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The effect of the burn wounds dressing and mechanical debridement training package on nursing interns' knowledge and executive functions: A quasi-experimental study

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Abstract

Background: Despite receiving training on caring for burn wounds in the undergraduate nursing program, nursing students do not acquire enough knowledge and skills in wound dressing and debridement. This research was carried out to determine the effect of a training package on the nursing interns' knowledge and executive functions regarding the dressing and mechanical debridement of burn wounds.

Methods: This quasi-experimental study was conducted on 60 nursing internship students in their 7th semester in Ilam, Iran, in 2023. A convenience sampling method was used, and participants were randomly assigned to groups using dice-throwing for simple randomization. Over six weeks, the intervention group received training on dressing burn wounds through a learning package, virtual gamification, a simulator, and clinical and real exercises. The control group received routine content through oral education by the same lecturer. Knowledge and executive function in mechanical debridement of burn wounds were assessed using the KMDBWT and EFMDBWT tools before and two weeks after the intervention. Data were analyzed with a standard error of 0.05 using Kolmogorov-Smirnov, independent t, paired t, chi-square, and analysis of covariance tests by SPSS V.16.

Results: Before the intervention, no significant difference was observed between the mean and standard error of the control and intervention groups' knowledge and executive performance scores. However, after the intervention, the knowledge scores significantly increased in the intervention group (16.35 ± 0.288) compared to the control group (10.00 ± 0.356) (P=0.001). Moreover, after the intervention, the executive function scores in the intervention group (105.00 ± 0.939) were significantly increased compared to the control group (56.81 ± 0.738) (P=0.001).

Conclusion: The burn wound dressing and mechanical debridement training increased nursing students' knowledge and executive function. Hence, this educational package is recommended as a supplementary teaching resource.

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Highlights

What is current knowledge?

Traditional teaching methods are used in nursing to teach therapeutic procedures, such as wound debridement.

What is new here?

A burn wound care and mechanical debridement educational bundle can enhance nursing interns' knowledge and abilities.

Introduction

Injuries caused by burns are a common reason for hospital visits and treatment, often leading to high mortality and disability (1). The World Health Organization has declared burns a global public health concern and a leading cause of trauma-related disability and mortality (2). Preventing infections can minimize mortality and the consequences of severe burns. Non-observance of health concerns during hydrotherapy and dressing changes, insufficient hand hygiene, protracted hospital stays, and delayed burn wound debridement can increase infection risk (3). Nursing care for burn wounds is crucial for preventing infection and facilitating wound healing. Debridement and dressing changes are among the most critical nursing care measures (4). Debridement removes dead tissue from a wound, facilitates healing, and prevents bacteria from entering the injured tissue (5).

Debridement is essential in burn wound care, and nurses must be skilled in this vital task. Choosing and implementing the correct wound debridement is crucial in reducing the risk of complications (6), and training in this regard is essential. The nursing curriculum appears to neglect burn wound debridement as a nursing duty. According to research, only 20% of nursing students have appropriate burn wound care knowledge and abilities (7,8). However, evidence indicates that nursing students' burn department experiences are stressful, preventing them from acquiring the necessary skills and knowledge (9).

Internships provide an opportunity to learn practical skills. However, clinical education systems seem defective, and existing efforts have failed to equip nurses with the necessary skills (10). The incompetence of instructors, the lack of practical opportunities, the unfavorable environmental conditions, defective theoretical education, and the lack of specialized departments and facilities all contribute to internship courses' ineffectiveness in improving nursing students' knowledge and skills (11,12). An effective amalgamation of teaching approaches and models is needed to improve student learning and skills, and integrating instructional techniques may enhance learning (13,14). Combining training methods or elements can improve nurses' learning and practical skills by strengthening interactive learning, creating a closer relationship with the clinical environment, and providing more flexibility in learning (15). Blended (Combined) learning methods include an organized framework to assist students learn and prevent information overload. Training packages may include instructional videos, multimedia content, hands-on exercises, interactive tests to help students practice their skills and knowledge in an interactive environment, and supplementary materials to expand the content and improve learners' skills and qualifications for related careers (16,17). In this approach, various validated contents are merged and presented with educational material to enhance the learning process's quality and the curriculum's effectiveness (18,19).

An educational package includes various teaching approaches or assistance to improve clinical knowledge and abilities (20). A combination of educational techniques improves students' learning and clinical skills more effectively (19). This approach enables students to repeatedly review the content and revise sections needing improvement, ultimately designing the final version based on professional learning standards. This ensures students are familiar with standard clinical concepts and processes (21,22). Moreover, gamification, as a newly recommended way to enhance the effectiveness of the learning process, opens broad prospects for facilitating the achievement of the aims of education (23). Online education and gamification boost students' cognitive abilities and encourage them to think critically and logically to meet challenges (24). The success of online education platforms during the coronavirus epidemic indicates their effectiveness in educating nursing students (25,26). Gamification uses real-life game features and advantages to improve learning (12). These approaches help to develop advanced cognitive skills and actively involve students in their education (23).

