BMC Nursing

RESEARCH

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Impact of moulage-based simulation on nursing students' recognition of physical violence: a randomised controlled trial

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Abstract

Background Violence against women is a global public health and human rights issue with profound physical and psychological consequences. Simulation-based learning may help nursing students recognize signs of violence. This study examined whether physical violence indicators created on a standardized patient using moulage improve nursing students' recognition of violence and their related attitudes, knowledge, satisfaction, self-efficacy, and communication skills.

Methods A randomized controlled pretest–posttest design was conducted with 55 fourth-year nursing students allocated to a moulage group ($n=28$) and a control group ($n=27$). The data collection tools included the "Demographic Information Form", "ISKEBE Attitude Scale for Violence Against Women," "Communication Skills Assessment Form", "Nurses' and Midwives' Recognition of Signs of Violence Against Women Form", "Modified Simulation Effectiveness Tool", "Student Satisfaction and Self-Efficacy Scale in Learning," and "Moulage Evaluation Questionnaire." Data analysis involved calculating frequency, mean, standard deviation, chi-square tests, the Mann-Whitney U test, and the Wilcoxon Signed Ranks Test.

Results The demographic data of the moulage and control groups were similar. Recognition of violence indicators was significantly higher in the moulage group (19.75 ± 2.78) than in the control group (16.38 ± 3.63; $p<0.05$). The communication skills of the students in the moulage group had an average score of 5.35 ± 0.48 for the effective communication subscale, while the average score for the therapeutic communication subscale was 4.55 ± 2.91. Additionally, the moulage group reported greater satisfaction with current learning (51.85 ± 6.66) and higher self-efficacy (29.21 ± 4.26, $p=0.006$) than the control group. The mean Modified simulation effectiveness tool score was 68.42 ± 20.87, indicating a positive perception of learning effectiveness. No significant between-group difference was found for attitudes (ISKEBE).

Conclusion Moulage-supported simulation enhanced recognition of physical violence indicators, satisfaction, self-efficacy, and communication-related outcomes. The integration of these methods is recommended in future educational programs.

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Clinical registration The study is registered on ClinicalTrials.gov. ID: NCT06982017 (date: 2024-05-20).
Keywords Nursing student, Moulage, Violence against women, Simulation, Education

Background

Violence against women (VAW) is recognized as a significant public health and human rights concern that adversely affects physical, psychological, social, and economic well-being [1, 2]. The root causes of VAW include gender inequality, financial dependency, and patriarchal cultural norms [2, 3]. A multifaceted approach is necessary to prevent this issue, involving educational campaigns, legal regulations, societal awareness initiatives, and support services for victims [4].

Global estimates indicate that approximately one in three women experiences physical and/or sexual violence during their lifetime [2]. These experiences are associated with elevated risks of depression, anxiety, post-traumatic stress disorder, chronic pain, and impaired social functioning [5]. Observable physical indicators of violence may include bruises, fractures, burns, and signs of strangulation, while emotional and psychological manifestations encompass anxiety, depression, hypervigilance, and trauma symptoms [2, 5]. Nurses are frequently the first point of professional contact for women experiencing violence, underscoring the need for structured educational approaches to enhance detection, communication, and intervention competencies [6].

Women who have experienced violence often struggle to care for their children due to stress and anxiety, limited access to healthcare, lack of economic independence, and being under constant control, which adversely affects family dynamics [7]. In this context, it is emphasized that VAW is not merely an individual issue but a multifaceted crisis that profoundly impacts societal welfare and health. VAW has reached alarming levels globally, and one of the primary reasons for this situation is gender roles.

Gender is a social concept shaped by cultural values, norms, and time, rather than being based solely on the biological characteristics attributed to individuals at birth [8]. These roles determine individual behavior patterns through the responsibilities and expectations assigned to women and men, leading to the perception of women as secondary in patriarchal societal structures [9]. Factors such as education, language, religion, family structure, individual educational level, and mass media play a significant role in the formation and perpetuation of gender roles [10]. Power imbalances shaped by traditional gender roles can legitimize psychological, physical, and economic VAW [11]. Gender inequality is considered one of the fundamental causes of VAW and is addressed within the framework of the Sustainable Development Goals. Among these goals, the elimination of all forms of VAW and girls is a primary objective. In this regard, assessing young individuals' perceptions of VAW is crucial for developing policies and practices that can mitigate the negative consequences of gender inequality [12].

