Research article

Effect of a forensic nursing virtual education course on knowledge and clinical decision-making of master's nursing students in Iran: a non-equivalent control group pre- and post-test study

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Purpose: Forensic nursing is a specialty in the nursing profession based on legal procedures. This study aimed to assess the effect of a forensic nursing virtual education course on knowledge and clinical decision-making among master's nursing students.
Methods: In a quasi-experimental study with a pre- and post-test, 106 master's nursing students at Guilan (n=65) and Mazandaran (n=41) Universities of Medical Sciences, Iran were enrolled. Data were collected using census sampling from March to April 2021. Participants in the intervention group received a forensic nursing virtual education course in three 90-minute sessions for 2 days.
Results: A total of 88 out of 106 master's nursing students were enrolled in this study. The mean post-education score for knowledge in the intervention group was significantly higher than in the control group (12.52 vs. 7.67, P<0.001). The mean post-education score for clinical decision-making in the intervention group was significantly higher than in the control group (16.96 vs. 13.64, P<0.001).
Conclusion: The level of knowledge and clinical decision-making of master's nursing students regarding forensic evidence improved after the forensic nursing virtual education course in the intervention group compared to the control group. Nursing managers and policymakers can develop appropriate strategies to improve the knowledge and clinical decision-making of nursing students by using forensic nursing education courses in the curricula of nursing programs, especially in postgraduate education as an elective or mandatory course.

Keywords: Clinical competence; Clinical decision-making; Forensic nursing; Iran; Nursing students

Introduction

Background

Forensic nursing is a specialty in the nursing profession based on legal procedures. In fact, forensic nursing is defined as a nursing specialty with subspecialties that focus on nursing practice related to clinical legal issues of living or deceased victims and offenders [1]. Nurses are the first people who are in contact with patients and their families and have a direct relationship with medical records [2]. Nurses should also be aware of possible injuries while performing work, such as collecting, storing, and preserving evidence, and preventing damage to forensic records [3]. Therefore, forensic nurses can help resolve disputed cases through membership in the forensic team [2]. There is little evidence in the field of forensic nursing in nursing courses [1,2]. Hence, strengthening forensic nursing education will have positive results such as improving the quality of patient care, increasing access to services, reducing the burden on the health care system, increasing nurses' confidence, and increasing patient satisfaction [4]. Conversely, if nurses do not receive adequate forensic education, forensic records may be overlooked, lost, or damaged during the collection, identification, and storage process. Finally, a lack of forensic education can make forensic examinations difficult and may lead to incomplete tests and incorrect clinical decision-making (CDM) [1]. Meanwhile, it is very important that nursing students, especially master's nursing students, have the desired knowledge and CDM regarding forensic evidence. In addition, educational interventions can play an important role in increasing CDM. Hence, a systematic review showed that educational interventions can be effective in improving nurses' judgment and CDM [5].

Therefore, due to the lack of sufficient knowledge of nursing students regarding forensic evidence, it is necessary to design interventions to improve their knowledge. In addition, nurses will have a weak CDM if they do not have sufficient knowledge of the problem [6]. However, previous studies in this area are limited. A study in Turkey showed that forensic nursing courses increased students' knowledge of forensic evidence [1]. Obviously, educating nursing students has always been a major challenge for nursing managers and policymakers. Meanwhile, virtual education is a simple, easy, and economical strategy that can have positive effects on the development of nursing competencies, critical thinking, and CDM of nursing students [7].

The knowledge and CDM of master's nursing students regarding forensic evidence are crucial to the provision of high quality, safe and holistic nursing care. Furthermore, increasing the knowledge of master's nursing students in forensics can improve their ability to understand patients' clinical problems and engage in proper and timely CDM to meet the needs of forensic patients.

Objectives

This study aimed to assess the effect of forensic nursing virtual education courses on the knowledge and CDM of master's nursing students regarding forensic evidence. Specifically, it assessed the effect of forensic nursing virtual education courses on the knowledge on and CDM of master's nursing students.

It was hypothesized that the implementation of forensic nursing virtual education courses via lectures, PowerPoint presentations, pictures, short educational videos, and simulated scenarios in an educational webinar would enhance the knowledge and CDM of master's nursing students regarding forensic evidence.

Methods

Ethics statement

This research was approved by the ethics committee of Guilan University of Medical Sciences (IR.GUMS.REC.1399.233). The objectives of the present study were explained to the participants, and they provided informed consent. Participants were reassured that they could withdraw at any stage of this research.

