Training course. The researchers aimed to determine whether experiencing simulated triage within a game-based environment would decrease nursing students' anxiety levels before engaging in actual patient care within a clinical setting.

## 2. Methods

### *2.1. Study Design*

This quasi-experimental study utilized a pretest-posttest design to investigate how game-based training (GBT) can reduce anxiety among nursing students before engaging in actual patient care within a clinical setting at Torbat Heydarieh University of Medical Sciences between 2021 and 2022. Furthermore, the participants' satisfaction with GBT was also assessed. A detailed description of this project can be found in a previously published article (27).

The emergency and crisis management course is a component of the three-year bachelor of science in nursing (BSN) program. This curriculum spans 34 hours across nine weeks. For this study, the Emergency and Crisis Management course encompassed both a theoretical phase and a clinical training phase. Following the completion of the theoretical segment

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

(five weeks), the practical component (four weeks) was undertaken as an internship.

## 2.2. Participants

In this study, a total of 60 third-year nursing students who had completed their clinical clerkship at the time of the study were selected through convenience sampling. The inclusion criteria included a willingness to participate in the research and the successful completion of an emergency course. Participants were excluded from the study if they hadn't attended the course or completed the study's second phase. The intervention group (n=30) and the control group (n=30) were assigned randomly using computerized random number generation software (Figure 1).

At the onset of the semester, students were briefed about the research project and informed that their decision to partake or not would impact their grades. All participants provided their informed consent to take part in the survey and were assured that only the data analysis would be made public. The student nurses had no prior experience with virtual simulators.

## 2.3. Instruments

**- Satisfaction questionnaire**

A 19-item student satisfaction survey, developed by Feingold, Calaluce, & Kallen (2004), employed a 4-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree) to gauge participants' agreement with the items. The instrument encompassed three subscales: realism (n = 3), transferability (n = 3), and value (n = 6). The realism subscale included items like "The scenario used with the patient simulator recreates real-life situations." The assessment of transferability to the clinical setting involved items such as "My interaction with the patient simulator improved my clinical competence." The evaluation of the learning value featured items like "Overall, the simulator experience enhanced my learning." Additionally, the survey encompassed seven extra items related to the patient simulation experience (17).

To assess the reliability of this questionnaire, a panel of ten academic staff members well-versed in simulation within the medical care domain was tasked with evaluating the satisfaction questionnaire's reliability. The satisfaction evaluation questionnaire comprised 19 questions, each rated on a Likert scale of 1 to 5, where 1 indicated strong disagreement and 5 indicated strong agreement. The internal consistency of the individual items in the questionnaire was examined. The questionnaire's internal consistency was then assessed using Cronbach's alpha. In statistical power analysis using SPSS, reliability is typically considered acceptable when the coefficient of reliability (alpha) is at least 0.70. For this sample, the reliability of the overall student satisfaction instrument was found to be r=0.87. The alpha coefficients for realism, transferability, and value were 0.52, 0.79, and 0.74, respectively. An initial factor analysis yielded three to six subscales per scree plot with eigenvalues greater than 1. However, the subscales might not have been accurately assigned based on the initial factor analysis due to the limited number of items or low alphas on the underlying subscales, even though the overall alpha was 0.87.

Regarding the face validity of the satisfaction questionnaire, a two-step translation process was performed by two bilingual experts in collaboration with the researcher, following the forward-backward procedure. Initially, a Persian translator translated the questionnaire. Subsequently, another expert translated the questionnaire back into English. Finally, the experts and a nursing department faculty member reviewed the Persian version of the questionnaire after comparing the two versions. The quantitative measurement of the study's face validity involved separately asking 15 student nurses from the target population (student nurses from departments other than triage) to assess, on a Likert scale, whether they encountered difficulties in understanding the concepts, whether there were ambiguities in their perceptions, and whether the items were pertinent and appropriate. An impact score was calculated using a formula that gauged the items' appropriateness and relevance:

Impact score: frequency in percent × importance score

**- The State-Trait Anxiety Inventory (STAI)**

The STAI was developed by Spielberger et al. (1983) in 1964 and contained a series of 40 self-report measures of both state and trait anxiety on a 4-point Likert scale. Unlike trait anxiety, a personality trait, state anxiety is a temporary response to a stressor. Several measurements have confirmed the reliability and validity of Spielberger's instrument over time. The Cronbach's alpha coefficients for state and trait anxiety are 0.93 and 0.90, respectively. The test-retest correlations for trait anxiety range from .73 to .86. Higher values indicate higher self-reported anxiety levels (28).