Society needs expert personnel, and training competent nurses can ensure efficient clinical services. Practical clinical training can lead to training competent nurses (27,28). Promoting nursing care for burn patients can reduce complications and facilitate recovery and rehabilitation. Therefore, using novel

methods to improve clinical skills in nursing students' academic education is necessary (7). A literature search demonstrates little research has been conducted on the effectiveness of teaching packages in improving nursing students' burn wound dressing and mechanical debridement skills. Evidence shows simulation techniques can enhance students' knowledge and function in various burn wound care areas. However, these investigations are sparse and occasionally inconsistent (18,19).

Therefore, due to the importance of nursing students' competence in burn wound care, this study aimed to assess the impact of an educational package on enhancing their knowledge and skills in dressing and mechanical debridement of burn wounds.

Methods

This quasi-experimental research was conducted with the approval of the Ethics Committee of Ilam University of Medical Sciences at the School of Nursing and Midwifery in Ilam, Iran (2023).

The participants were selected among the nursing interns at the School of Nursing and Midwifery of Ilam University of Medical Sciences through convenience sampling. Inclusion criteria included willingness to participate, full-time attendance in the study, living in various dormitory campuses, being in the 7th semester of nursing internships, and owning a personal smartphone. Exclusion criteria included any record of failing in the burns nursing unit during previous semesters, relocation to other institutes, and duplicated filling of the instruments. Written informed consent was obtained from all participants.

Sample size, randomization and blinding

According to the convenience sampling method, sixty 7th semester nursing internships were randomly divided into control (n=30) and intervention groups (n=30) by dice throwing. The first person in the class list, in alphabetical order, threw the dice. If the number of the dice thrown was odd, the participant entered the control group, and if the number was even, the participant entered the intervention group. The following samples were entered into the groups by throwing dice using the same algorithm. This process continued until the last participants entered the research.

The sample size calculation was based on Rodríguez et al. study in which the mean and standard deviation of knowledge scores before intervention were 35.78 ± 9.40 and after intervention was 48.15 ± 14.36 based on the comparison of two mean formulas by considering the first error type of 0.01, the power of 0.95 that reported 25 participants for each group (29) Thus, assuming a 20% attrition rate, the eventual number of participants in each group was determined to be 30.

The participants' lists were extracted and divided, and their codes were entered from the Porsline platform into Microsoft Excel 2010. The Excel file was locked and set to a blinded view for the research team to prevent biases or manipulations until the end of the research, ensuring the study's accuracy. The statistical analyst received the coded data after the end of the research without knowing the aim of the study, outcomes, group allocation, randomization, and type of intervention to avoid any biases and keep the analysis intact (Figure 1).

Measurement, validity, and reliability

1. Demographic information form

The demographic information included age, gender, marital status, history of participation in burns workshops, and grade point average.

2. Knowledge of Mechanical Debridement of Burn Wounds Tool (KMDBWT)

The research team designed this tool to measure knowledge of mechanical debridement of burn wounds. It had 20 questions with multiple choices, giving one point for each correct response and zero points for a false response; the minimum score was 0, and the maximum was 20. Ten faculty members of the Faculty of Nursing and Midwifery examined the tool and made corrections to measure CVI based on Bausell and Waltz's method (30). After performing the necessary calculations and corrections, CVI was calculated as 0.79. The reliability was assessed using a test-re-test, which reported a score of 0.707.

3. Executive Function of Mechanical Debridement of Burn Wounds Tool (EFMDBWT)

The research team designed this questionnaire to measure the executive function of mechanical debridement of burn wounds in the form of 30 items. The scale of this tool is based on a 4-point Likert scale from weak (1) to excellent (4). The minimum and maximum scores obtained in this questionnaire were 30 to 120. Higher grades indicated superior executive function. Based on Bausell and Waltz's method, ten faculty members from the Faculty of Nursing and Midwifery examined the tool and made corrections to measure CVI (30). After completing the required calculations and adjustments, the CVI was determined to be 0.96. A test-retest was conducted to assess reliability, and the result was reported as 0.864.

Intervention

The study began after receiving the ethics code, establishing random allocation, and defining inclusion and exclusion criteria. Subsequently, demographic information was collected, and the participants on the Porsline platform filled in KMDBWT and EFMDBWT tools. This platform was locked until the end of the intervention to prevent refilling, data manipulation, or leaking.