Study design

This is a quasi-experimental study, with a non-equivalent control group pre- and post-test design. It is described according to the Transparent Reporting of Evaluations with Nonrandomized Designs statement (https://www.cdc.gov/trendstatement/).

Setting

Data were collected using census sampling from March to April 2021: students of Guilan University of Medical Sciences and Mazandaran University of Medical Sciences.

Participants

All 1st- and 3rd-semester nursing students studying at Guilan and Mazandaran Universities of Medical Sciences were included. Students who participated in only 1 phase of the present study were excluded. In total, 106 master's students of nursing at Guilan (n = 65) and Mazandaran (n = 41) Universities of Medical Sciences, Iran were enrolled.

Intervention

Participants in the intervention group received a forensic nursing virtual education course in three 90-minute sessions for 2 days. The educational content is shown in Supplement 1. The educational content was presented to the students by a faculty mem-

ber using lectures, PowerPoint presentations, pictures, short educational videos, and simulated scenarios in an educational webinar. Participants completed the questionnaires before the intervention and 2 weeks after the intervention.

Data sources/measurement

Data were collected using a researcher-made 3-part questionnaire including individual and occupational characteristics, nursing students' knowledge of forensic nursing, and simulated scenarios related to CDM in forensic nursing.

Individual and occupational characteristics

Individual and occupational characteristics such as age, sex, marital status, nursing experience in the clinical setting, work experience, bedside nursing experience in the emergency department, work experience in the emergency department, job position, history of forensic patient care, written instructions for caring for forensic patients, and history of participation in workshops related to forensic nursing.

Nursing students' knowledge of forensic evidence

This researcher-made tool contained 17 items, which were designed to assess nursing students' knowledge of forensic evidence. Participants responded to the items on a 3-point Likert scale (incorrect [score of 0], do not know [score of 0], and correct [score of 1]). One point was given for each correct answer. The overall scores of this tool were classified as insufficient (0–5), moderate (6–11), and sufficient (12–17). A 10-member panel consisting of forensic faculty members of Guilan University of Medical Sciences approved the tool, with a content validity ratio between 0.80 and 1 and a content validity index of 1. The internal stability of the items of this tool was evaluated using the Kuder-Richardson coefficient among 20 master's nursing students. The internal reliability of this tool was 0.95 (Supplement 2).

Simulated scenarios related to CDM in forensic evidence

This researcher-made tool contained 25 items, which were designed to assess cases related to trauma, elderly abuse, suicide, child abuse, and the collection and documentation of evidence. The items in each case were related to data collection methods, nursing diagnoses, selection of the best care, and evaluation of care performed. One point was given for each correct answer. The overall scores of this tool are classified at 3 levels: weak (0–50), moderate (50–75), and desirable (75–100). A 10-member panel consisting of forensic faculty members of Guilan University of Medical Sciences approved the tool in private and collective sessions, with a content validity ratio of 0.92 and a content validity

index of 0.97. The internal stability of the items of this tool was evaluated using the split-half method among 20 master's nursing students. The Spearman correlation coefficient between the 2 halves and the internal reliability of the instrument were 0.484 and 0.66, respectively (Supplement 3).

Bias

None.

Outcomes

The outcomes of this study were as follows: first, an evaluation of master's nursing students knowledge forensic evidence before and after the forensic nursing virtual education course; and second, an evaluation of master's nursing students' CDM regarding forensic evidence before and after the forensic nursing virtual education course.

Sample size

There was no estimation of the sample size because all 1st- and 3rd-semester nursing students studying at Guilan and Mazandaran Universities of Medical Sciences were included. In this study, a total of 88 out of 106 master's nursing students completed both a pre- and post-intervention encounter, in which they completed forensic nursing virtual education course.

Assignment method

Students of the Guilan University of Medical Sciences were allocated to the intervention; while students of Mazandaran University of Medical Sciences were selected as the control group.

Blinding (masking)

There was no blinding for participants.

Unit of analysis

The unit of analysis was the group (experimental or control).

Statistical analysis

SPSS ver. 16.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Quantitative and qualitative variables were presented as the mean (± standard deviation [SD]) and number (percentage), respectively. The normal distribution of data was evaluated by the Kolmogorov-Smirnov and Shapiro-Wilk tests. The data had a normal distribution. The independent t-test, chi-square, and Fisher exact tests were used to assess knowledge and CDM and their relationship with individual and occupational characteristics of the participants. The significance level was considered $P < 0.05$.