VAW is not only an individual trauma but also a significant issue that directly confronts healthcare delivery and requires intervention. When women who are victims of violence seek help from healthcare institutions, the first healthcare professionals they often encounter are nurses. This situation highlights the responsibility of nurses to recognize VAW, assess it correctly, and initiate effective care processes. Therefore, nursing education must be structured to enhance students' skills in identifying and intervening in cases of VAW. This necessity also requires a review of the methods used in nursing education and the implementation of innovative approaches. Despite theoretical instruction, nursing students often struggle to transfer knowledge into clinical practice [13, 14]. Simulation-Based Learning (SBL) is a widely adopted educational approach in nursing education. SBL addresses this theory–practice gap by offering safe, authentic, and repeatable learning environments [14–16].

Standardized patients are individuals who act in a specific manner to facilitate realistic clinical interactions. They are commonly used in nursing education for teaching and assessment purposes, particularly for communication objectives and skill acquisition, and can provide feedback when requested [14].

A feature increasingly used in simulation experiences, moulage aims to enhance the realism of cases used in learning activities by developing sensory characteristics, thereby contributing to a more convincing simulation experience [16]. Moulage is a technique used in health education to enhance the realism and learning value of simulations by recreating injuries, illnesses, and other physical findings using special effects makeup, molds, painting, attachable objects, and scents [17]. In nursing education, the moulage technique has come to the fore due to its ability to realistically simulate these physical symptoms, thereby enabling students to develop their skills in recognising violence and responding to it. Although moulage is widely used in simulation-based education, there is a lack of studies specifically evaluating its effectiveness in the recognition of violence cases among nursing students. By aligning with original learning principles (real-world context, open-ended inquiry, discourse, and choice), it has been demonstrated to enhance students' immersion in scenarios, clinical decision-making, and skill transfer, as well as content/surface validity, and knowledge retention [16, 18]. However, the mechanisms by which manikins influence the student

experience and their specific role in educational outcomes remain unclear, and current evidence suggests a need for further interdisciplinary research and the integration of pedagogical/learning theories. To our knowledge, this is the first study to systematically investigate the impact of moulage-enhanced simulation on the recognition of violence among nursing students.

Although simulation-based education has become an integral part of nursing curricula, the use of moulage to enhance realism and learning outcomes remains underexplored, particularly in the context of violence recognition. Previous studies have demonstrated the general benefits of simulation and moulage for skill acquisition and learner engagement [16, 18]. However, there is a notable gap in the literature regarding the specific effectiveness of moulage for improving the recognition of violence-related injuries and scenarios. To address this gap, our study aims to evaluate whether moulage-enhanced simulation can better equip nursing students to identify signs of violence, compared to traditional simulation methods. We hypothesize that incorporating moulage will lead to significantly higher recognition rates and improved learning outcomes.

Methods

Study aim

This study aims to investigate whether the physical violence indicators created in a standardized patient using the moulage technique assist nursing students in recognizing signs of violence and improving their attitudes, knowledge, and skills regarding this issue. The objective is to examine how this method contributes to students' ability to identify physical VAW more easily and to identify potential barriers (such as communication) encountered during this process, ultimately developing strategies for the early recognition of violence.

Study design

The research design is a complete experimental study with a pre-test and post-test control group. In this design, participants are randomly assigned to either the moulage or control groups.

Study hypotheses

H1 The knowledge level of students in the moulage group regarding the recognition of physical violence against women is higher than that of students in the control group.

H2 The attitude scores (ISKEBE) related to violence against women of students in the moulage group are higher than those of students in the control group.

H3 The moulage group is more effective than the traditional method in developing therapeutic communication skills among students.

H4 The learning satisfaction and self-confidence levels of students in the moulage group are higher than those of students in the control group.

Population, sampling

The population consists of 71 students enrolled in the Mental Health and Psychiatric Nursing course at a university during the fall semester of the 2024–2025 academic year. The sample consists of 55 students who agreed to participate in the study. For sample selection, all fourth-year students were included in the sampling frame. Fourth-year nursing students were selected for this study because they have completed the majority of their theoretical and practical coursework, including foundational modules on communication, ethics, and clinical skills. At this stage, students possess advanced clinical reasoning and are more likely to encounter complex patient scenarios, including cases involving VAW, during their internships and clinical rotations. Additionally, fourth-year students are preparing for transition into professional practice, making it crucial for them to recognize and appropriately respond to signs of violence. Including students at earlier stages might result in limited exposure to relevant content and insufficient clinical experience, which could impact the validity and reliability of the study outcomes.

On the day of the research, 65 students attended the class, while ten students declined to participate in the study. No formal sample size calculation was performed, as the study aimed to include the entire population of fourth-year students ($n = 71$). The participation rate was 78.9% ($n = 55$), which was considered adequate to represent the study population. The names of the students who agreed to participate were recorded in a list, and each student was assigned a randomly generated number using the SPSS software. These random numbers were then sorted in ascending order, and the students were assigned to the moulage group and control group in equal numbers using a simple randomization method. The moulage group consisted of 28 students, while the control group comprised 27 students (Fig. 1). The statistical homogeneity of the groups in terms of age, gender, and history of violence was assessed to ensure comparability between the groups following randomization. The CONSORT-compliant flow diagram of the trial procedure and participant flow is presented in Fig. 1.