In the intervention group, six training sessions were considered; the duration of each session was determined as ninety minutes by a nursing instructor who had worked in the burn unit for at least ten years. These educational sessions were held on Saturdays (To prevent possible content and intervention leaks to the control group) at the education room of the burns unit in Imam Khomeini Hospital in Ilam (Iran). The sessions included lectures, educational booklets and video clips, group discussions, questions and answers, and practical exercises on mollag for the first two sessions. Subsequently, in the third session, practical training on virtual burn wounds using a burn wound simulator was conducted. In the fourth session, all educational content was assessed through an online gamification competition created by the research team on the Kahoot gamification platform (Including puzzles, conceptual patient scenarios, brainstorming, gallery walking, multiple competitive matching times, and filling the blanks). This was designed to motivate participants to exercise and compete based on their previous sessions and provide intelligent feedback for the final two sessions. In the fifth session, the participants were allowed to dress real burn wounds, debride them individually with the instructor's assistance (If necessary) on at least two patients, and receive oral feedback after each dressing. In the sixth session, each participant changed the dressing of real burn wounds and conducted mechanical debridement under the instructor's supervision without any assistance. In the last quarter of the final session, online gamification on the Kahoot platform was implemented to spotlight potential errors and assess skills taught in the intervention group regarding time management and the accuracy of dressing processes. The contents mentioned were based on valid and relevant references (31-37).

Normal distribution was used initially to avoid any group connection during the study, and Saturdays were considered for the intervention group and Thursdays for the control group. The participants received educational sessions on the training days from the same lecturer. Moreover, the intervention group completed their nursing internship courses at the same hospital, and the control group did their nursing internship courses in a different hospital without any interaction until the end of the tool filling.

The control group also received what was taught to the intervention group in the form of lectures and presentations without any practical or clinical exercise (Standard method) by the same instructor during six ninety-minute face-to-face sessions on Thursdays.

Finally, two weeks after the last session, participants completed the KMDBWT and EFMDBWT. Then, the coded data were provided to the statistical analyst, unaware of the study's aim, outcomes, group allocation, randomization, or type of intervention, to prevent any biases and ensure the analysis remained unbiased.

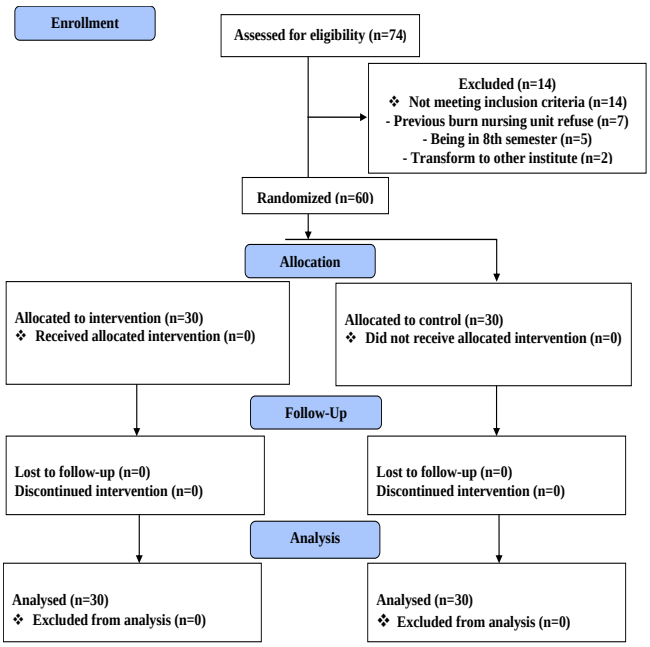

Figure 1. The process of the study and assigning the participants to the control and intervention groups

Data analysis

Descriptive statistics were used for the demographic data, and the variables were reported as mean, standard deviation, frequency, and percentage. Analytical statistics tests included Kolmogorov-Smirnov (For normal distribution), independent t and chi-square (For comparing the two groups regarding the demographic variables), paired t (For comparing before and after scores), and ANCOVA (For analyzing intervention effect). Independent t-tests were utilized to compare the differences between the scores of the two groups. SPSS V.16 was used for data analysis, and the standard error was considered 0.05.

Results

The mean and standard deviation of the total age of the participants were 23.40± 1.48. Most participants were single women who had not passed any burns workshop and had an average grade point between 16 and 17.99. The chi-square test demonstrated no significant differences regarding gender (P=0.855), marital status (P=1.000), and grade point average (P=0.128) in both groups, as shown in Table 1.

The normality of all data was checked, and it showed that the distribution of KMDBWT and EFMDBWT before intervention in the control and intervention groups was 0.084, 0.251, 0.143, and 0.295. In addition, their normality after intervention was 0.457, 0.177, 0.308, and 0.332, respectively. Overall, all mentioned variables had normal distributions (Table 2).

