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SAKARYA UYGULAMALI BİLİMLER ÜNİVERSİTESİ

The Effect of the Escape Room Method on the Patient Care Process of Nursing Students

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ABSTRACT

This study evaluated the effect of the escape room method on the patient care process of nursing students. The study employed a one-group posttest research design and was conducted between July and December 2023. The sample was 60 second-year nursing students from the Faculty of Health Sciences at Manisa Celal Bayar University. Data were collected using the Descriptive Information Form, the Time, Tips and Score Chart, and the Satisfaction Form for Escape Room. The escape room activity was implemented with 10 groups, each comprising six students, with each group participating in the activity once. Descriptive statistics, numbers, frequency, percentages, Mann-Whitney U test, Kruskal-Wallis test, and Spearman correlation analysis were employed to analyze the data. Analysis of the satisfaction scores indicated that most students (85.2%) reported being satisfied with the escape room method. The mean total application time was 20.85 ± 5.15 minutes, and the mean total score of the groups was 56.80 ± 2.50. A comparison of total application durations and scores among different groups revealed no statistically significant differences ($p > 0.05$). All groups (100%) used 1-3 tips during the activity. A weak positive correlation was found between total application durations and total scores; however, no significant correlation was observed between the time spent in the escape room, total scores, and satisfaction levels. All students completed the escape room activity within the allocated time. The majority attained high scores while utilizing a minimal number of tips, and most reported a high level of satisfaction with the experience. They indicated that the escape room method enhanced their motivation and learning processes and contributed to developing manual and problem-solving skills. Moreover, they found the activity engaging and were able to effectively transfer their theoretical knowledge into practice. As a result, they recommended the integration of similar experiential learning approaches into nursing education.

Keywords: Escape room, gamification, nursing education, student, patient care process

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Hemşirelik Öğrencilerinde Hasta Bakım Sürecinin Uygulanmasında Kaçış Odasının Etkisi

ÖZET

Bu çalışma, hemşirelik öğrencilerinde hasta bakım sürecinin uygulanmasında kaçış odası yönteminin etkisini değerlendirmek amacıyla yapılmıştır. Araştırmanın tipi son-test tek gruplu araştırma tasarımı şeklinde gerçekleştirildi. Araştırma, Temmuz-Aralık 2023 tarihlerinde Manisa Celal Bayar Üniversitesi Sağlık Bilimleri Fakültesi'nde 2. sınıf hemşirelik bölümünde öğrenim gören 60 öğrenciyle gerçekleştirildi. Veriler, Birey Tanılama Formu, Zaman, İpuçları ve Puan Çizelgesi ve Memnuniyet Anketi ile toplandı. Kaçış odası 6 kişiden oluşan toplam 10 grup ile gerçekleştirildi ve her grup sadece bir defa aktiviteye katıldı. Verilerin analizinde, sayı yüzde dağılımı, tanımlayıcı istatistikler, Mann Whitney U, Kruskal Wallis testi ve Spearman korelasyon analizi kullanıldı. Çalışmaya katılan öğrencilerin memnuniyet puanlarını incelendiğinde, çoğunun (%85,2) kaçış odası yönteminin uygulamasından memnun olduğu saptandı. Grupların toplam işlem süresi ortalaması 20,85±5,15, toplam puan ortalaması ise 56,80±2,50 olarak saptandı. Öğrencilerin gruplara göre toplam işlem süresi ve toplam puanları karşılaştırıldığında, gruplar arasında istatistiksel olarak anlamlı fark olmadığı belirlendi ($p>0,05$). Grupların hepsi (%100) 1-3 ipucu kullandı. Öğrencilerin toplam işlem süreleri ile toplam puanları arasında pozitif yönde zayıf korelasyon olduğu belirlendi. Öğrencilerin kaçış odası yönteminin uygulanması sırasında kullandıkları süre, toplam puanları ve memnuniyet düzeyleri arasında ilişki olmadığı saptandı. Öğrencilerin hepsi verilen süre içerisinde oyunu tamamladı. Çoğu yüksek puan aldı, çok az ipucu kullandı ve çoğu oyundan memnun kaldılar. Öğrenciler kaçış odası yönteminin uygulanmasında kendilerini motive ettiğini, öğrenmelerine, el becerilerinin ve problem çözme becerilerinin gelişmesine yardımcı olduğunu belirttiler. Ayrıca uygulamadan keyif aldıklarını, teori bilgilerini pratiğe aktardıklarını bildirdiler. Sonuç olarak bu tür uygulamalara hemşirelik eğitiminde yer verilmesini önerdiler.