**- The scoring method in the STAI questionnaire**

In Form Y-1, scores for questions 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20 range between 4 and 1, while for the remaining questions, they range between 1 and 4. In Form Y-2, scores for questions 21, 23, 26, 27, 30, 33, 34, 36, and 39 falls between 4 and 1, and for the other questions, they range between 1 and 4. Anxiety scores within the range of 20 to 40 indicate low levels of anxiety, scores between 40 and 60 indicate moderate anxiety and scores between 60 and 80 indicate high anxiety levels (28).

Results stemming from the face validity assessment of the satisfaction questionnaire and STAI Test revealed an agreement rate exceeding 80% and an impact score surpassing 1.5. This signifies that the items are easily interpretable and can be effectively utilized within the survey. Participants concurred that all items in the questionnaire were straightfor-

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

ward, clear, and relevant to the objectives (28). The panel of ten experts concluded that the questionnaire's results were reliable and could be used for subsequent research endeavors.

Regarding the STAI Test, following a preliminary study involving ten individuals as a pilot sample, Cronbach's coefficient of internal reliability for the tool was determined to be 0.87.

**Phase 1: Theoretical training**

**Interventions**

Emergency and crisis management is among the courses within the three-year BSN program (29). The curriculum spans 34 hours distributed across a 9-week timeframe. In this study, the Emergency and Crisis Management course encompassed both a theoretical training phase and a clinical training phase. The theoretical training took place over a period of five weeks within a simulated university classroom, where a game-based case was presented weekly, supervised by a clinical professor. To adapt the game's content and tasks, as well as to design scenarios based on gameplay, researchers utilized computer software. The game unfolded across five sessions, each addressing distinct topics: 1) Preparing medical and health resources for earthquake rescue; 2) Racing against time: triage, rescue, and treatment of five injured victims in a disaster area; 3) Providing comfort to injured family members by assessing and intervening in their psychological stress response; 4) Managing a patient with hemorrhagic shock; 5) Assessing and managing a patient with a head injury.

For each session game, the following protocol was adhered to. A two-hour session featuring the disaster and crisis game was scheduled and conducted, commencing with student login and concluding with feedback. Access to the game was granted through usernames and passwords assigned to each user. The researcher provided comprehensive instructions for game engagement. Upon logging in, students could access specific sections of interactive learning content within the game. The teacher monitored students' activities, and they received feedback from the instructor regarding their gameplay. Twenty-four hours after participating in each scenario, students convened for a 90-minute debriefing session held in the Shahidi conference room at Nohomeday Hospital in Torbat Heydariyeh. The clinical professor, equipped with expertise gained from a debriefing workshop, conducted the debriefing sessions. Throughout the study, a 3D model was utilized for debriefing, adhering to INACSL guidelines (30). Upon the completion of the five sessions, participants who opted to join the study signed an informed consent form and utilized the research instrument to assess their perceptions. In the control group, instruction was conducted through face-to-face interactions. Each two-hour session commenced with a case study concerning a disaster related to the topic of the lesson. While delving into the paper-based scenario, a clinical instructor elaborated on the training objectives that students were expected to fulfill through engagement with the scenario. Additionally, the instructor posed questions to gauge the students' comprehensive prior understanding of the case. Following a concise introduction to the case from the clinical professor, students embarked on working through the scenario. Similar to the intervention group, the control group underwent five weeks of theoretical training. Each week, a disaster and a crisis scenario were presented.

**Phase 2: Clinical training**

**Disaster & crisis internship**

In this phase, the intervention and control groups were each divided into five groups of six students (10 groups of six students in total). Four weeks of practicum and clinical training were conducted in the university's clinical laboratories with standardized patients and simulated emergencies and crisis situations.

The control and intervention groups self-reported their anxiety level before the first clinical experience and after participating in the theoretical phase. To determine the level of anxiety, the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was administered to each student before the actual clinical experience. The students' satisfaction with the simulation program was measured after the theoretical intervention phase with a self-report questionnaire.