The mean scores of KMDBWT in the control and intervention groups did not significantly differ before the intervention (P=0.186). However, after the intervention, this difference was significant (P=0.001). Additionally, the mean scores of EFMDBWT in both the control and intervention groups showed no significant difference before the intervention (P=0.389). However, after the intervention, this difference became significant (P=0.001). The results of the independent t-test showed a statistically significant difference in the mean scores of KMDBWT (P=0.012) and EFMDBWT between the two groups (P=0.003) (Table 3).

The paired t-test results indicated no statistically significant difference between the average scores of KMDBWT before and after the intervention in the control group (p = 0.322). However, the difference in the intervention group was significant (p = 0.001). The same pattern was observed in the average scores of EFMDBWT before and after the intervention in the control group (P=0.122) and intervention group (P=0.001) (Table 3).

In addition, this study plotted regression slopes on KMDBWT and EFMDBWT in two control and intervention groups to assess the uniformity and prerequisites required to conduct the ANCOVA test. The results indicated that the slope of the line was parallel and divided into two distinct groups on the graph, suggesting that the regression lines were homogeneous. The ANCOVA test showed that there was a significant increase in KMDBWT scores among the intervention group to 435.75 with P<0.001 and F (1, 60) after the intervention. These findings indicate that the intervention positively impacted the participant's KMDBWT. These results were obtained assuming that the average KMDBWT score before the intervention remained constant, which was considered a covariate in the model. The educational intervention led to a substantial improvement in the EFMDBWT score in the intervention group compared to the control group. The EFMDBWT score in the intervention group was 1749.60, with P<0.001, F (1,60). It is important to note that this result was obtained by assuming that the EFMDBWT score remained the same before the covariate intervention. The assessment of the model's EFMDBWT was conducted using the R2 coefficient. The model's prediction power was initially evaluated without considering the KMDBWT variables as covariates, resulting in an R2 value of 0.758. However, after conducting an analysis of covariance and equalizing the KMDBWT variables, the R2 value improved to 0.911, indicating that the model was effective. In addition, the R2 index increased from R2=0.912 to R2=0.967 after the ANCOVA analysis (Table 4).

Table 1. The demographic variables of the participants in control and intervention groups

Variables		Control n (%)	Intervention n (%)	P-Value (Chi-Square)
Sex	Men	13 (43.3)	14 (46.7)	0.855
	Women	17 (56.7)	16 (53.3)	
Marital status	Single	28 (93)	28 (93)	1.000
	Married	2 (7)	2 (7)	
Grade point average	12 – 13.99	2 (7)	0 (0)	0.128
	14 – 15.99	8 (26.7)	10 (30)	
	16 – 17.99	15 (50)	17 (56.7)	
	18 -20	7 (23.3)	4 (13.3)	

Table 2. Dispensation of quantitative variables according to control and intervention groups based on the current study

Variables		Group	
		Control	Intervention
		P-Value (Kolmogorov–Smirnov test)	**P-Value** (Kolmogorov–Smirnov test)
KMDBWT	Before	0.084	0.143
	After	0.457	0.308
EFMDBWT	Before	0.251	0.295
	After	0.177	0.332

KMDBWT: Knowledge of Mechanical Debridement of Burn Wounds Tool
EFMDBWT: Executive Function of Mechanical Debridement of Burn Wounds Tool

Table 3. Comparison of the mean scores of KMDBWT and EFMDBWT based on current study in the participants before and after the intervention in both control and intervention groups

Variable		Group		P-Value (Independent t-test)
		Control	Intervention	
		Mean ± SE	Mean ± SE	
KMDBWT	**Before**	8.72 ± 0.89	9.48 ± 0.420	P= 0.186
	After	10.00 ± 0.356	16.35 ± 0.288	P= 0.001
Mean difference (SE)		1.28 (0.330)	6.87 (0.920)	P=0.012
Paired t-test		P=0.322	P=0.001	--
EFMDBWT	**Before**	52.03 ± 0.519	52.84 ± 0.779	P=0.389
	After	56.81 ± 0.738	105.00 ± 0.939	P=0.001
Mean difference (SE)		4.78 (0.880)	52.16 (0.745)	P=0.003
Paired t-test		P=0.122	P=0.001	--

KMDBWT: Knowledge of Mechanical Debridement of Burn Wounds Tool
EFMDBWT: Executive Function of Mechanical Debridement of Burn Wounds Tool

Table 4. ANCOVA analysis results to evaluate the intervention's effect on KMDBWT and EFMDBWT in both intervention and control groups.