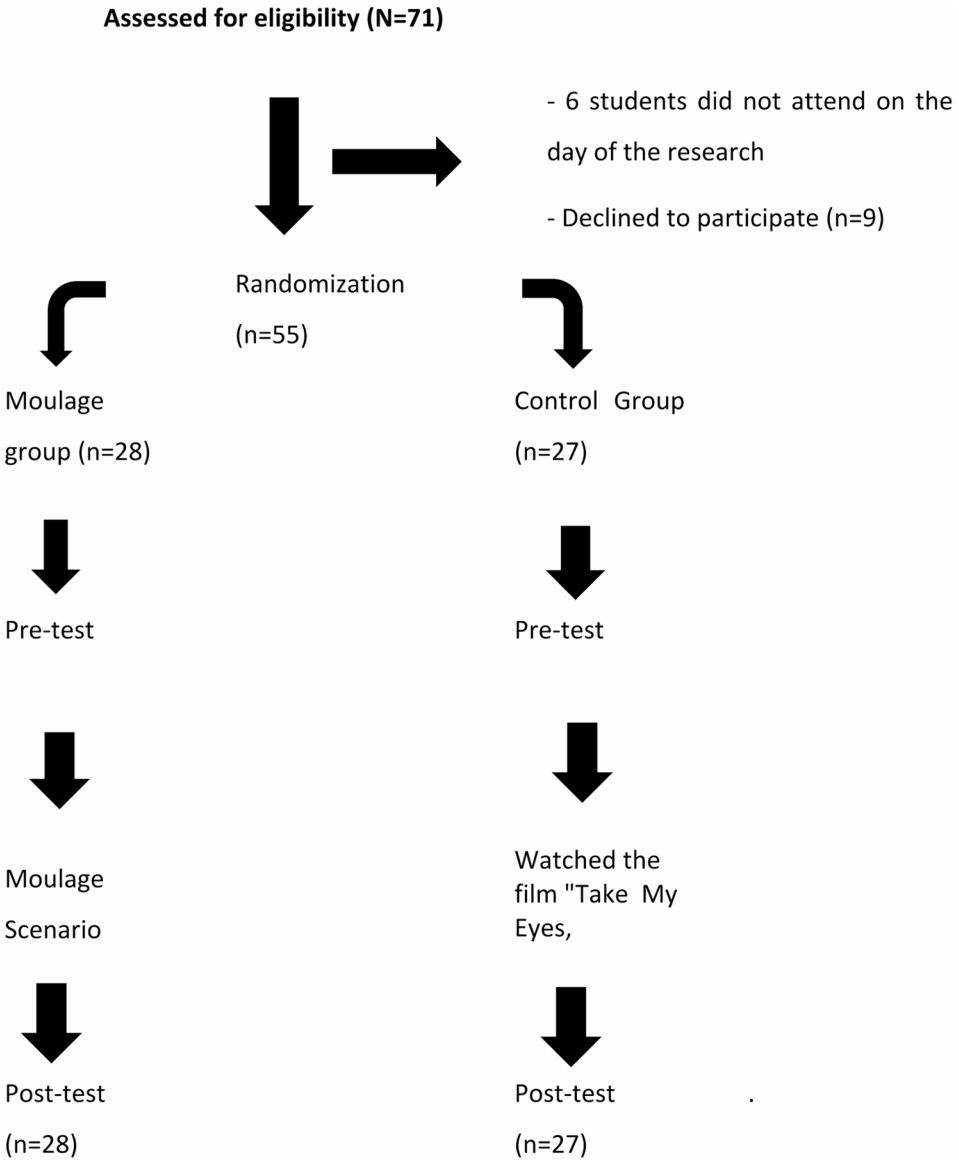

Fig. 1 CONSORT flow diagram of the study

Eligibility criterria

Inclusion criteria

- Being a fourth-year undergraduate nursing student enrolled in the Mental Health and Psychiatric Nursing course during the study semester.
- No prior participation in a simulation or moulage scenario specifically addressing recognition of physical violence against wome.
- Agreement not to disclose intervention content to peers allocated to the other arm until data collection is completed (confidentiality undertaking).

Exclusion criteria

- Self-reported acute severe psychiatric condition (e.g., current major depressive episode with functional impairment, acute psychosis) or exposure to a recent traumatic event within the past 3 months potentially exacerbated by study content.

