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RESEARCH

IMPACT OF DEBRIEFING ON STUDENTS' SEPSIS-RELATED CLINICAL COMPETENCIES: A QUASI-EXPERIMENTAL STUDY

IMPACTO DO DEBRIEFING NO DESENVOLVIMENTO DE COMPETÊNCIAS CLÍNICAS EM SEPSE ENTRE ESTUDANTES: A QUASI-EXPERIMENTAL STUDY

IMPACTO DO DEBRIEFING NO DESENVOLVIMENTO DE COMPETÊNCIAS CLÍNICAS EM SEPSE ENTRE ESTUDANTES: ESTUDO CUASE-EXPERIMENTAL

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ABSTRACT

Objective: to evaluate the impact of debriefing on nursing students' knowledge and skills in managing sepsis patients through clinical simulation scenarios. **Method**: this is a quasi-experimental, before-and-after study conducted with 20 nursing students from a public university. Data were collected using a sociodemographic questionnaire, a validated pre- and post-test assessing students' sepsis-related knowledge, and a practical skills checklist. Descriptive statistics were used for qualitative variables, while the mean and standard deviation were calculated for participants' age. Pre- and post-intervention scores were compared using the Wilcoxon test, while effect size was calculated using Rosenthal's r. Changes in overall classification on the practical skills checklist were assessed using McNemar's test, appropriate for paired categorical variables, while internal consistency was assessed using Cronbach's alpha (with the significance level set at 5%). **Results:** students' post-test knowledge was significantly higher ($p<0.05$) than in the pre-test, and the same pattern was observed for the skills assessed before and after debriefing. The mean pre-test score was 2.50(±1.23), and 5.95(±1.14) ($p<0.001$) in the post-test. The mean total score on the simulation checklist before debriefing was 11.45(±3.85), and, after debriefing, 14.80(±1.79) ($p=0.002$). **Conclusion:** the results confirm the intervention's effectiveness in enhancing both knowledge and skills in sepsis management.

Keywords: Simulation Training; Education. Nursing; Teaching Method; Students, Nursing; Clinical Competence; Sepsis.

RESUMO

Objetivo*: avaliar o impacto do debriefing associado ao cenário de simulação clínica no conhecimento e nas habilidades de estudantes de enfermagem no manejo do paciente com sepse.* ***Método:*** *estudo quase-experimental, do tipo antes e depois, realizado com 20 estudantes de enfermagem de uma universidade pública. Os dados foram coletados por meio de questionário sociodemográfico, pré e pós-teste validado sobre sepse, e checklist de habilidades. Para as variáveis qualitativas, utilizou-se estatística descritiva; para a idade, foram calculadas média e desvio padrão. A comparação dos escores pré e pós-intervenção foi realizada pelo teste de Wilcoxon, com cálculo do efeito pela estatística r de Rosenthal. A mudança na classificação global no checklist de habilidades foi avaliada pelo teste de McNemar, adequado para variáveis categóricas pareadas, e a consistência interna foi mensurada pelo alfa de Cronbach (significância de 5%).* ***Resultados:*** *o conhecimento dos estudantes no pós-teste foi significativamente maior ($p<0,05$) do que no pré-teste, assim como as habilidades avaliadas antes e após o debriefing. A média das notas no pré-teste foi 2,50(±1,23) e, no pós-teste, 5,95(±1,14) ($p<0,001$). A média do somatório do checklist da simulação antes do debriefing foi 11,45(±3,85) e, após o debriefing, 14,80(±1,79) ($p=0,002$).* ***Conclusão:*** *os resultados demonstram a eficácia da intervenção, que promoveu significativa ampliação do conhecimento e das habilidades no manejo da sepse.*

Palavras-chave: *Treinamento por Simulação; Educação em Enfermagem; Ensino; Estudantes de Enfermagem; Competência Clínica; Sepse.*

RESUMEN

Objetivo*: evaluar el impacto del debriefing asociado al escenario de simulación clínica en el conocimiento y las habilidades de estudiantes de enfermería en el manejo del paciente con sepsis.* ***Método:*** *estudio cuasi-experimental, del tipo antes y después, realizado con 20 estudiantes de enfermería de una universidad pública. Los datos fueron recopilados mediante un cuestionario sociodemográfico, un pre y post-test validado sobre sepsis y una lista de verificación de habilidades. Se realizó estadística descriptiva para las variables cualitativas y la media y desviación estándar para la edad. La comparación de los puntajes pre y post-intervención utilizó la prueba de Wilcoxon, con efecto calculado mediante la estadística r de Rosenthal. El cambio en la clasificación global en la lista de verificación de habilidades fue evaluado mediante la prueba de McNemar, adecuada para variables categóricas emparejadas, y la consistencia interna se midió mediante el alfa de Cronbach (significancia del 5%).* ***Resultados:*** *el conocimiento de los estudiantes en el post-test fue significativamente ($p<0,05$) mayor que en el pre-test, al igual que en relación con las habilidades antes y después del debriefing. La media de notas en el pre-test fue 2,50(±1,23) y, en el post-test, fue 5,95(±1,14) ($p<0,001$). La media del sumatorio de la lista de verificación de la simulación antes del debriefing fue 11,45(±3,85) y, después del debriefing, fue 14,80(±1,79) ($p=0,002$).* ***Conclusión:*** *los resultados demuestran la eficacia de la intervención, que promovió una significativa ampliación del conocimiento y habilidades en el manejo de la sepsis.*