Anahtar Kelimeler: Kaçış odası, oyunlaştırma, hemşirelik eğitimi, öğrenci, hasta bakım süreci

1 Introduction

Rapid technological advancements, accelerated information transfer, and shifting student expectations have rendered traditional nursing education methods inadequate, necessitating innovative teaching strategies (Aktaş & Baykara, 2023). Integrating innovative active learning methods alongside traditional educational approaches should be encouraged to enhance the learning experience. One increasingly recognized active teaching method is "gamification" (Aktaş & Baykara, 2023). Game-based approaches in education allow students to track their progress, receive feedback, engage in teamwork, adapt to collaboration, learn through practice, and socialize (Bıyık Bayram & Çalışkan, 2019; White & Shellenbarger, 2018).

In recent years, educators have increasingly adopted timed problem-solving activities to boost student engagement, encourage critical thinking, and improve collaborative and flipped classroom teaching methods (Reinkemeyer et al., 2022). Team collaboration is vital in nursing practice, and game-based methods effectively mirror real-life team roles. These activities enhance student motivation and satisfaction by fostering a sense of teamwork. Additionally, the grading system in game-based methods makes learning more enjoyable by allowing millennial nursing students to affirm their success and receive constructive feedback (Şahin & Başak, 2019).

The integration of game-based learning in nursing education offers numerous advantages. It allows students to learn without direct interaction with patients or clinical equipment, encourages teamwork, and helps develop critical thinking, decision-making, and problem-solving skills. Additionally, game-based learning enhances the connection between theoretical knowledge and clinical practice, promotes active participation, fosters empathy, strengthens communication and creativity, and allows students to

progress at their own pace. It also supports individualized learning, enables repetition and self-assessment, and ultimately improves clinical practice competencies (Bıyık Bayram & Çalışkan, 2019; Koivisto et al., 2018; Şahin & Başak, 2019; Ordu & Çalışkan, 2021). Blakely et al. (2009) noted that nursing students have a positive perception of game-based learning due to its ability to facilitate knowledge exchange among individuals from diverse backgrounds. This approach encourages active learning, provides immediate feedback, fosters supportive learning environments, enhances empathy, and offers a structured setting for understanding complex clinical scenarios. Game-based learning also provides more experiential opportunities compared to conventional learning formats and enhances motivation, communication, and interaction. The primary objective of gamification is to increase student engagement and motivation by incorporating reward systems, scoreboards, and other game-like elements into educational activities (Aktaş & Baykara, 2023). Furthermore, game-based learning can better prepare nursing students for advanced clinical practice (Angus-Garcia et al., 2021).

One of the most prominent approaches to game-based learning in recent years is the use of escape rooms (Nicholson, 2015). The concept of escape rooms originated from video games, with the first documented live escape room event taking place in Kyoto, Japan, in 2007. This event was designed as a single-room game for teams of 5–6 players (Roman et al., 2020). Escape room games are inherently problem-based and require active participation and collaborative teamwork, making them a valuable tool for interactive learning (Manojlovic, 2022). In nursing education, educational escape rooms serve as an innovative method designed to enhance clinical decision-making skills, which are essential for delivering safe and effective patient care (Barker, 2020). A healthcare-based escape room offers a dynamic platform to enhance clinical knowledge through evidence-based practice, promoting educational excellence among clinical nurses across all levels of expertise (Dacanay et al., 2021). Gamification in general, and escape rooms in particular, can support students in consolidating existing knowledge, acquiring new skills, developing specific professional attitudes, and enhancing motivation for learning (Gallegos et al., 2017).

This study evaluated the effect of the escape room method on the patient care process in nursing students.

Research Questions

- What is the students' escape room activity score?
- How long did the students take to complete the escape room activity?
- How many tips did students use during the escape room activity?
- What are the students' satisfaction scores with the escape room activity?
- Is there a relationship between the duration of the escape room activity, total scores, and satisfaction scores?

2 Materials and Methods

2.1 Type of Research

The study was planned as a post-test one-group research design.

2.2 Setting and Duration of the Study

The study was conducted at Manisa Celal Bayar University, Faculty of Health Sciences, Simulation Supported Nursing Skills Laboratory between July and December 2023.