Data collection tools

Demographic data form

This form, prepared by the researcher based on the literature [1, 2, 6, 12, 15], consists of two sections. The first section comprises three questions that address individual characteristics, including age, gender, and economic status.

The second section poses a question related to violence based on the World Health Organization's report [6]. This question is evaluated across four categories: Physical Violence: Includes behaviors such as twisting your arm, slapping, throwing something at you that could cause harm, kicking, pulling your hair, beating, choking, shaking, intentional burning, and threats with a weapon or other objects. Sexual Violence: Involves the use of physical force for non-consensual sexual intercourse, engaging in sexual relations due to fear of your partner, and being forced to do things you find sexually degrading. Emotional Violence: Comprises insults, swearing, belittlement, constant humiliation, and threats to remove children from the home. Controlling Behaviors: Defined as separating you from family and friends or preventing you from seeing them, monitoring your movements, and restricting access to financial resources, employment, education, or medical care.

ISKEBE attitude scale towards violence against women

The scale developed by Kanbay et al. [19] aims to determine individuals' attitudes towards VAW and is based on a five-point Likert-type scale. The scale consists of a total of 30 items. The total score obtainable from the scale ranges from 30 to 150 points. Higher scores reflect a more negative attitude towards VAW, while lower scores indicate a more positive attitude towards it. In the validity and reliability study of the scale, the Cronbach's Alpha value for the entire scale was found to be 0.86. In our study, the Cronbach's Alpha coefficient is 0.92.

Communication skills assessment form

The researchers developed the "Communication Skills Assessment Form" through a review of relevant literature to evaluate the communication skills of students when interacting with women who have experienced violence during simulation exercises.

In the section on effective communication elements, the following criteria are assessed: the student's face being oriented towards the individual, maintaining a relaxed posture, keeping hands and arms free, ensuring personal space during communication with the patient, maintaining eye contact, appearing sincere and engaged, and using a soothing tone of voice. A score ranging from 0 to 6 can be obtained in this section. An increase in the student's score indicates the use of effective communication elements.

In the section on therapeutic communication techniques, the student's therapeutic communication techniques are evaluated. A point is awarded for each method employed. An increase in the student's score in this section indicates a greater use of therapeutic communication techniques.

Scale for recognizing signs of violence against women by nurses and midwives

Developed by Baysan and Karadağlı [20], this scale consists of 31 items and is presented in true-false format. The scale was designed to assess the knowledge level of nurses and midwives regarding the recognition of signs of VAW. It comprises two sub-dimensions: "Physical Symptoms" and "Emotional Symptoms." The highest possible score on the scale is 31, while the lowest score is 0. The Cronbach's alpha coefficient of the scale is 0.76. In our study, the Cronbach's alpha coefficient is also 0.76.

Modified simulation effectiveness tool

This tool, modified by Leighton et al. [21], is a self-report scale that evaluates participants' perceptions of the effectiveness of learning in a simulation environment. The scale, adapted into Turkish by Şahin et al. [22], has a Cronbach's alpha value of 0.92. It consists of 19 items. The total score ranges from 18 to 95, with higher scores indicating positive perceptions of learning effectiveness in the simulation environment. In our study, the Cronbach's alpha coefficient of the scale is 0.97.

Student satisfaction and self-efficacy scale in learning

Developed by Jeffries and Rizzolo [23], this scale was adapted into Turkish by Ünver et al. [24]. The scale consists of 12 items and two sub-dimensions (satisfaction related to current learning and self-efficacy in learning), employing a five-point Likert-type format. An increase in the total score obtained from the scale indicates a rise in student satisfaction and self-efficacy in learning. The overall Cronbach's alpha coefficient of the scale is 0.89. In our study, the Cronbach's alpha coefficient of the scale is 0.96.

Moulage evaluation questionnaire

A comprehensive literature review was conducted to identify key components and best practices in moulage-based simulation evaluation [16, 18]. This questionnaire, prepared by the researcher, consists of five questions aimed at assessing students' opinions regarding the authenticity and effectiveness of moulage, as well as determining their level of satisfaction with this technique. Four faculty members who specialize in simulation-based learning evaluated the form to ensure its content validity before the interventions. Necessary adjustments to the questionnaire content and the study's specific context were made based on their feedback.

Randomisation and blinding

The first author reviewed the students' transcripts and assessed whether they met the research criteria. All 71 fourth-grade students met the research criteria. The students were not informed of the day the research would

be conducted to avoid bias. Six students did not attend by chance. Sixty-five students were informed about the research, and ten students declined to participate. The students were randomly assigned to the experimental and control groups by the third author using simple randomisation via SPSS. To ensure reproducibility of random number generation, a seed value was used during randomisation. Block randomisation was not applied. While the control group watched a film, the experimental group was taken to the location where the applications were performed. Due to the nature of the educational intervention, blinding of participants and instructors was not feasible. However, the communication skills assessment was conducted by an independent observer who was blinded to group allocation. No other blinding was implemented. The students in the experimental group were asked to sign a confidentiality agreement. This ensured that the students who interviewed the standardised patient could not share information with the other students. The agreement was prepared with the principle of honesty and ethics. The students who interviewed the standardised patient were in a separate environment from the other students, thereby minimising interaction between them.