**Data Analyses**

All analyses were performed using SPSS version 26 (SPSS, Inc., Chicago, IL). Statistical significance was determined with a p-value of less than 0.05. The Shapiro-Wilk test was employed to assess the normality of data distribution differences in mean STAI anxiety scores between student groups, which were evaluated using Student's t-tests as continuous variables. Anxiety levels were assessed as outlined in the method. Additionally, reliability estimates for the instrument and descriptive statistical analysis, encompassing means and frequencies, were computed. A descriptive statistical analysis involving means and frequencies was executed to ascertain student nurses' satisfaction with Game-based learning. Qualitative data were also gathered during debriefings by capturing subjective comments from both students and faculty concerning the simulated disaster experience. These insights were used to further enhance the simulation process for future applications.

## 3. Results

### *3.1. Patients characteristics*

A total of 60 nursing students took part in this study, with the majority being single (87.3%) and female (81.7%). Based on

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

the Chi-square test for mean age, there was no significant distinction between the intervention and control groups (20.75 ± 1.16 vs. 20.70 ± 1.16 years, respectively; p = 0.83). Consequently, both groups were homogeneous concerning age. The bulk of participants (86.2%) had no prior exposure to disasters or rescue scenarios. Furthermore, none of the participants had undergone any form of crisis management training course before (Table 1).

**Satisfaction test**

Twenty-nine out of 30 participants expressed satisfaction with the scenario's effectiveness in assessing technical skills and aiding in exam preparation. Respondents generally concurred that the experience, to some extent, tested clinical decision-making. Over 95% of participants reported feeling adequately prepared for the exam, with all of them valuing their acquired technical and decision-making skills. In 36.6% of cases, students indicated a need for instruction prior to engaging with a patient simulator. Some participants (22.72%) believed that the pace of clinical simulation didn't entirely mirror that of a real clinical setting. All students acknowledged that the virtual simulation significantly enriched their overall learning experience (Table 2).

Furthermore, responses were evaluated based on the three original subscales of transferability, realism, and value (Table 3). Within the transferability subscale (3 items), there was unanimous agreement with survey items concerning the applicability of what was learned or developed in the sessions to real clinical contexts. In the Realism subscale (3 items), 93.95 percent of students agreed that the scenario accurately reflected real-life situations, settings, and patients. The game based on the patient simulation experience was deemed valuable by nearly all participants (95.46%) (6 items).

**Anxiety test**

As per the anxiety test, students exhibited a high level of anxiety prior to the clinical clerkship; notably, no statistically significant differences were observed between the two groups (p = 0.558). An independent t-test, comparing the means of the two groups (32.46 and 55.76), indicated statistically significant differences between the groups before the clinical clerkship (p < 0.0001). The results of the STAI test are depicted in Figure 2. In the intervention group, 24 students demonstrated low anxiety levels regarding the simulation (80%), while 6 reported moderate anxiety (20%). Conversely, in the control group, 17 students reported moderate anxiety, 12 indicated high anxiety, and merely one reported low anxiety (Figure 2).

## 4. Discussion

This study examined nursing students' satisfaction and anxiety levels with an emergency and crisis management Game-Based Training (GBT) course. Nursing students universally believed that the GBT experience contributed to enhancing their learning and their ability to make informed decisions. Respondents expressed contentment with the patient simulation experience in terms of transferability, realism, and value. However, in the simulator experience, there is room for improvement in terms of pacing, considering the passage of time in a hospital setting. Providing students with more feedback on their performance during the patient simulator activity could enhance its value.

A study conducted by Sinclair and Ferguson (2009) discovered that simulation alone or in combination with traditional teaching methods could bolster students' self-confidence. Students who participated in simulation exercises that integrated case studies and role-plays experienced an increase in their self-efficacy (31). While subjective comments about heightened confidence emerged following the simulated experience, these were not empirically evaluated in this study. As a result of GBT with the virtual gamified theme, students consistently reported feeling more self-assured about their skills and better equipped for clinical experiences. For instance, one student noted feeling less apprehensive about entering a patient's room. GBT participants conveyed sentiments such as, "I feel much more confident with my skills now that I know what to expect and how to plan for the clinical day." Several participants also remarked that they had been unaware of the busy schedule and extensive responsibilities of nurses on a typical day. A comparison of the effects of traditional course and scenario-based simulation training on 116 nurses was conducted by Hsu et al. (2015). Despite improved communication competence and self-efficacy in both intervention and control groups, nurses in the intervention group exhibited greater satisfaction than their control counterparts (32).