2.3 Population and Sample of the Study

The study population consisted of second-year nursing students enrolled in the Department of Nursing at Manisa Celal Bayar University (N = 216). The study sample comprised individuals who met the predetermined inclusion and exclusion criteria. The required sample size was calculated using G*Power software, based on a one-sample t-test. The parameters for the power analysis included a medium effect size (d = 0.50), an alpha level of 0.05, and a statistical power of 0.80 (1-β = 0.80), yielding a minimum required sample size of 34 participants. To reduce the risk of data attrition, the sample size was increased by 30%, resulting in a final target of 44 participants per group (Cohen, 1988; Faul et al., 2007).

A total of 60 students volunteered to participate in the study, and thus the final sample size was established as 60. In accordance with recommendations from the relevant literature, participants were organized into 10 groups, each consisting of 6 members. To facilitate positive group dynamics and enhance interpersonal cohesion, participants were permitted to form groups based on personal preference.
Before going into clinical practice, the patient care process is explained theoretically and practiced in the context of the Fundamentals of Nursing course for first-year nursing students. They prepare and implement a care plan for the patient they care for in the clinic. Therefore, students who are successful in this course were included in this study.

2.4 Inclusion Criteria

The inclusion criteria for this study were being 18 years of age or older, enrollment as a second-year student in the undergraduate nursing program, first-time enrollment in the Fundamentals of Nursing course, successful completion of the Nursing Principles course, and voluntary participation in the study.

2.5 Exclusion Criteria

The exclusion criteria included students who did not complete the Fundamentals of Nursing course and those who declined to provide informed consent for participation in the study.

2.6 Data Collection Tools

Data were collected using the Descriptive Information Form, the Time, Tips and Score Chart, and the Satisfaction Form for Escape Room.

2.6.1 Descriptive Information Form

This form includes demographic and academic information like the student's age, gender, grade in the Fundamentals of Nursing course, and grade point average (GPA) for the first year of study.

2.6.2 Time, Tips, and Score Chart

The chart documented the nursing diagnosis, objectives, interventions, and applications for the sample case based on relevant literature (Aksoy & Bilgili, 2023), along with the duration of the intervention, the use of tips, and the score assigned for each step of the application.

2.6.3 The Escape Room Satisfaction Form

Prepared by researches based on relevant literature (Gómez-Salgado et al., 2019; Anguas-Gracia et al., 2021; Molina-Torres et al., 2022), the Escape Room Satisfaction Form consists of 10 items designed to evaluate students' satisfaction with the escape room activity. The questions assess various aspects of the experience, including perceived learning effectiveness, enjoyment, applicability to care preparation, integration of theoretical knowledge, support for incorporating similar activities in nursing education, and anxiety levels during the game. Responses were measured using a 6-point Likert scale ranging from 0 to 5.

2.7 Data Collection Method

In accordance with the literature (Aksoy & Bilgili, 2023), a case example with diagnosis of pneumonia and COPD attack was provided to guide the escape room activity. Students were instructed to review the case example and received detailed instructions on the application for the activity. The application was conducted at the Simulation-Supported Nursing Skills Laboratory at the Faculty of Health Sciences, the University, where students were grouped into teams of six. Participation was voluntary, with students selecting their group members. A pilot study was conducted with a separate group prior to the main study, and based on feedback from the pilot, the case example was revised. Following the revisions, the time allocated for the fourth station was adjusted to 10 minutes, while the fifth station was allocated 20 minutes, resulting in 38 minutes for all stations. Prior to the application, students were briefed on the stations by the researcher, and written informed consent was obtained. Additionally, expert validation was sought from three professionals to assess the case and the content for each of the five stations.

At the *first station*, a case was presented, written on cardboard with a red background. The case included patient information, such as disease history, laboratory values, medications used, and patient data according to the activities of daily living. Students were not given any specific time to read or analyze the case at this station.

At the *second station*, students were provided with 12 nursing diagnoses written on colored cards, some of which were appropriate, while others were inappropriate for the given case. Accompanied by the researcher, students were instructed to select 3 nursing diagnoses, prioritizing them according to their relevance to the case. Each card had a sign on the back indicating whether the diagnosis was appropriate. If students initially selected an incorrect diagnosis, they were prompted to choose again. This step was allotted 6 minutes; however, if students did not select the correct diagnoses within this time frame, additional time was granted. The goal was to complete the application as quickly as possible. Students could not proceed to the next step without selecting the correct option. Students received one point for each correct diagnosis. If the selected diagnosis was appropriate, it was scored as a plus; if not, it was scored as a minus. The station had a scoring range of +9 points for selecting all three correct diagnoses and -4 points for incorrect selections. The number of tips used was also recorded. If students successfully identified all three correct and prioritized diagnoses, they could reach the ICN code.