Data collection

Before the intervention, a faculty member who was part of the research team explained to the participants the concept of VAW (including physical, sexual, emotional, and controlling behaviors) to both groups and provided information regarding nursing care. Only the moulage group worked on a simulation scenario that included a case exhibiting signs of physical violence. The physical violence indicators mentioned in the case report by Iskender [25] were created by the first author, who had received training in moulage, and were subsequently reviewed by the second author. To assess the conceptual validity of the simulation scenarios, consultations were held with two psychiatrists, and the scenarios were finalized based on their feedback. The moulage group engaged with a clinical simulation scenario that included a standardized patient modality ($n = 28$). In contrast, only the control group ($n = 27$) watched the film "Take My Eyes," which addresses VAW. Before the intervention, both the moulage and control groups completed the "Demographic Information Form" and the "ISKEBE Attitude Scale towards Violence against Women." The items of the "Scale for Recognising Signs of Violence Against Women for Nurses and Midwives" were not applied during the pre-test phase of the scale due to the risk of artificially increasing the intervention effect by creating early awareness (test sensitivity) among participants.

During the sessions with the standardized patient, a researcher filled out the "Communication Skills Assessment Form" using a non-participant observation method. The independent observer was an instructor with a doctoral qualification in mental health and psychiatric nursing, as well as pedagogical formation. Before the assessment, the researcher provided training to the observer regarding the data collection tools. After the interventions, both groups completed the "ISKEBE Attitude Scale towards Violence against Women," the "Scale for Recognizing Signs of Violence against Women for Nurses and Midwives," and the "Student Satisfaction and Self-Efficacy Scale in Learning." Furthermore, the experimental group was assessed using the "Modified Simulation Effectiveness Tool." All participants completed the study; there was no loss of data.

Data analysis

In the study, the data were analyzed using IBM SPSS for Windows version 24.0 (IBM Inc., NY, USA). Descriptive statistics included frequency, mean, and standard deviation. The distribution of the data was assessed using the Shapiro-Wilk test, and as the assumption of normality was not met, nonparametric tests were employed. There were no missing data in the study, and all students who were included in the randomization were retained in the analyses. The differences between groups were determined using the Chi-square test and the Mann-Whitney U test. For comparing binary groups, the Mann-Whitney U test was used, while the Wilcoxon Signed-Rank Test was applied for dependent groups. The internal consistency coefficient of Likert-type scales was assessed using Cronbach's alpha, and the internal consistency coefficient of dichotomous-type scales was evaluated using the Kuder-Richardson 20 coefficient, with a significance level set at 0.05.

Result

When examining the socio-demographic characteristics of the students, it was found that the moulage group consisted of 75% women, while the control group comprised 66.7% women. Additionally, 67.9% of the moulage group and 51.9% of the control group reported having an income equal to expenditure. When asked about their experiences of physical, sexual, and emotional violence at any point in their lives, 28.6% of the moulage group and 40.7% of the control group reported experiencing physical violence. In comparison, 3.6% of the moulage group reported experiencing sexual violence. Furthermore, 42.9% of the moulage group and 66.7% of the control group indicated that they had experienced emotional violence. Additionally, 21.4% of students in the moulage group and 37% of those in the control group reported having been subjected to controlling behaviours at some point in their lives. The average age of the participating students was found to be 22.11 ± 1.01 (Table 1).

Table 1 Comparison of students' socio-demographic characteristics ($n=55$)

	Moulage Group ($n=28$)		Control Group ($n=27$)		Test	*p*
	n	**%**	***n***	**%**	**X^2**	
Gender					0.463	0.562
Female	21	75	18	66.7		
Male	7	25	9	33.3		
Economic situation					2.550	0.279
Income less than expenditure	5	17.9	10	37		
Income equal to expenditure	19	67.9	14	51.9		
Income less than expenditure	4	14.3	3	11.1		
Have you experienced physical violence at any point in your life?						
No	20	71.4	16	59.3	2.494	0.476
Yes	8	28,6	11	40.7		
Have you experienced sexual violence at any point in your life?						
No	27	96.4	27	100	0.982	1.000
Yes	1	3.6	-	-		
Have you experienced emotional violence at any point in your life?						
No	16	57.1	9	33.3	6.944	0.139
Yes	12	42.9	18	66.7		
Have you experienced controlling behavior at any point in your life?						
No	22	78.6	17	63	5.291	0.259
Yes	6	21.4	10	37		
Age	**Min.-Max**	**Mean-SD**	**Min.-Max**	**Mean-SD**	**Z**	**p**
	21–29	22.57 ± 1.81	21–25	22.11 ± 1.01	-0.599	0.549