In comparison to students who did not engage in preclinical GBT, those who experienced disaster-themed games recorded significantly lower self-reported anxiety scores. Teachers cannot design teaching activities, employ teaching techniques, or utilize methods without considering students' interests, reactions, emotions, and learning styles (33). Therefore, educators should attempt to empathize with students to identify the causes of anxiety (34). Additionally, Zhang's research has shown that anxiety correlates with students' achievement, self-esteem, and motivation (35). Educational games and learning simulators have demonstrated the capacity to increase students' motivation and enhance their learning skills. This is attributed to the fact that games and simulators offer a more engaging and interactive learning approach than traditional methods. They also enable students to explore concepts in a hands-on manner, fostering a deeper understanding of the material (36). Consequently, students may be better able to interact with their teachers, ultimately reducing their anxiety. However, there's also the

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

possibility that virtual learning eliminates the physical presence of teachers, eliminating concerns about being judged or ridiculed for thoughts or actions. This creates a safer and more relaxed learning environment, which could aid in anxiety reduction and enhance classroom interaction enjoyment. There are limited articles addressing the evaluation of student anxiety and GBT. In clinical intensive care units, nursing students' anxiety decreased after engaging in intensive care simulation, as observed by Erler and Rudman (1993) (37). Bremner, Aduddell, and Amason (2006) conducted a study examining the impact of human patient simulation on the anxiety levels of first-year baccalaureate nursing students. Researchers found statistically significant improvements when assessing the students' comfort levels with initiating clinical trials (38). In this study, anxiety linked to communication with the teacher was analyzed, and the majority of students reported an improved teacher-student relationship after the game-based sessions, potentially due to enhanced self-esteem (39). Masoumian et al. revealed that game-based approaches such as crossword puzzles were able to reduce anxiety in 75% of operating room students preparing for exams. Furthermore, in this study, 92.5% of students expressed satisfaction with this pedagogical approach (40). These findings suggest that this approach effectively engages students and aids in learning, as a substantial proportion expressed satisfaction with the experience.

## 5. Limitations

The sample size was small in this study. Sixty students from a single nursing school in Iran with similar demographic characteristics were included in this study. Consequently, the results may not be generalizable to other nursing programs or geographical areas. Also, anxiety self-reports may not accurately reflect actual feelings due to the general limitations of self-reports. As a result of comparing the intervention group with a virtual game-based experience and the control group with traditional training, we believe that the GBT experience positively affected anxiety levels.

## 6. Conclusion

The results of this study suggest that game simulators are associated with positive satisfaction and decreased anxiety in student nurses. They provide a safe and realistic environment where students can practice and gain the confidence to become successful nurses. Virtual game simulators are a valuable tool for student nurses to gain confidence, practice decision-making and increase satisfaction in their learning in GBT.

## 7. Declarations

### *7.1. Acknowledgment*

Our sincere thanks go to the team of game developers and teachers who contributed to the validation of the questionnaire instruments of this study.

### *7.2. Conflict of interest*

The authors have no conflicts of interest.

### *7.3. Funding and supports*

Smart University of Medical Sciences (VUMS) had funded the project (project no.323)

### *7.4. Authors' contributions*

TMH and MMH wrote the manuscript draft. TMH and KQ designed the study. MMH did the data gathering. MMH conducted the analyses. All authors reviewed and approved the manuscript.

### *7.5. Ethical statement*

Ethical approval for this research was secured from the research ethics committee of the Smart University of Medical Sciences (ethics code: IR. VUMS. REC.1400.028).

### *7.6. Informed consent*

Informed consent was acquired from all participants, who were assured of the confidentiality of their personal information, with only aggregate statistics and data being utilized for publication.

### *7.7. Availability of supporting data*

Upon a reasonable request, the corresponding author can provide the data set that was analyzed during this study.

### *7.8. Using artificial intelligence chatbots statement*

This study was not written with the assistance of artificial intelligence

## References

1. Xue CL, Shu YS, Hayter M, Lee A. Experiences of nurses involved in natural disaster relief: A meta-synthesis of qualitative literature. Journal of clinical nursing. 2020;29(23-24):4514-31.
2. Davis AH, Manning J, Germain DS, Hayes S, Pigg C. Implementing disaster simulations for baccalaureate nursing students in the Gulf-Coast region. Clinical Simulation in Nursing. 2020;43:26-34.
3. Flaubert JL, Le Menestrel S, Williams DR, Wakefield MK, National Academies of Sciences E, Medicine. Nurses