At the *third station*, students were provided with purpose statements related to the nursing diagnosis (ineffective respiratory pattern). The set included 1 appropriate, 3 partially appropriate, and 4 inappropriate purpose sentences, written on colored paper and arranged in order. Students were instructed to select the most appropriate sentence; if incorrect, they were allowed to try again. This step was allotted 2 minutes, with additional time if needed. The maximum score for this step was +5,

and the minimum was -6. The number of tips used was also recorded. The appropriate purpose sentence card included a NANDA code on its reverse side.

At the *fourth station*, students were presented with 24 nursing interventions related to the case, including 6 appropriate and 18 inappropriate, written on colored cards in a mixed order. They were tasked with selecting 6 interventions and categorizing them as independent, semi-dependent, or dependent. Incorrect selections required students to choose again. Inappropriate interventions were marked as "unsuitable" on the reverse side of the card. The task was allotted 10 minutes, with additional time provided if needed. Scoring ranged from +24 points for correctly selecting and categorizing all interventions to -36 points for incorrect choices. The number of tips used was also recorded. Upon correctly categorizing the interventions, students could access the NICNOC code.

The *fifth station* focused on the application of nursing interventions. Six selected interventions were applied by six students on a patient care model, with each student practicing one intervention. The students applied the interventions by correctly selecting the materials prepared as relevant, irrelevant, and confusing for the application. A time limit of 20 minutes was set, with additional time provided if necessary. The station was evaluated out of a total of 24 points. No guidance was provided by the supervisor during the implementation. Correct performance of an intervention got +4 points, incomplete performance got +2 points, and failure to perform the intervention resulted in 0 points. The maximum score for this station was +24, and the minimum was 0. Successful completion of the interventions led to access to the NURSES code.

2.8 Evaluation of Data

Data were analyzed using SPSS 21.0 software. Descriptive statistics and frequency distributions were employed to describe participants' demographic characteristics. To assess data normality, the Kolmogorov-Smirnov test was conducted, yielding the following results: Satisfaction form: K-S = 0.147, p = 0.002; Total application time: K-S = 0.133, p = 0.010; Total score: K-S = 0.268, p = 0.000. Data did not show a normal distribution. Given that the sample size in each group was less than 30, non-parametric tests, including the Mann-Whitney U test, Kruskal-Wallis test, and Spearman correlation analysis, were used. $p < 0.05$ was considered statistically significant.

2.9 Ethical Approval

Prior to the start of the research, written consent was obtained from the Directorate of the Health Sciences Institute at Manisa Celal Bayar University, the Faculty of Medicine Health Sciences Ethics Committee (dated 02.08.2023, number 1938), the Dean's Office of the Health Sciences Faculty, and the students, via the informed consent form.

3 Results

The study revealed that 75% of the students were under 20 years of age, 78.3% were female, 63.3% had a course average of 70 or higher, and 61.7% had a GPA classified as good/very good, while 38.3% were classified as average. The mean age of the students was 20.06 ± 1.10 years, the mean course average was 70.58 ± 7.48, and the mean GPA was 3.09 ± 0.36.

The mean satisfaction score across all groups was 4.26 ± 0.28. A comparison of mean satisfaction scores between groups revealed no statistically significant differences ($p > 0.05$) (Table 1). Detailed satisfaction scores for each group are presented in Table 1.

Table 1: *Comparison of students' escape room method satisfaction scores according to groups (n=60)*

	n	**Mean±SD**	**Median (IQR)**	**Min-Max**	
Group (total)	60	4.26±0.28	4.30 (0.30)	3.50-5.00	
	n	**Mean±SD**	**Median (IQR)**	**Min-Max**	**KW/p**
Group 1	6	4.30±0.28	4.35 (0.43)	3.80-4.60	
Group 2	6	4.13±0.31	4.25 (0.28)	3.50-4.30	
Group 3	6	4.16±0.23	4.20 (0.50)	3.90-4.40	
Group 4	6	4.30±0.24	4.30 (0.40)	3.90-4.60	
Group 5	6	4.45±0.35	4.35 (0.60)	4.10-5.00	6.679/0.671
Group 6	6	4.31±0.28	4.30 (0.43)	4.00-4.80	
Group 7	6	4.15±0.28	4.15 (0.55)	3.80-4.50	
Group 8	6	4.30±0.30	4.40 (0.35)	3.70-4.50	
Group 9	6	4.11±0.32	410 (0.58)	3.70-4.50	
Group 10	6	4.38±0.18	4.40 (0.28)	4.20-4.70	

KW: Kruskal Wallis test.