Dependent variable: Knowledge score after the intervention				
Source	**Type III sum of squares**	**Mean square**	**F**	**P-Value**
Pretest (KMDBWT) covariate	130.73	130.73	108.40	P<0.001
Groups	525.53	525.53	435.75	P<0.001
Error	72.36	1.20	-	
R Squared = 0.914 (Adjusted R Squared = 0.912)				
Dependent Variable: Executive function score after the intervention				
Source	**Type III sum of squares**	**Mean square**	**F**	**P-Value**
Pretest (EFMDBWT) covariate	139.23	139.23	6.83	P=0.011
Groups	35623.03	35623.03	1749.60	P<0.001
Error	1221.63	20.36	-	
R Squared =0.965 (Adjusted R Squared =0.967)				

KMDBWT: Knowledge of Mechanical Debridement of Burn Wounds Tool
EFMDBWT: Executive Function of Mechanical Debridement of Burn Wounds Tool

Discussion

This study aimed to examine the impact of a training package on burn wound dressing and mechanical debridement on the knowledge and performance of nursing students at a university in western Iran. The research findings demonstrated a significant increase in students' average scores of learning and performance following the educational intervention. The training program on dressing and mechanical debridement of burn wounds significantly enhanced the subjects' knowledge and performance.

A clinical trial conducted by Unal et al. showed that implementing an active simulation method in a clinical skills center context effectively improved nursing students' burn wound care knowledge (38). Moreover, a quasi-experimental study conducted by Mohammad et al. showed that another nursing education program on burn injuries significantly improved the knowledge and skills of nurses (39). Omran et al. investigated the effect of dressing training using two methods, group and video training, on the knowledge and performance of nurses. They observed that both methods effectively improved nurses' understanding and performance. Nevertheless, the video method offered advantages such as cost-effectiveness and the ability to train anytime and anywhere, making its use in educational programs highly recommended (40). Moreover, Olszewski's study, which aimed to train burn nursing care and publication guidelines, demonstrated that after the training, the basic knowledge of burns (Such as infection control and wound care) was enhanced (41). The present study used a combination of educational methods to make the intervention more effective, and the results demonstrated that the intervention and combined educational methods improved students' knowledge and clinical skills. Our results contradict Van Nuland et al.'s study on the effects of a gamified training package and traditional instruction on medical students' anatomy course knowledge and engagement. They found no significant differences in knowledge levels or educational involvement across groups after the intervention (42). This inconsistency can be attributed to the duration of the intervention, the sample size, the content of the training, and the instruments.

There is evidence that clinical simulations can significantly improve the knowledge and skills of nursing students. Unal et al. demonstrated that the combined simulation method in the clinical skills center environment can improve nursing students' burn wound care skills (38). Moreover, the results of the Forbes et al. study confirmed the positive effect of educational videos on improving the quality of clinical education (43). A study by Imani-Goghary et al. also confirmed the positive impact of the combined learning method using video in enhancing the knowledge and performance of nursing and midwifery students (8). Nonetheless, Ghezelghash et al. compared the effectiveness of an online training package on nursing students' executive function, knowledge, and problem-solving skills in reading electrocardiograms, and the results contradicted the current study's findings. Their research found that the intervention enhanced knowledge and problem-solving skills, but executive functions weakened, and the method failed (44). The differences may be attributed to the intervention's features, length, content design, inadequate sample criteria, and evaluation methods.

A study by Lam et al. demonstrated an increase in the knowledge and performance of healthcare providers in various skills, including burn wound dressing and splinting. Nonetheless, implementing combined training courses and practical simulation models significantly improved the professional competence of healthcare personnel in burn injury management (45). Several studies have highlighted how instructors use innovative educational methods, such as simulations, portfolios, videos, and presentations, impact students' clinical practice and performance (13,46). Despite the paucity of research on teaching nursing students burn wound debridement, this study indicated that the current educational package, which may be used with other clinical training methods, can be effective.

It appears that Iran's nursing curriculum lacks enough burn wound care content. Nursing graduates are poorly prepared for wound care due to a lack of specialized burn departments and cases, especially in small cities in Iran. Moreover, a lack of specialized training, insufficient practical experience, and the complexity of treating burn wounds, along with outdated educational resources, equipment, and psychological and emotional pressures, further complicate the situation. An organized internship course design is essential for burn wound care training. Training packages, virtual gamification (Puzzle, conceptual patients' scenario, brainstorming, gallery walking, multiple competitive matching times, and filling in the blank), simulators, clinical exercises, and actual exercises can help nursing students prepare for burn wound debridement.

It should be noted, however, that this study's timeframe and sample size limited its generalizability to society. Nonetheless, using online platforms (Kahoot and Porsline) to learn and evaluate samples and intervention material designed for nursing internships was a strength.

Conclusion

The study findings show that an instructional package on burn wound care and mechanical debridement improved the knowledge and skills of nursing interns. The educational intervention in this study, which comprised educational booklets, theoretical instruction, online gamification with intelligent feedback, reality-based exercises, and educational videos, substantially enhanced nursing students' knowledge and clinical proficiency in burn wound care. Furthermore, it adequately prepared them to address the practical challenges encountered in clinical settings effectively. The results of the current study can be used in reevaluating nursing's curriculum in internship courses, adding electronic learning to clinical content, and supervising nursing internships before graduation.