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

in Disaster Preparedness and Public Health Emergency Response. The Future of Nursing 2020-2030: Charting a Path to Achieve Health Equity: National Academies Press (US); 2021.
4. Kim J, Lee O. Effects of a simulation-based education program for nursing students responding to mass casualty incidents: A pre-post intervention study. Nurse education today. 2020;85:104297.
5. McCaughey CS, Traynor MK. The role of simulation in nurse education. Nurse education today. 2010;30(8):827-32.
6. Jonson C-O, Pettersson J, Rybing J, Nilsson H, Prytz E. Short simulation exercises to improve emergency department nurses' self-efficacy for initial disaster management: Controlled before and after study. Nurse education today. 2017;55:20-5.
7. Niu A, Ma H, Zhang S, Zhu X, Deng J, Luo Y. The effectiveness of simulation-based training on the competency of military nurses: A systematic review. Nurse Education Today. 2022;119:105536.
8. MSNED PR-S, Jeremy Jarzembak M, Jennifer Shanholtzer MSN R. Simulating complex community disaster preparedness: Collaboration for point of distribution. Online Journal of Issues in Nursing. 2017;22(1):1E.
9. Alinier G. A typology of educationally focused medical simulation tools. Medical teacher. 2007;29(8):e243-e50.
10. Medley CF, Horne C. Using simulation technology for undergraduate nursing education. Journal of nursing education. 2005;44(1):31-4.
11. Amin HJ, Aziz K, Halamek LP, Beran TN. Simulation-based learning combined with debriefing: trainers satisfaction with a new approach to training the trainers to teach neonatal resuscitation. BMC research notes. 2013;6:1-5.
12. Moule P, Wilford A, Sales R, Lockyer L. Student experiences and mentor views of the use of simulation for learning. Nurse Education Today. 2008;28(7):790-7.
13. Gore T, Hunt CW, Parker F, Raines KH. The effects of simulated clinical experiences on anxiety: Nursing students' perspectives. Clinical simulation in nursing. 2011;7(5):e175-e80.
14. Bland A, Sutton A. Using simulation to prepare students for their qualified role. Nursing times. 2006;102(22):30-2.
15. King CJ, Moseley S, Hindenlang B, Kuritz P. Limited use of the human patient simulator by nurse faculty: An intervention program designed to increase use. International journal of nursing education scholarship. 2008;5(1):000010220215489231546.
16. Reeves K. Using simulated education for real learning. Medsurg Nursing. 2008;17(4):219-21.
17. Feingold CE, Calaluce M, Kallen MA. Computerized patient model and simulated clinical experiences: Evaluation with baccalaureate nursing students. Journal of Nursing Education. 2004;43(4):156-63.
18. Hosseini TM, Ahmady S, Edelbring S. Teaching Clinical Decision-Making Skills to Undergraduate Nursing Students via Web-based Virtual Patients during the COVID-19 Pandemic: A New Approach to The CyberPatientTM Simulator. J Contemp Med Sci| Vol. 2022;8(1):31-7.
19. Chakravarthy B, Ter Haar E, Bhat SS, McCoy CE, Denmark TK, Lotfipour S. Simulation in medical school education: review for emergency medicine. Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health. 2011;12(4):461-6.
20. Bearnson CS, Wiker KM. Human patient simulators: A new face in baccalaureate nursing education at Brigham Young University. Journal of Nursing Education. 2005;44(9):421-5.
21. Ayaz O, Ismail FW. Healthcare simulation: a key to the future of medical education–a review. Advances in Medical Education and Practice. 2022:301-8.
22. Vlachopoulos D, Makri A. The effect of games and simulations on higher education: a systematic literature review. International Journal of Educational Technology in Higher Education. 2017;14(1):1-33.
23. Haleem A, Javaid M, Qadri MA, Suman R. Understanding the role of digital technologies in education: A review. Sustainable Operations and Computers. 2022;3:275-85.
24. Okuda Y, Bryson EO, DeMaria Jr S, Jacobson L, Quinones J, Shen B, et al. The utility of simulation in medical education: what is the evidence? Mount Sinai Journal of Medicine: A Journal of Translational and Personalized Medicine: A Journal of Translational and Personalized Medicine. 2009;76(4):330-43.
25. Smith IL. Impact of the human patient simulation experience on the anxiety level of preclinical nursing students: Capella University; 2014.
26. Ravert P. An integrative review of computer-based simulation in the education process. CIN: Computers, Informatics, Nursing. 2002;20(5):203-8.
27. Masoumian Hosseini M, Masoumian Hosseini T, Qayumi K, Baeradeh N. Game-based vs. Case-based Training for Increasing Knowledge and Behavioral Fluency of Nurse Students Regarding Crisis and Disaster Management; a Quasi-Experimental Study. Arch Acad Emerg Med. 2022;10(1):e77.
28. Spielberger CD. State-trait anxiety inventory for adults. 1983.
29. Iran TMohameo. SCPMS. B.Sc. nursing curriculum (specifications, program, course outline, and evaluation method), approved by the fifty-fourth session of the Supreme Council for Planning of Medical Sciences in 2014. . In: nursing, editor. 2014.