Results

Participants

In total, 88 out of 106 master's nursing students were enrolled in the present study (Fig. 1, Dataset 1). Out of 88 students, 52 were in the intervention group; while 36 were in the control group. Of the participants, 77.27% were female, 56.82% were married, 85.23% had nursing experience in clinical settings, and 52.27% had a history of forensic patient care. The mean age and work experience of the participants were 29.84 years (SD = 6.36) and 7.02 years (SD = 5.17), respectively. The details of the individual and occupational characteristics of the participants are presented in Table 1.

Main results

Master's nursing students' knowledge of forensic evidence

As shown in Table 2, the mean score of master's nursing students' knowledge of forensic evidence in the intervention group was significantly higher post-education than pre-education (12.52 versus 7.00, P < 0.001). The control group showed a slight increase in the mean score for knowledge (7.67 versus 7.08,

P = 0.039). The mean post-education score of knowledge of students in the intervention group was significantly higher than that of students in the control group (12.52 versus 7.67, P < 0.001). Furthermore, master's nursing students' knowledge of forensic evidence improved after the forensic nursing virtual education course in the intervention group compared to the control group (P < 0.001).

CDM of master's nursing students regarding forensic evidence

As shown in Table 2, the mean score of master's nursing students' CDM regarding forensic evidence in the intervention group was significantly higher post-education than pre-education (16.96 versus 13.50, P < 0.001). The mean post-education score of CDM in the control group was slightly lower than the pre-education score (14.94 versus 13.64, P = 0.008). The mean post-education score of CDM of students in the intervention group was significantly higher than that of students in the control group (16.96 versus 13.64, P < 0.001). Furthermore, master's nursing students' level of CDM regarding forensic evidence improved after the forensic nursing virtual education course in the intervention group compared to the control group (P < 0.001).
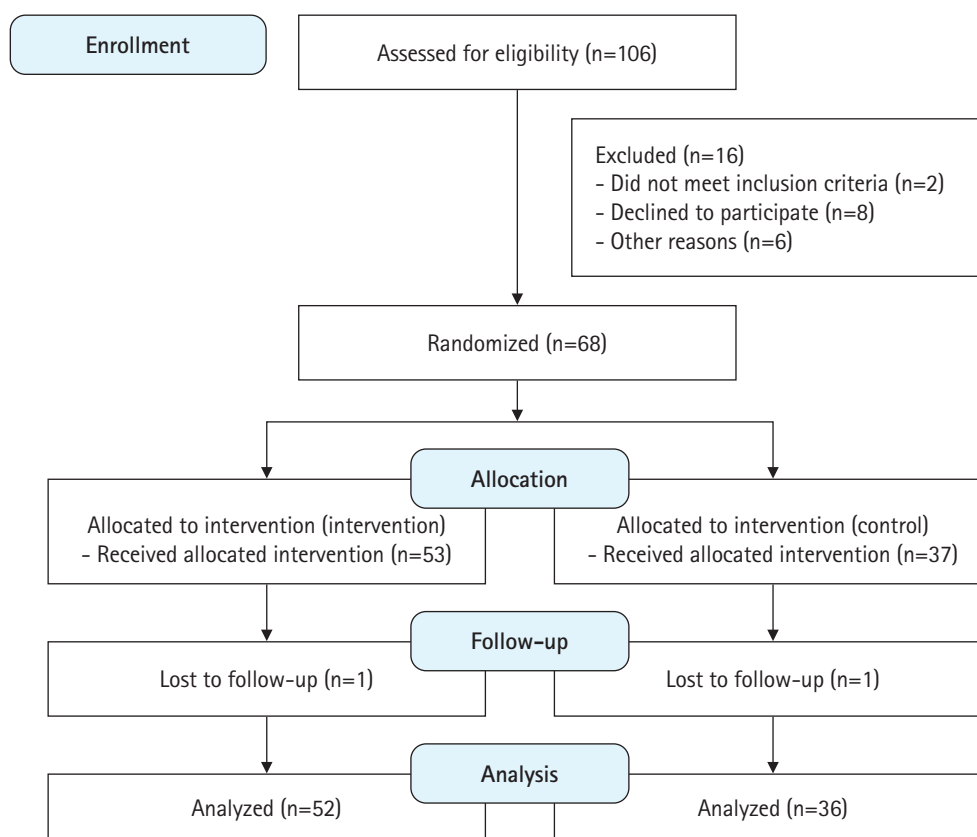

Fig. 1. Flowchart of the study.