X^2: Chi-square test - Fisher's exact test, Z: Mann-Whitney U test

Table 2 Descriptive statistics for the main tools

	Moulage Group ($n=28$)		Control Group ($n=27$)	
	Min.-Max.	**Mean-SD**	**Min.-Max.**	**Mean-SD**
ISKEBE Total	105–148	130.28 ± 12.12	90–150	129.05 ± 13.13
Recognition of Violence Indicators	0–52	19.75 ± 2.78	8–23	16.38 ± 3.63
Physical Symptoms	0–19	12.16 ± 4.92	5–16	11.07 ± 2.26
Emotional Symptoms	0–33	7.76 ± 6.04	0–10	5.35 ± 2.52
Self-Efficacy Scale Total	30–60	51.85 ± 6.66	24–60	42.61 ± 9.73
Satisfaction with Current Learning	10–25	22.64 ± 3.11	10–25	17.77 ± 4.24
Self-Efficacy in Learning	20–35	29.21 ± 4.26	14–35	25.03 ± 5.84

Regarding the communication skills of the students in the moulage group, the average score for the effective communication subscale was 5.35 ± 0.48, while the average score for the therapeutic communication subscale was 4.55 ± 2.91.

All students in the moulage group expressed positive views in their evaluations of the "moulage application."

Descriptive statistics for the main tools for the moulage and control groups are presented in Table 2. For the ISKEBE Total score, the moulage group had a mean of 130.28 ± 12.12, while the control group had a mean of 129.05 ± 13.13. Regarding the Recognition of Violence Indicators subscale, the moulage group scored 19.75 ± 2.78 (range: 0–52), compared to 16.38 ± 3.63 (range: 8–23) in the control group. For self-efficacy and learning satisfaction, the moulage group demonstrated higher scores on the Self-Efficacy Scale Total (51.85 ± 6.66 vs. 42.61 ± 9.73), Satisfaction with Current Learning (22.64 ± 3.11 vs. 17.77 ± 4.24), and Self-Efficacy in Learning (29.21 ± 4.26 vs. 25.03 ± 5.84) than the control group.

When examining the distribution of scores for the ISKEBE scale, it was found that the pre-test score for the moulage group (130.28 ± 12.12) was higher than the post-test score (128.12 ± 9.626) ($p>0.05$) (Table 3).

In the comparison of the average scores for recognizing of violence indicators, it was found that the average score of the moulage group (19.75 ± 2.78) was significantly higher than that of the control group (16.38 ± 3.63) when comparing the total scale scores ($p<0.05$) (Table 3).

In the group comparison of students' responses to the satisfaction and self-efficacy scale in learning, it was found that the average total score for the moulage group (51.85 ± 6.66) was significantly higher than that of the control group (42.61 ± 9.73) ($p<0.05$). The average score for the subscale related to satisfaction with current learning was also significantly higher in the moulage

Table 3 Comparison of the ISKEBE scale and scores for recognizing indicators of violence against women by group and time

		Pre Test Mean-SD [%95 CI]	Post Test Mean-SD [%95 CI]	Z/*p*†	Effect Size
ISKEBE Total	Moulage Group (*n* = 28)	130.28 ± 12.12 [125.58; 134.98]	128.12 ± 9.626 [124.39; 131.85]	−1.322/0.220	− 0.18
	Control Group (*n* = 27)	129.05 ± 13.13 [123.85; 134.25]	130.22 ± 17.14 [123.44; 137.00]	−1.234/0.203	− 0.17
Recognition of Violence Indicators	Moulage Group (*n* = 28)	–	19.75 ± 2.78 [18.67; 20.83]		
	Control Group (*n* = 27)	–	16.38 ± 3.63 [14.94; 17.82]		

†:Wilcoxon Signed-Rank Test, ‡:Man-Whitney U Test, * $p < 0,05$ statistically significant

Table 4 Comparison of student satisfaction and Self-Efficacy scale in learning by group