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

30. Hallmark B, Brown M, Peterson DT, Fey M, Decker S, Wells-Beede E, et al. Healthcare Simulation Standards of Best PracticeTM Professional Development. Clinical Simulation in Nursing. 2021;58:5-8.
31. Sinclair B, Ferguson K. Integrating simulated teaching/learning strategies in undergraduate nursing education. International Journal of Nursing Education Scholarship. 2009;6(1).
32. Hsu L-L, Chang W-H, Hsieh S-I. The effects of scenario-based simulation course training on nurses' communication competence and self-efficacy: a randomized controlled trial. Journal of Professional Nursing. 2015;31(1):37-49.
33. Horwitz EK. Horwitz comments: It ain't over'til it's over: On foreign language anxiety, first language deficits, and the confounding of variables. JSTOR; 2000. p. 256-9.
34. Dávila LT. "J'aime to be Funny!": Humor, Learning, and Identity Construction in High School English as a Second Language Classrooms. The Modern Language Journal. 2019;103(2):502-14.
35. Zhang X. Foreign language anxiety and foreign language performance: A meta-analysis. The modern language journal. 2019;103(4):763-81.
36. Huang Y-M, Silitonga LM, Wu T-T. Applying a business simulation game in a flipped classroom to enhance engagement, learning achievement, and higher-order thinking skills. Computers & Education. 2022;183:104494.
37. Erler C, Rudman S. Effect of intensive care simulation on anxiety of nursing students in the clinical ICU. Heart & Lung: the Journal of Critical Care. 1993;22(3):259-65.
38. Bremner MN, Aduddell K, Bennett DN, VanGeest JB. The use of human patient simulators: Best practices with novice nursing students. Nurse Educator. 2006;31(4):170-4.
39. Nadile EM, Alfonso E, Barreiros BM, Bevan-Thomas WD, Brownell SE, Chin MR, et al. Call on me! Undergraduates' perceptions of voluntarily asking and answering questions in front of large-enrollment science classes. PLoS One. 2021;16(1):e0243731.
40. Masoumian hosseini M, Ruhabadi F, Gazarani A, Gazarani A, Larki M. Effect of using crosswords on operating room students' learning in a Haematology course: A quasi experimental study. Journal of Medical Education Development. 2023;16(49):7-16.

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

**Table 1:** Demographic characteristics of students

| **Characteristic** | **Value, No. (%)** | | | |
|---|---|---|---|---|
| **Gender** | | | | |
| Male | **11 (18.3%)** | | | |
| Female | **49 (81.7%)** | | | |
| Employed in health care | **8 (13.8%)** | | | |
| Previous contact with the simulators | **None** | | | |
| Age, years | Mean | Median | Mode (SD) | Range |
| Male | 20.83 | 20 | 1.126 | 18-22 |
| Female | 20.53 | 20 | 1.023 | 18-22 |