It is recommended that future studies implement a larger sample size, longer interventional sessions, and include other nursing interns in different courses in combination with academic evidence in educational promotion approaches.

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Ethical statement

The ethical considerations for this research include obtaining the code of ethics from Ilam University of Medical Sciences (IR.MEDILAM.REC.1402.053), securing written informed consent from participants, ensuring the protection of their privacy, allowing participants the option to opt in or out of the study, and adhering to the ethical guidelines of the Declaration of Helsinki for the collection of human, library, and research data.

Conflicts of interest

The authors have declared no conflict of interest.

Author contributions

MO, AA: Conceptualization; MB, HT, YV, AV: Methodology; MO, AV: Validation; YV: Formal analysis; MB, YV: Investigation; MO, AV, AA: Resources; MO, MB, HT, AA: Data curation; MO, AA: Writing and original draft preparation; MO, AV, AA: Writing, review, and editing; AA, HT: Visualization; MB, YV, AA: Supervision, MO: Project administration.

References

1. Afkhamzadeh A, Majidi F, Ahmadi C. Risk factors for nosocomial infections among burn patients hospitalized in Tohid hospital, Sanandaj, Kurdistan Iran. Med J Mashhad Univ Med Sci. 2017;59(4):225-32. [View at Publisher] [DOI] [Google Scholar]
2. Shahsavarinia K, Soleimanpour H, Harzand Jadidi S, Saadati M, Javanmardi A, Gilani N. Determinants of hospital length of stay among burn patients using quantile regression. Depiction of Health. 2021;12(3):262-72. [View at Publisher] [DOI] [Google Scholar]
3. ghorbani F, saifi B, mohammadzadeh S, zare M. Microbiological factors in burn wound infection in patients hospitalized in Zanjan. Iran J Nurs Res. 2011;6(22):65-72. [View at Publisher] [Google Scholar]
4. Moghimian M, Moieni M, Farzi S, Aboutalebi MS, Shahriari M, Yousefi H, et al. Explain Experiences of Physicians and Nurses' Perspectives on Burn Injury Care Priorities. Journal of Military Medicine. 2022;24(1):1047-56. [View at Publisher] [Google Scholar]
5. Kwa KAA, Goei H, Breederveld RS, Middelkoop E, van der Vlies CH, van Baar ME. A systematic review on surgical and nonsurgical debridement techniques of burn wounds. J Plast Reconstr Aesthet Surg. 2019;72(11):1752-62. [View at Publisher] [DOI] [PMID] [Google Scholar]
6. Lu FC, Shen MY, Chen HQ, Xu T, Han CM. [Nursing care of 29 central venous catheterizations for one burn patient with 99% total body surface area]. Zhonghua Shao Shang Za Zhi. 2020;36(7):600-2. [View at Publisher] [DOI] [PMID] [Google Scholar]
7. Sawetz I, Hasiba-Pappas S, Kamolz LP, Holzer-Geissler JCJ, Tuca AC, Lumenta DB, et al. Introducing the "SIMline"-A Simulation Course in the Management of Severe Burns as a Tool in Undergraduate Medical Education. J Pers Med. 2023;13(2):338. [View at Publisher] [DOI] [PMID] [Google Scholar]
8. Imani-Goghary Z, Alavi-Arjas F, Balvardi M, Beigmoradi S. Effect of blended-learning in promoting clinical skills of nursing students. J Multidiscip Care. 2023;12(2):63-7. [View at Publisher] [DOI] [Google Scholar]
9. Alsadat Hosseini F, Momennasab M. Nursing student experiences of caring for burned patient: from fearfulness to normalization. Invest Educ Enferm. 2020;38(1):e90. [View at Publisher] [DOI] [PMID] [Google Scholar]
10. Abazari P, Namnabati M. Restrictive and Facilitating Factors of Nursing Students' Clinical Education Effectiveness. Iranian Journal of Medical Education. 2017;17:494-503. [View at Publisher] [Google Scholar]
11. Abdolmaleki M, Ashoorioun V, Momeni S, Zarezadeh Y, Rokhzadi M. The Influence of Study Guide on Clinical Education of Nursery Students. Iranian Journal of Medical Education. 2011;10(5):1289-95. [View at Publisher] [Google Scholar]
12. Panda S, Dash M, John J, Rath K, Debata A, Swain D, et al. Challenges faced by student nurses and midwives in clinical learning environment-A systematic review and meta-synthesis. Nurse Educ Today. 2021;101:104875. [View at Publisher] [DOI] [PMID] [Google Scholar]