Palabras clave: *Entrenamiento Simulado; Educación em Enfermería; Enseñanza; Estudiantes de Enfermería; Competencia Clinica; Sepsis.*

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INTRODUCTION

Sepsis remains a major global public-health threat, imposing significant demands on healthcare systems and clinical staff[1]. It is currently described as a clinical syndrome that leads to life-threatening organ failure driven by a dysregulated host response to infection[1,2].

Globally, this syndrome affects an estimated 47 to 50 million people annually and is characterized by high lethality. Each year, sepsis is responsible for nearly 11 million deaths, accounting for 19.7% of all cases[3]. In developing countries, where limited resources impede early detection, this lethality can double, reaching 40–50% in reported cases[4,5].

Despite its high lethality, sepsis remains a treatable clinical syndrome, and timely, targeted interventions can significantly improve patient outcomes. Consequently, the literature encourages establishing programs to strengthen prevention, support early diagnosis, and promote proper sepsis management[3,4].

Numerous variables may contribute to high sepsis mortality, including healthcare professionals' unpreparedness to promptly and accurately identify sepsis or septic shock cases, resulting in treatment delays and potentially irreversible damage[6].

In this context, national and international studies have revealed gaps in knowledge regarding sepsis recognition, progression, and management among nursing students and nurses[6-9]. The literature highlights that effective training in clinical sepsis management must focus on early detection, fluid resuscitation strategies, and timely antibiotic administration to reduce mortality[10,11]. In this context, active teaching methods can play a crucial role in helping nursing staff recognize the distinct stages of sepsis progression, ultimately leading to significant improvements in patient outcomes[9-12].

Regarding active methodologies, clinical simulation proves to be highly effective, offering a safe and controlled environment where students can develop the skills necessary to care for real sepsis patients in the future[9,12,13]. The simulation's pedagogical structure, also referred to as simulation design, follows three stages: pre-briefing/briefing, in-simulation, and debriefing[14-17]. During the pre-briefing/briefing phase, participants are provided with guidance on the environment, equipment, and simulators, as well as information on learning objectives, rules, and case limitations. The pre-briefing stage mentally prepares students for the experience, while briefing clarifies the simulation's core rules[17].

The in-simulation stage involves carrying out the proposed scenario using resources varying in realism, such as actors, mannequins, or simulators[14-16]. In turn, during the debriefing stage, participants reflect on their experiences and discuss the simulation's theoretical and practical applications, fostering critical thinking, constructive feedback, and learning consolidation, key elements for developing clinical skills and guiding decision-making[14-16].

The debriefing stage is essential in simulation-based learning, as it promotes knowledge consolidation, in addition to refining skills that must be developed. This final stage, therefore, promotes cognitive reframing, that is, the ability to view a situation from a new perspective, leading to enhanced clinical competencies and skill development[16].

In this context, a study[18] evaluated 120 nursing students' clinical performance in learning scenarios with and without debriefing. Results showed that debriefing was highly effective ($p < 0.001$) in improving students' performance in clinical exams[18]. Additionally, another study highlighted that debriefing enhances skills, builds self-confidence, and strengthens teamwork, showing a positive impact[19].

Although debriefing is crucial for fostering a safe learning environment and enhancing clinical competencies, literature still lacks evidence on its impact on learning outcomes in simulation-based settings[9,13,19]. Further robust studies are needed to investigate this aspect, particularly within sepsis contexts.

Therefore, considering sepsis as a critical public health issue and debriefing as a valuable simulation tool for developing sepsis-related clinical competencies, this study is crucial for evaluating its impact on nursing students' knowledge and skills when managing sepsis patients through clinical simulation scenarios.

METHOD

This is a quasi-experimental, before-and-after study using a single-group interrupted time series design[20]. Quasi-experimental studies, also known in medical literature as non-randomized controlled trials, apply an intervention to a single group. There are several quasi-experimental designs, including the single-group interrupted time series employed in this study. This design involves conducting repeated measurements on the same group before and after the intervention[20].

The study was conducted between October and November 2023 at a public higher education institution in the Southeast region of Brazil. The institution provides

multiple undergraduate health programs, including Nursing, structured over five years or ten semesters, admitting up to 40 students per semester.

The study population included undergraduate nursing students enrolled in the elective course "Advanced Health Practices and Interventions" (n = 34), from semesters 4 to 10 (2nd to 5th year). Students who participated only partially in the study, i.e., did not complete all stages, were excluded. The inclusion criterion, which encompassed students from semesters 4 and 5, was based on the nursing undergraduate curriculum, as these students had completed basic cycle courses but had not yet taken Adult and Elderly Nursing Care II, where the relevant content is introduced. It is important to note that students who missed any stage had access to the same content and learning opportunities; however, their data were excluded from the analysis.