	Moulage Group (*n* = 28) Mean-SD [%95 CI]	Control Group (*n* = 27) Mean-SD [%95 CI]	Z/*p*†	Effect Size
Total score of the scale	51.85 ± 6.66 [49.27; 54.43]	42.61 ± 9.73 [38.76; 46.46]	**– 3.449/0.001***	**– 0.47**
Satisfaction with Current Learning	22.64 ± 3.11 [21.43; 23.85]	17.77 ± 4.24 [16.09; 19.45]	**– 4.130/0.001***	**– 0.56**
Self-Efficacy in Learning	29.21 ± 4.26 [27.56; 30.86]	25.03 ± 5.84 [22.72; 27.34]	**– 2.741/0.006***	**– 0.37**

†: Man-Whitney U Test, * $p < 0,05$ statistically significant

Table 5 Distribution of scores for the modified simulation effectiveness tool (*n* = 28)

	Min.-Max.	Mean-SD
MSET Total	25–89	68.42 ± 20.87
Prebriefing	4–10	8.57 ± 1.61
Learning	9–20	16.87 ± 3.52
Confidence	7–35	27.56 ± 6.31
Debriefing	5–25	21.0 ± 4.12

group (22.64 ± 3.11) compared to the control group (17.77 ± 4.24) ($p < 0.05$). Furthermore, the average score for the self-efficacy subscale in learning was significantly higher in the moulage group (29.21 ± 4.26) than in the control group (25.03 ± 5.84) ($p < 0.05$) (Table 4).

The average score for the modified simulation effectiveness tool among students was 68.42 ± 20.87. This indicates that students have a high perception of the effectiveness of learning in a simulation environment. The average score for the Prebriefing subscale was 8.57 ± 1.61, the average score for the learning subscale was 16.87 ± 3.52, the average score for the confidence subscale was 27.56 ± 6.31, and the average score for the Debriefing subscale was 21.00 ± 4.12 (Table 5).

Discussion

Simulation-based learning is considered a crucial innovation in nursing education. This method enables students to apply their theoretical knowledge in practical settings, creating a safer and more effective learning environment compared to traditional approaches. In our study, we aimed to investigate whether the physical violence indicators created on a standardized patient using the moulage technique could assist nursing students in recognizing signs of violence and improving their attitudes, knowledge, and skills regarding this issue. The literature indicates that simulation-based learning plays a significant role in developing students' practical skills [14, 15]. The results of this study demonstrate that simulations supported by the moulage technique enable students to engage with realistic scenarios, facilitating more effective learning.

In addition to enhancing students' practical skills, simulation-based learning also improves their communication skills [26]. The high subscale scores of communication skills among students in the moulage group suggest that simulation training has contributed to the development of their therapeutic communication skills. Simulation serves as a valuable tool for enhancing nursing knowledge and skills, as well as supporting the development of communication skills [27, 28]. Standardized patient simulation is the most commonly used method to help nursing students improve their communication skills (H3 hypothesis was confirmed). Research has shown that standardized patient simulation is more effective than traditional methods in enhancing nursing students' communication skills [27, 29]. Therefore, standardized patients should be included in simulation designs to help nursing students develop their communication skills in line with their learning objectives.

There was no significant difference between the moulage and control groups on the ISKEBE attitude scale towards VAW (H2 hypothesis was rejected). The lack of difference in attitude scores between groups suggests that both interventions were similarly effective in this domain, possibly due to the powerful effect of the educational film used in the control group. On the other hand, our data did show that the moulage group reported higher satisfaction, self-efficacy, and communication skills, aligning with previous studies that highlight the benefits of experiential and simulation-based learning for these outcomes [29, 30]. This indicates that while moulage simulation may not necessarily enhance attitude towards VAW beyond a well-designed film, it can still play a crucial role in improving students' confidence and communication abilities. Future research could explore longer or more intensive simulation experiences or utilize different outcome measures to capture the unique contributions of moulage-based learning better.

The positive evaluations from students in the moulage group indicate that this educational method is accepted and found effective by the students. Through a realistic scenario, students have the opportunity to experience their future professional roles, enabling them to adapt more quickly and effectively to their professional roles in the healthcare sector. Moulage-supported simulation education is a significant teaching method that supports students' professional development processes and strengthens their practical skills.

When examining the ability to recognise of violence indicators in our study, the moulage group scored higher than the control group in terms of recognising signs of violence (H1 hypothesis was confirmed). This finding can be attributed to the increased realism and sensory engagement provided by moulage, which may foster deeper immersion and critical thinking during simulation scenarios. There have been no studies examining the relationship between the identification of violence in standardized patients using the moulage technique. Therefore, other studies investigating attitudes toward VAW have been discussed. In the study by Togur Keskin and Hançer Tok [31], the effects of drama training and classroom education on nursing students' attitudes toward VAW were examined, and no significant difference was found. Öztürk et al. [32] found that awareness training related to VAW increased nursing students' knowledge and awareness levels regarding VAW. In the study by Agartıoglu Kundakci et al. [33], it was stated that screen-based simulation methods positively affected nursing students' attitudes and practices regarding VAW. In our study, the moulage group exhibited positive attitudes toward physical VAW. It demonstrated better identification of violence indicators due to the increased realism provided by the moulage technique. Various methods have been used in studies examining nursing students' attitudes toward VAW, and it has been observed that effective methods exist, including our study.