13. Koukourikos K, Tsaloglidou A, Kourkouta L, Papathanasiou IV, Iliadis C, Fratzana A, et al. Simulation in Clinical Nursing Education. Acta Inform Med. 2021;29(1):15-20. [View at Publisher] [DOI] [PMID] [Google Scholar]
14. Karimi H, Kalati H, Amini S, Jamalzadeh N. Applying Blended Education Methods in Nursing Process Learning: An educational evaluation study. Iranian Journal of Medical Education. 2021;21:533-6. [View at Publisher] [Google Scholar]
15. Najafi H. Comparing of the effect of Blended and Traditional teaching on Learning. Res Med Edu. 2019;11(2):54-63. [View at Publisher] [DOI] [Google Scholar]
16. Leidl DM, Ritchie L, Moslemi N. Blended learning in undergraduate nursing education - A scoping review. Nurs Educ Today. 2020;86:104318. [View at Publisher] [DOI] [PMID] [Google Scholar]
17. Berga K-A, Vadnais E, Nelson J, Johnston S, Buro K, Hu R, et al. Blended learning versus face-to-face learning in an undergraduate nursing health assessment course: A quasi-experimental study. Nurse Education Today. 2021;96:104622. [View at Publisher] [DOI] [PMID] [Google Scholar]
18. Go CFM, Gonzales FRS, Gonzales MMT, Gonzales SAC, Gregorio AH, Guerra MAEG, et al. Nursing students' blended learning satisfaction, self-efficacy, and work readiness: A structural equation modeling study. Teach Learn Nurs. 2024;19(4):e638-45. [View at Publisher] [DOI] [Google Scholar]
19. Vo HM, Zhu C, Diep NA. The effect of blended learning on student performance at course-level in higher education: A meta-analysis. Studies in Educational Evaluation. 2017;53:17-28. [View at Publisher] [DOI] [Google Scholar]
20. Özdemir A, Yildiz Karadeniz E, Kaplan Serin E. Investigation of pre-discharge learning needs and affecting factors in individuals with burns. Journal of tissue viability. 2024;33(2):160-4. [View at Publisher] [DOI] [PMID] [Google Scholar]
21. Sawangsri B. Learning Package by Means of the Inductive Teaching with Group Process. Universal Journal of Educational Research. 2016;4(3):618-21. [View at Publisher] [DOI] [Google Scholar]
22. Mirmoghtadaie z, Haeri A. Comparative Study of Two Traditional and Microlearning Methods in Teaching Drug-Loaded Nanoliposomes to Pharmacy Students. Res Med Edu. 2024;16(1):46-55. [View at Publisher] [DOI] [Google Scholar]
23. Ghasemzadeh I, Aghamolaei T, Hosseini-Parandar F. Evaluation of medical students of teacher-based and student-based teaching methods in infectious diseases course.J Med Life. 2015;8(Spec Iss 3):113-7. [View at Publisher] [PMID] [Google Scholar]
24. Aghapour SA, Vakili MA, Karbasi M, Badeli R. Comparison the Effect of Student-Based Group Discussion and Lecture Methods Teaching on Midwifery Student's Learning Level. Educ Strategy Med Sci. 2015;8(5):281-6. [View at Publisher] [Google Scholar]
25. Marek MW, Chew CS, Wu WV. Teacher experiences in converting classes to distance learning in the COVID-19 pandemic. International Journal of Distance Education Technologies (IJDET). 2021;19(1):89-109. [View at Publisher] [DOI] [Google Scholar]
26. Nabolsi M, Abu-Moghli F, Khalaf I, Zumot A, Suliman W. Nursing faculty experience with online distance education during COVID-19 crisis: A qualitative study. J Prof Nurs. 2021;37(5):828-35. [View at Publisher] [DOI] [PMID] [Google Scholar]
27. Aghakhani N, Soheili A, Eghtedar S, Saraparnak F, Soltany B, khodaparast A, et al. The Effect of Supervision in Clinical Education on Nursing Students' Clinical Skills. Journal of Medical Education Development. 2017;10(26):1-9. [View at Publisher] [DOI] [Google Scholar]
28. Araghian Mojarad F, Shirmohammadi Y, Talebian F, Malekzadeh R, Yaghoubi T. Evaluation of challenges and benefits of preceptorship model in nursing clinical education: a review study. Journal of Medical Education Development. 2022;14(44):19-27. [View at Publisher] [Google Scholar]
29. Rodríguez-Ferrer JM, Manzano-León A, Fernández-Jiménez C, Aguilar-Parra JM, Cangas AJ, Luque de la Rosa A. The use of digital escape rooms in nursing education. BMC Med Educ. 2022;22(1):901. [View at Publisher] [DOI] [PMID] [Google Scholar]