The average total application time across groups was 20.85 ± 5.15 minutes, and the average total score was 56.80 ± 2.50. Group 4 had the shortest total time, while Group 9 had the longest. Four groups completed the application in under 20 minutes, while six took longer. Group 3 had the lowest total score, and Group 7 had the highest. Only 2 of the 10 groups scored over 60 points. A comparison of total application times and scores across groups revealed no statistically significant differences ($p > 0.05$) (Table 5). All groups utilized tips, with a total of 22 tips used, averaging 2.20 ± 0.91 tips per group. Group 8, Group 9, and Group 10 each used one tip; Group 1 and Group 7 used two tips, while the remaining groups used three tips (Table 2).

Table 2: *Comparison of students' total application time, total score and total number of tips according to groups (n=10)*

	Total Application Time (minute)			**Total Score**			**Total Number of Tips**		
	Mean±SD	**Median (IQR)**	**Min-Max**	**Mean±SD**	**Median (IQR)**	**Min-Max**	**Mean±SD**	**Median (IQR)**	**Min-Max**
Group (total)	20.85±5.15	21.20 (8.65)	13.78-31.07	56.80±2.50	56.50 (1,00)	53.00-62.00	2.20±0.91	2.50 (2.00)	1.00-3.00
Groups	**Mean**			**Mean**			**Number**		
Group 1	24.68			56.00			2		
Group 2	21.88			57.00			3		
Group 3	24.53			53.00			3		
Group 4	13.78			56.00			3		
Group 5	14.87			54.00			3		
Group 6	23.53			57.00			3		
Group 7	20.53			62.00			2		
Group 8	17.77			57.00			1		
Group 9	31.07			60.00			1		
Group 10	15.88			56.00			1		
KW/p	9.000/0.457			9.000/0.457					

KW: Kruskal Wallis test Note: Since the group score is taken as basis, standard deviation is not stated.

A weak positive correlation was found between the students' total application time and their total scores (r_s: 0.255, p = 0.049). However, there was no significant correlation between the total application time and their total scores (r_s: -0.191, p = 0.144), nor was there a significant correlation between the total score and satisfaction scores (r_s: -0.139, p = 0.291) (Table 3).

Table 3: *Correlations between students' total application time, total scores, and satisfaction scores (n=60)*

	Total Application Time	**Total Score**	**Satisfaction Scores**
Total Application Time	-	r_s: 0.255 p=0.049*	r_s: -0.191 p=0.144
Total Score	-	-	r_s: -0.139 p=0.291
Satisfaction Scores	-	-	-

*p<0.05, r_s: Spearman Correlation Analysis.

No significant correlation was found between the total application duration and GPA scores (p > 0.05). A weak positive correlation was observed between the total scores and course average (r_s: 0.271, p = 0.036). There was no significant correlation between the total scores and GPA scores (p > 0.05). A high positive correlation was identified between the course averages and GPA scores (r_s: 0.712, p = 0.000) (Table 4).

Table 4: *Correlations between total application time, total score, course averages and GPA (n=60)*

	Course Averages	**GPA**
Total Application Time	r_s: 0.102 p=0.439	r_s: 0.008 p=0.950
Total Scores	r_s: 0.271 p=0.036*	r_s: 0.110 p=0.404
Course Averages	-	r_s: 0.712 p=0.000**

*p<0.05, **p<0.01, r_s: Spearman Correlation Analysis, GPA: Grade Point Average

No significant difference was observed between the course averages and total application duration (p > 0.05). However, a significant difference was observed between the course averages and total score averages (p < 0.05), with students whose course averages were 70 points and above having higher average scores than those whose course averages were below 70 points. Additionally, there was no significant difference between the GPA classifications and their total application duration and total score averages (p > 0.05) (Table 5).