In our study, the satisfaction and self-efficacy scores of the moulage group in learning were found to be higher than those of the control group (H4 hypothesis was confirmed). In parallel with our research, Crowe et al. [27] found that simulation-based education increased nurses' confidence in their study on general medical units. Oh et al. [34] concluded that simulation-based education involving standardized patients helped nursing students acquire knowledge and clinical skills. Torkshavand et al. [35] divided 70 nursing students into experimental and control groups. The experimental group participated in standardized patient modalities, while the control group received traditional education. They determined that the experimental group had significantly higher knowledge levels than the control group. Together, these previous studies suggest that clinical simulation may enhance nursing students' knowledge and confidence. Unlike traditional simulation, moulage allows students to observe and interact with lifelike injury patterns, which likely contributes to their improved performance and confidence.

The combination of multiple assessment tools can provide a more comprehensive evaluation of simulation outcomes. In this study, we utilized the Modified Simulation Effectiveness Tool (MSET) to evaluate participants' perceptions of simulation-based education. Recent evidence suggests that simulation-based education, particularly when using validated tools like the MSET, can enhance not only knowledge acquisition but also critical thinking, communication, and teamwork skills [29, 30]. Our findings regarding satisfaction and self-efficacy align with recent studies that have used the MSET and reported similar improvements in these domains following simulation interventions [29, 30, 36].

Nevertheless, it is essential to recognize some limitations. The MSET, while comprehensive, is based on self-reported data and may be subject to response bias. Future studies should consider triangulating self-report measures with objective performance assessments and qualitative feedback to gain a deeper understanding of simulation effectiveness.

Limitations of the study

In this study, the sample consisted of nursing students attending the same university, thereby essentially controlling for the influence of the educational system. However, students who transferred horizontally and vertically were also included in the sample. These students may have been exposed to different curricula and teaching methods due to their previous education at other universities. They may have taken more courses related to violence. This situation may have an impact on students'

attitudes towards violence, their knowledge, and their ability to identify violence, thereby limiting the findings of the study. The study's data collection tools are limited to the selected scales. More comprehensive results can be obtained by examining different variables in identifying VAW.

Conclusion

This study demonstrated that moulage-enhanced simulation significantly improves nursing students' ability to recognize physical violence indicators, increases their satisfaction with learning, and enhances their self-efficacy and communication skills compared to traditional methods. The integration of realistic moulage techniques into simulation scenarios provides a more immersive and practical learning experience, supporting the development of both knowledge and practical competencies related to violence recognition. These findings highlight the importance of incorporating advanced simulation strategies, such as moulage, into nursing curricula to better prepare students for real-world clinical challenges. Further research is recommended to investigate the long-term effects of moulage-based simulation on professional practice and to validate these findings in larger, more diverse student populations.

Given the critical impact of VAW on both individuals and society, the widespread adoption of such educational practices will not only improve the quality of nursing care but also contribute meaningfully to advancing gender equality. Based on the results of this study, it is recommended that nursing education institutions develop mandatory training modules focused on the identification and management of VAW. Aligning nursing and health education curricula with national and international strategies to combat gender-based violence is essential for preparing future healthcare professionals to address this pressing issue effectively. Further research is recommended to investigate the long-term effects of moulage-based simulation on professional practice and to validate these findings in larger, more diverse populations.

Acknowledgements
The authors thank all the participants of this study.

Author contributions
1 Study design: S.U.Y., Y.D. 2. Data collection: S.U.Y., M.A.,M.Z.T., N.O.S. 3 Data analysis S.U.Y., T.O., M.Z.T. 4. Study supervision N.O.S., T.O., Y.D. 5. Manuscript writing: S.U.Y, M.A., T.O. Y.D. All authors reviewed the manuscript confirmed the final version of the manuscript.

Funding
This study was financed by Kocaeli Health and Technology University Scientific Research Projects Coordination Office with the Scientific BAP project number KOSTU-BAP-2024/3.

Data availability
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
This study was carried out according to the ethical guidelines described in the Declaration of Helsinki. The study was approved by the Ethics Committee of the Kocaeli Health and Technology University Ethics Committee (Approval Number: 17-01-2024, 2024/65). Participation in the study was on a voluntary basis. The purpose of the study was explained, and verbal and written consent was obtained from the participants.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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Received: 10 July 2025 / Accepted: 12 September 2025
Published online: 29 September 2025

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