30. Ziat A, Bertea P. Scale validity in exploratory stages of research. Management and Marketing - Craiova. 2013;XI(1):38-46. [View at Publisher] [Google Scholar]
31. Ziegler B, Fischer S, Pieper D, Mathes T, Kneser U, Hirche C. Evidence and Trends in Burn Wound Debridement: An Evidence Map. Plast Surg (Oakv). 2020;28(4):232-42. [View at Publisher] [DOI] [PMID] [Google Scholar]
32. Salehi SH, Momeni M, Vahdani M, Moradi M. Clinical Value of Debriding Enzymes as an Adjunct to Standard Early Surgical Excision in Human Burns: A Systematic Review. J Burn Care Res. 2020;41(6):1224-30. [View at Publisher] [DOI] [PMID] [Google Scholar]
33. Sharaf A, Muthayya P. Microbial profile of burn wounds managed with enzymatic debridement using bromelain-based agent, NexoBrid®. Burns. 2022;48(7):1618-25. [View at Publisher] [DOI] [PMID] [Google Scholar]
34. Thomas DC, Tsu CL, Nain RA, Arsat N, Fun SS, Sahid Nik Lah NA. The role of debridement in wound bed preparation in chronic wound: A narrative review. Ann Med Surg (Lond). 2021;71:102876. [View at Publisher] [DOI] [PMID] [Google Scholar]
35. Aisa J, Parlier M. Local wound management: A review of modern techniques and products. Vet Dermatol. 2022;33(5):463-78. [View at Publisher] [DOI] [PMID] [Google Scholar]
36. Greenhalgh DG. Basic techniques for optimizing burn wound healing: insights from clinical practice. Plast Aesthet Res. 2024;11:27. [View at Publisher] [Google Scholar]
37. Pasquale T, Maruccia M. Ulcer Debridement. In: Maruccia M, Papa G, Ricci E, Giudice G, editors. Pearls and Pitfalls in Skin Ulcer Management. Cham: Springer International Publishing; 2023. p.63-74. [View at Publisher] [DOI] [Google Scholar]
38. Unal E, Ozdemir A. The effect of hybrid simulated burn care training on nursing students' knowledge, skills, and empathy: A randomised controlled trial. Nurse Educ Today. 2023;126:105828. [View at Publisher] [DOI] [PMID] [Google Scholar]
39. Mohammed R, Hassan M, Mohammed IR. Effect of an Educational Nursing Program on Nurses' Performance Regarding Burn Injury Management. International Journal of Novel Research in Healthcare and Nursing. 2021;8(2):50-63. [View at Publisher] [Google Scholar]
40. Omran F, Bagheri T, mousavi sj, Akbari J, Araghi S. The Effectiveness of Hand Dressing Education through Group and Video Training on Nurses' Knowledge and Performance in Hazrat Fatima hospital in 2012. Journal of Nursing Education. 2017;6(2):26-32. [View at Publisher] [DOI] [Google Scholar]
41. Olszewski A, Yanes A, Stafford J, Greenhalgh DG, Palmieri TL, Sen S, et al. Development and Implementation of an Innovative Burn Nursing Handbook for Quality Improvement. J Burn Care Res. 2016;37(1):20-4. [View at Publisher] [DOI] [PMID] [Google Scholar]
42. Van Nuland SE, Roach VA, Wilson TD, Belliveau DJ. Head to head: The role of academic competition in undergraduate anatomical education. Anat Sci Educ. 2015;8(5):404-12. [View at Publisher] [DOI] [PMID] [Google Scholar]

43. Forbes H, Oprescu FI, Downer T, Phillips NM, McTier L, Lord B, et al. Use of videos to support teaching and learning of clinical skills in nursing education: A review. Nurse Educ Today. 2016;42:53-6. [View at Publisher] [DOI] [PMID] [Google Scholar]
44. Ghezelghash A, Atashzadeh Shourideh F, Alavi MH, yaghmaei F. Comparing methods of lecturing, problem solving and self-learning via internet to learn proper interpretation of electrocardiogram among nursing student. Iran J Nurs Res. 2008;3(10-11):7-14. [View at Publisher] [Google Scholar]
45. Lam NN, Huong HTX, Tuan CA. Preparation for major burns incidents: evaluation of continuing medical education training courses for professionals. Ann Burns Fire Disasters. 2018;31(4):322-8. [View at Publisher] [PMID] [Google Scholar]
46. Meschial WC, Ciccheto JRM, Lima MFd, Menegaz JdC, Echevarría-Guanilo ME, Oliveira MLF. Active teaching strategies improve nursing knowledge and skills to assist burn victims. Rev Bras Enferm. 2021;74(Suppl 5):e20200235. [View at Publisher] [DOI] [PMID] [Google Scholar]

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