Table 1. Individual and occupational characteristics of the participants (n=88)

Characteristic	Total (n = 88)	Groups Intervention (n = 52)	Control (n = 36)	P-value
Individual characteristics				
Age (yr)	29.84 ± 6.36	28.71 ± 6.34	31.47 ± 6.10	0.044[a)]
< 25	22 (25.00)	19 (36.54)	3 (8.33)	0.020[b)]
26–30	27 (30.68)	14 (26.92)	13 (36.11)	
31–35	17 (19.32)	7 (13.46)	10 (27.78)	
> 35	22 (25.00)	12 (23.08)	10 (27.78)	
Sex				
Male	20 (22.73)	13 (25.00)	7 (19.44)	0.541[b)]
Female	68 (77.27)	39 (75.00)	29 (80.56)	
Marital status				
Single	38 (43.18)	29 (55.77)	9 (25.00)	0.004[b)]
Married	50 (56.82)	23 (44.23)	27 (75.00)	
Occupational characteristics				
Nursing experience in a clinical setting				
Yes	75 (85.23)	41 (78.85)	34 (94.44)	0.043[b)]
No	13 (14.77)	11 (21.15)	2 (5.56)	
Years of work experience	7.02 ± 5.17	6.18 ± 5.15	8.03 ± 5.10	0.125[a)]
Bedside nursing experience in the emergency department				
Yes	41 (46.59)	22 (42.31)	19 (52.78)	0.333[b)]
No	47 (53.41)	30 (57.69)	17 (47.22)	
Years of work experience in the emergency department	3.65 ± 3.80	2.75 ± 2.88	4.68 ± 4.51	0.106[a)]
Job position (n = 75)				0.587[c)]
Bedside nurse	72 (96.00)	40 (97.56)	32 (94.12)	
Head nurse	3 (4.00)	1 (2.44)	2 (5.88)	
History of forensic patient care				
Yes	46 (52.27)	17 (32.69)	29 (80.56)	< 0.001[b)]
No	42 (47.73)	35 (67.31)	7 (19.44)	
Are there written instructions on caring for a forensic patient in your ward?				
Yes	17 (19.32)	9 (17.31)	8 (22.22)	0.628[b)]
No	71 (80.68)	43 (82.69)	28 (77.78)	
History of participation in workshops related to forensic nursing				
Yes	4 (4.55)	3 (5.77)	1 (2.78)	0.642[c)]
No	84 (95.45)	49 (94.23)	35 (97.22)	

Values are presented as mean±standard deviation or number (%).
[a)]P-value was obtained with the independent t-test. [b)]P-value was obtained with the chi-square test. [c)]P-value was obtained with the Fisher exact test.

Discussion

Key results

This study assessed the effect of a forensic nursing virtual education course on the knowledge and CDM of master's nursing students regarding forensic evidence. Based on the findings of the present study, the level of knowledge and CDM of master's nursing students regarding forensic evidence improved after the forensic nursing virtual education course in the intervention group compared to the control group. Therefore, the hypothesis of this study was accepted.

Interpretation

As presented in this study, the level of knowledge and CDM of master's nursing students regarding forensic evidence improved after the forensic nursing virtual education course in the intervention group compared to the control group. The difference between the score before and after the intervention in the present study showed that forensic nursing education for nursing students can improve their level of knowledge and CDM. This finding emphasizes the

Table 2. Knowledge and CDM of master's nursing students regarding forensic evidence in the intervention and control groups (n=88)