Table 5: *Comparison of course averages and GPA classifications with total application time and total score (n=60)*

		Total Application Time		Total Score	
	n	**Mean±SD**	**Median (IQR)**	**Mean±SD**	**Median (IQR)**
Course Averages					
Under 70 point	22	20.11±5.09	20.65 (8.65)	55.77±1.77	56.00 (1.75)
70 points or higher	38	21.27±5.20	21.20 (5.20)	57.39±2.68	57.00 (4.00)
z/p		-0.647/0.517		**-2.370/0.018***	
GPA Classifications					
Medium (2.00-2.99)	23	21.58±6.13	23.53 (8.65)	56.26±2.26	56.00 (1.00)
Good/Very good (3.00-4.00)	37	20.39±4.46	20.53 (7.65)	57.13±2.61	57.00 (1.00)
z/p		-0.688/0.492		-1.363/0.173	

*p<0.05, z: Mann Whitney U test

4 Discussion

The satisfaction scores indicated that most students (85.2%) were satisfied with the escape room activity. This high level of satisfaction may account for the absence of statistically significant differences in mean satisfaction scores between groups. These findings align with research by Gutiérrez-Puertas et al. (2020), which demonstrated that escape room activities positively impacted nursing students' clinical skill evaluations and overall satisfaction. Similarly, Anguas–Gracia et al. (2021) reported that escape rooms served as an innovative and engaging teaching strategy, with students expressing high levels of enjoyment. Collectively, these results suggest that escape rooms in nursing education enhance student motivation and contribute to greater satisfaction with the learning experience. Valdés et al. (2021) evaluated the use of escape room simulations to develop nursing teamwork, leadership, and communication skills. Based on the study's findings and qualitative data, participants reported that they found the escape room to be an engaging and effective teaching method for mastering teamwork and leadership competencies.

Arıkan Dönmez et al. (2025) developed, implemented, and evaluated an escape room game focused on oncologic emergencies with nursing students. The study concluded that the escape room effectively supported the development of various cognitive and psychomotor skills, including learning motivation, satisfaction, self-confidence, problem-solving, active learning, and task completion.

Gómez-Urquiza et al. (2019) explored nursing students' perceptions and motivational outcomes following the application of an escape room as a pedagogical tool. The results indicated that students found the activity effective in enhancing subject comprehension, boosting motivation, and providing an engaging learning environment. Participants also expressed support for the increased integration of such interactive methods into nursing education. Molina-Torres et al. (2022) implemented an escape room activity with nursing students and reported that all participants scored above average in satisfaction measures. Consistent with findings from both Turkish and international studies, this evidence suggests that the use of escape room-based educational interventions positively influences nursing students' satisfaction and motivation in the learning process.

In the escape room activity, participants were organized into groups and tasked with collaboratively solving puzzles, addressing complex problems, and performing skill-based tasks to escape the room. Success was determined by the shortest completion time, requiring critical thinking and decision-making skills (Zhang et al., 2018). All groups completed the activity within the allotted time frame (13.78–31.07 minutes out of a total 38-minute limit). Group 4 achieved the shortest completion time, while Group 9 recorded the longest. The variability in completion times was attributed to differences in the efficiency of group decision-making processes; Group 4 demonstrated faster collective decision-making, whereas Group 9 exhibited slower decision-making.

Escape rooms are typically time-limited activities. In the study by Anguas-Gracia et al. (2021), nursing students were given 60 minutes to complete the escape room activity, successfully finishing within the allotted time. Similarly, Gomez-Urquiza et al. (2019) provided participants with 45 minutes, yet they completed the game in just 27 minutes. Despite these time constraints, students reported being able to recall and apply relevant information during the activity. A comparable trend was observed in the study by Molina-Torres et al. (2022), where both experimental and control groups completed the tasks within the given time. These findings suggest that, while the time allocated for the escape room activity varies across studies, the specific duration may be influenced by the content and learning objectives of the activity. Therefore, differences in time allocation likely reflect the complexity and goals associated with the escape room experience in each study.

In this study, the maximum achievable score for groups in the escape room activity was 62, while the minimum score was -46. The lowest group score recorded was 53, and the highest was 62, with an average score of 56. Analysis of the total scores reveals that most students achieved scores close to the maximum, indicating a strong level of theoretical knowledge and a propensity for effective teamwork.