N = 30; 30 surveys were returned

**Table 2:** The percentage of student participation and their satisfaction with the simulator

| **Item** | **Strongly Disagree** | **Disagree** | **Agree** | **Strongly Agree** |
|---|---|---|---|---|
| Scenario used with the patient simulator recreates real-life situations (R) | 0 (0%) | 0 (0%) | 14 (45.45%) | 16 (54.54%) |
| Scenario adequately tests technical skills (V) | 0 (0%) | 1 (4.54%) | 18 (59.09%) | 11 (36.36%) |
| Scenario adequately tests clinical decision-making (V) | 0 (0%) | 0 (0%) | 14 (45.45%) | 16 (54.54%) |
| I was adequately prepared for the testing experience with the patient simulator (I) | 0 (0%) | 1 (4.54%) | 22 (72.72%) | 7 (22.72%) |
| Needed an orientation to working with the patient simulator before the diagnostic test (I) | 0 (0%) | 10 (31.81%) | 16 (54.54%) | 4 (13.63%) |
| The patient simulator space resembled a real critical care setting (R) | 0 (0%) | 4 (13.63%) | 22 (72.72%) | 4 (13.63%) |
| Temperature in room was comfortable (I) | 0 (0%) | 0 (0%) | 22 (72.72%) | 8 (27.27%) |
| Lighting in the room was adequate (I) | 0 (0%) | 1 (4.54%) | 21 (68.18%) | 8 (27.27%) |
| Patient simulator model provides a realistic patient simulation (R) | 0 (0%) | 1 (4.54%) | 22 (72.72%) | 7 (22.72%) |
| Technical skills taught in the course are valuable (I) | 0 (0%) | 0 (0%) | 12 (40.91%) | 18 (59.09%) |
| Clinical decision-making skills taught in this course are valuable (I) | 0 (0%) | 0 (0%) | 8 (27.27%) | 22 (72.72%) |
| Increased my confidence about going into the real clinical setting (T) | 0 (0%) | 0 (0%) | 14 (45.45%) | 16 (54.54%) |
| Working with the patient simulator was a valuable learning experience for me (V) | 0 (0%) | 0 (0%) | 11 (36.36%) | 19 (63.64%) |
| My interaction with the patient simulator improved my clinical competence (T) | 0 (0%) | 0 (0%) | 14 (45.45%) | 16 (54.54%) |
| Working with the patient simulator reinforced objectives of this course (V) | 0 (0%) | 0 (0%) | 16 (54.54%) | 14 (45.45) |
| Pace reflected flow of actual clinical setting (I) | 0 (0%) | 7 (22.72%) | 18 (59.09%) | 5 (18.18%) |
| Prepared me to perform in the “real-life” clinical setting (T) | 0 (0%) | 0 (0%) | 18 (59.09%) | 12 (40.91%) |
| Received adequate feedback regarding my performance (V) | 0 (0%) | 7 (22.72%) | 18 (59.09%) | 5 (18.18%) |
| Overall the experience enhanced my learning (V) | 0 (0%) | 0 (0%) | 11 (36.36%) | 19 (63.64%) |

Subscale items: (T) = transferability, (R) = realism, and (V) = value; (I) = Individual items

**Table 3:** Demographic characteristics of students

| **Subscale/Item** | **Mean (SD)** | **% of Student Agreement** |
|---|---|---|
| Realism subscale (R) | 3.161 (0.3959) | 93.95 |
| Transferability subscale (T) | 3.500 (0.07915) | 100 |
| Value subscale (V) | 3.424 (0.2597) | 95.46 |

Note: Each subscale was calculated based on the Likert scale; Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem

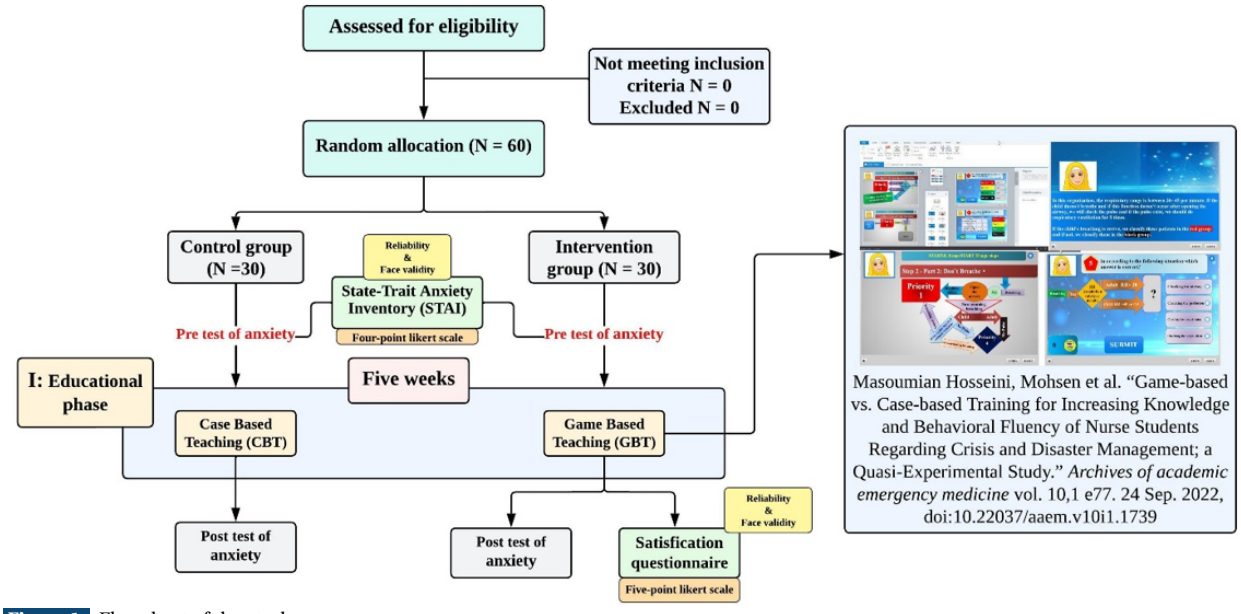


**Figure 1:** Flowchart of the study.

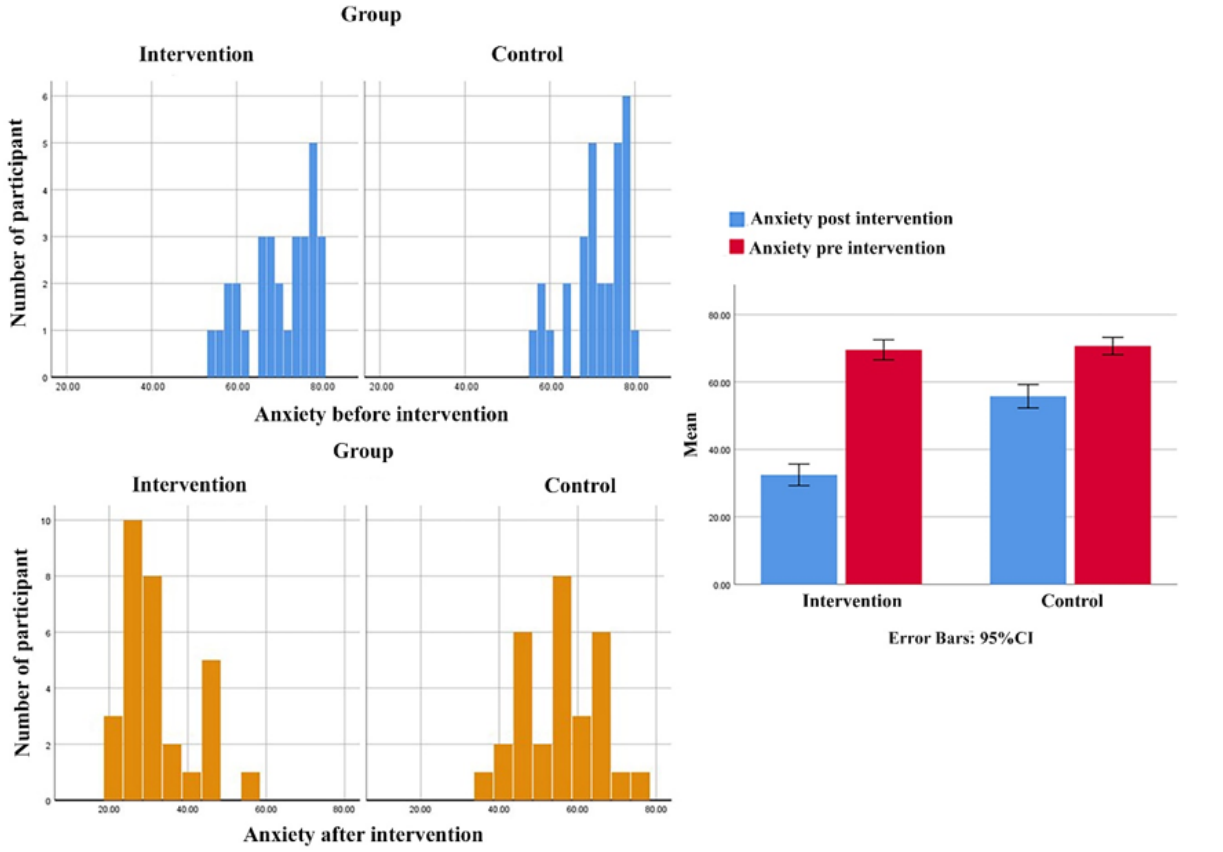


**Figure 2:** Results of anxiety tests in two control and intervention groups. (A) before and (B) after the implementation of the intervention. (C) provides a summary of the results (mean ± standard deviation). Low, medium, and high anxiety scores are indicated on a scale of 20 to 40, 40 to 60, and 60 to 80, respectively.

This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).
Downloaded from: https://journals.sbmu.ac.ir/jpem