Variable	Groups		P-value
	Intervention (n = 52)	Control (n = 36)	
Knowledge			
Pre-education	7.00 ± 2.32	7.08 ± 2.80	0.879[a]
Insufficient	14 (26.92)	11 (30.56)	
Moderate	37 (71.16)	23 (63.89)	0.603[b]
Sufficient	1 (1.92)	2 (5.55)	
Post-education	12.52 ± 1.80	7.67 ± 2.50	< 0.001[a]
Insufficient	0	6 (16.67)	
Moderate	13 (25.00)	29 (80.55)	< 0.001[b]
Sufficient	39 (75.00)	1 (2.78)	
CDM			
Pre-education	13.50 ± 2.68	14.94 ± 2.57	0.013[a]
Weak	16 (30.77)	7 (19.45)	
Moderate	34 (65.38)	26 (72.22)	0.361[b]
Desirable	2 (3.85)	3 (8.33)	
Post-education	16.96 ± 3.07	13.64 ± 3.41	< 0.001[a]
Weak	3 (5.77)	14 (38.89)	
Moderate	32 (61.54)	20 (55.56)	< 0.001[c]
Desirable	17 (32.69)	2 (5.55)	

Values are presented as mean±standard deviation or number (%).
CDM, clinical decision-making.
[a]P-value was obtained with the independent t-test. [b] P-value was obtained with the Fisher exact test. [c]P-value was obtained with the chi-square test.

importance of adding forensic nursing virtual education courses to the curricula of nursing programs, especially postgraduate education. Obviously, nurses are important members of forensic medicine as the first health professionals to deal with cases involving legal issues at hospitals [6]. Therefore, the knowledge, CDM, and practice of nursing students should be improved through the use of forensic nursing education. However, one of the main barriers to forensic evidence is nursing students' insufficient knowledge [1]. An insufficient level of knowledge of nursing students about forensic nursing can cause many legal problems for patients and institutions and prevent the provision of high-quality health services. Therefore, it is suggested that nursing managers provide forensic nursing services at the desired level in clinical settings by providing education to nurses in the field of forensic nursing.

Nursing managers and policymakers can develop appropriate strategies to improve the knowledge and CDM of nursing students by using forensic nursing education courses in the curricula of nursing programs, especially in postgraduate education as an elective or mandatory course. Furthermore, holding group discussions for nursing students and nurses about forensic cases can im-

prove their knowledge and CDM.

Comparison with previous studies

Consistent with the findings of this study, the results of a study in Turkey showed that a forensic nursing course increased students' knowledge of forensic evidence [1]. Furthermore, no inconsistent study was found. It is essential that nurses be able to identify disputed cases well and, within the framework of their responsibilities, have sufficient knowledge in that area [8]. Based on previous evidence, nurses have insufficient knowledge about forensic nursing and inadequate status for evaluating forensic records [1,9]. A study in Turkey found that 73% of health professionals had no education in forensic nursing [10]. They also showed that 17.5% of the participants had received education related to forensic nursing and that this education was insufficient in raising the level of knowledge of nurses related to forensic nursing.

Regarding knowledge about forensic nursing, a study in Iran showed that 45.13% of emergency nurses had an insufficient level of knowledge and 54.36% of them had moderate knowledge of forensic nursing evidence [11]. In other studies, the level of knowledge of nursing students and nurses in different countries was different [12,13]. Meanwhile, in South Africa, a country where nurses do not receive any formal nursing education, there was insufficient knowledge about forensic nursing evidence [14]. In contrast, a study in the United States showed that academic education had a direct relationship with nurses' knowledge of forensic nursing evidence [15]. The difference in nursing students' level of knowledge about forensic nursing evidence between the present study and other studies can be attributed to differences in the educational programs of forensic nursing in different countries [12,13].

Limitations

The main limitation of the present study was the non-randomized allocation of the participants.

Generalizability

The results of this study may be useful for other nurses and nursing students in Iran.

Suggestions

Emergency nurses are the first to encounter forensic nursing cases. Hence, it is recommended that future studies investigate well-designed interventions to assess and compare the effect of virtual and in-person forensic nursing education courses on the knowledge and CDM of emergency nurses regarding forensic evidence.

Conclusion

It is suggested that a course on forensic nursing be added to the curricula of nursing programs, especially postgraduate education as an elective or mandatory course. It is also recommended that forensic nursing education courses be used as a simple, effective, and low-cost intervention to improve nurses' knowledge and CDM in clinical settings.

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Authors' contributions

Conflict of interest

Funding

Data availability

Acknowledgments

Supplementary materials

Supplementary files are available from Harvard Dataverse: https://doi.org/10.7910/DVN/ZRJ6SQ
Supplement 1. Educational content.
Supplement 2. Measurement tool for the knowledge of nursing students regarding forensic evidence.
Supplement 3. Measurement tool for the simulated scenarios related to clinical decision-making in forensic evidence.
Supplement 4. Audio recording of the abstract.

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