In this study, students were provided with a total of 30 tips. All groups utilized at least one tip (with the number of tips used by each group varying between one and three). However, no correlation was found between the groups' activity durations at the stations and the number of tips they used. Tips were employed exclusively at the second, third, and fourth stations. Given the limited use of tips, it can be inferred that students could effectively analyze the case, identify issues, make accurate nursing diagnoses, and nearly complete the nursing process. Tips play a crucial role in the escape room activity. A review of the literature reveals that participants consistently benefit from the use of tips. In the study conducted by Aktaş and Baykara (2023), each game group was initially provided with one tip; however, participants also made use of additional tips.

A weak positive correlation was observed between total application duration and total scores, indicating that as application duration increased, total scores also tended to increase, suggesting that students may have spent more time reflecting and collaborating to make collective, accurate decisions during the application. However, no relationship was found between total application duration, total scores, and overall satisfaction. Given that students' satisfaction scores were high, it is likely that satisfaction did not significantly influence application times or total scores. Due to the lack of studies in the literature examining the impact of the escape room activity on the patient care process, no direct comparisons could be made. In the anatomy escape room study conducted by Molina-Torres et al. (2022) with nursing students, it was found that the experimental group scored above the average in terms of satisfaction compared to the control group. Statistically significant differences were observed between the satisfaction scores of the two groups.

Course average and GPA did not significantly influence total application duration. As anticipated, students with higher course averages also had higher GPAs. It is suggested that the high course

averages of students may be correlated with higher total scores in the escape room game. Furthermore, students with an average of 70 points or higher on the course also achieved higher total scores in the game. In the study by Millsaps et al. (2022), an escape room activity was implemented to encourage participation in undergraduate nursing courses. The results indicated that escape room experiences can be effectively used in nursing education to engage students and help them achieve key learning objectives. Similarly, Ghiamikeshtgar et al. (2023) found that nursing students with high course averages reported high satisfaction with the escape room experience, suggesting its potential usefulness in clinical education.

5 Conclusions and Recommendations

The average total score of students in the escape room game was 56.80 ± 2.50, with Group 7 achieving the highest score of 62. The average total application time for the escape room game was 20.85 ± 5.15 minutes, with Group 4 completing the game in the shortest time (13.78 minutes) and Group 9 taking the longest time (31.07 minutes). Students used between 1 and 3 tips during the game. Regarding the effect of the escape room on student satisfaction with their learning, it was found that 85.2% of students rated their satisfaction above 4 points, indicating a positive impact on their learning experience. No significant relationships were identified between application durations, total scores, and satisfaction levels during the escape room activity. However, a weak positive correlation was found between the total application time and total scores.

Given that the escape room practice facilitates learning, enhances student motivation, provides an enjoyable experience, supports the recall and application of theoretical knowledge, and fosters the development of manual and problem-solving skills, it is recommended that the escape room method be more frequently incorporated into nursing education. Future studies should compare outcomes across different class levels and explore modifications to the escape room design (such as incorporating audible alarms, colored lighting, and room layouts that simulate real-world warning scenarios) to improve the effectiveness of the method.

6 Declarations

6.1 Study Limitations

A limitation of the study was that the nursing laboratory where data collection occurred was not fully optimized for the application of the escape room game. Furthermore, as the game was conducted at a single institution with second-year nursing students using a single case example and without control group, the findings may not be generalizable to other settings or populations.

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6.3 Funding source

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6.4 Competing Interests

There is noconflict of interest in this study.

6.5 Authors' Contributions

Define the contribution of each researcher named in the paper to the paper.

1. Author Ezgi TAŞKIN: Contribution to the article planning the materials and methods to reach the results, taking responsibility for the experiments, organizing and reporting the data, taking responsibility for the explanation and presentation of the results, taking responsibility for the literature review during the research, taking responsibility for the creation of the entire manuscript or the main part, reworking not only in terms of spelling and grammar but also intellectual content

Corresponding Author Tülay SAĞKAL MİDİLLİ: Contribution to the article developing ideas or hypotheses for the research and/or article, planning the materials and methods to reach the results, taking responsibility for the experiments, taking responsibility for the creation of the entire manuscript or the main part, reworking not only in terms of spelling and grammar but also intellectual content.

7 Human and Animal Related Study

7.1 Ethical Approval

Prior to the start of the research, written consent was obtained from the Directorate of the Health Sciences Institute at Manisa Celal Bayar University, the Faculty of Medicine Health Sciences Ethics Committee (dated 02.08.2023, number 1938), the Dean's Office of the Health Sciences Faculty, and the students, via the informed consent form.

7.2 Informed Consent

Informed consent form was obtained from all participants for the study that they agreed to participate in the study.

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