Participant recruitment was facilitated by the Nursing program coordination, which sent eligible students details about the elective course and its syllabus via email. The sample included all students enrolled in the referred course. Therefore, participants were selected intentionally, using a non-random approach.

After enrollment, the program coordination was requested to provide the names and emails of students interested in participating, so that the schedule and study details could be shared with them. After each participant confirmed their attendance, an in-person meeting was held to explain the course objectives and the applied methodology. All students received information on the study's objectives and were invited to participate upon signing the Free and Informed Consent form.

For data collection, researchers used a sociodemographic questionnaire, a theoretical knowledge test[21], and a skills assessment checklist[22].

The sociodemographic questionnaire included questions about gender, age, semester in the undergraduate program, and prior knowledge on sepsis. The validated theoretical knowledge test[21] consisted of 10 multiple-choice questions covering sepsis identification, treatment, and management.

The checklist[22] for assessing skills in simulated clinical scenarios contained 18 items, distributed across five scales: anamnesis, physical examination, and personal protective equipment (six items); suspected sepsis, identifying Systemic Inflammatory Response Syndrome signs and associated organ dysfunction (five items); initial sepsis protocol management (five items); and reassessment of initial measures (two items). Each item was scored based on student performance, with three possible ratings: inadequate (0 points), partially adequate (0.5 points), and adequate (1 point). To achieve a minimum average of 70%, students needed to score at least 12.5 from 18 points[21].

The study was conducted in five stages (Figure 1): 1) Pre-debriefing knowledge assessment; 2) Pre-debriefing skills training in a simulated scenario; 3) Structured debriefing session; 4) Post-debriefing knowledge assessment; and 5) Post-debriefing skills training in a simulated scenario.

In the first stage, students had 30 minutes to complete the sociodemographic questionnaire and the theoretical knowledge test[21] on sepsis (pre-test) in a private setting. Afterwards, they attended a theory-practice session led by a specialist nurse, covering sepsis identification, treatment, and management in adults. The class was based on international protocols and guidelines[2,11].

In the second stage, students participated in a sepsis-related clinical simulation using a validated scenario[22] in an emergency unit, organized by the lead author and conducted by a trained research team. The simulation was divided into three phases: pre-briefing/briefing, during which students received guidance; in-simulation, where two tutors evaluated students using an adapted checklist; and a one-minute individual feedback session, where students' strengths and areas for improvement were discussed based on the checklist[22].

In the third stage, debriefing was conducted using questions designed to encourage student reflection, organized into five steps. In the fourth stage, students completed a 30-minute post-test on sepsis-related theoretical knowledge in a private setting, using the same test applied in stage 1. In the fifth stage, students participated once more in the validated and adapted clinical simulation scenario from stage 2, with their skills evaluated by tutors using the checklist[22]. This stage aimed to assess students' skills in managing sepsis within a clinical simulation scenario, following the debriefing intervention.

The data were tabulated in Microsoft Excel® and transferred to Stata® v. 18, where statistical analyses were conducted. Absolute and relative frequencies were calculated for the qualitative variables characterizing the students' profiles. For the age variable, a quantitative measure, the mean and standard deviation were calculated.

To compare scores from the theoretical knowledge test and the clinical simulation checklist assessment before and after the intervention, the Wilcoxon test was applied, as it is appropriate for non-parametric distributions and paired samples. The effect size was calculated

using Rosenthal's r statistic, interpreted according to Cohen's criteria (small: 0.1; medium: 0.3; large: ≥ 0.5).

The McNemar test was used to examine changes in participants' overall classification on the skills checklist, as it is appropriate for paired categorical data.

The clinical simulation assessment checklist's internal consistency was determined using Cronbach's alpha coefficient, with a value ≥ 0.7 indicating satisfactory reliability for the instrument. A 5% significance level ($p < 0.05$) was adopted.

The study adhered to the principles outlined in Resolution No. 466/2012 of the *Conselho Nacional de Saúde (BR)*, which regulates guidelines for research involving human participants, utilized a Free and Informed Consent Form, and was approved by the Research Ethics Committee of the *Universidade Federal de Juiz de Fora*.

RESULTS

From a total of 34 eligible students, five withdrew from the course, nine did not participate in one or more stages, and 20 completed the intervention protocol. Among the participants, 14 were female (70%), and 12 were enrolled in the undergraduate program's seventh or eighth semester (60%). The mean age was 22.25 years (±1.68). When asked about prior knowledge of any sepsis protocol, all participants reported no familiarity with it; however, all had previous experience with clinical simulation.

In the theoretical knowledge test(21) on sepsis identification, treatment, and management, the pre-test showed higher correct answer percentages for items 1 and 8, while items 7 and 10 had the lowest percentages.

An increase in the correct answer percentage was observed for all test items in the post-test. Notably, the items with the highest success rates in the pre-test also showed the highest rates in the post-test, albeit with an increase in percentages, as shown in Table 1.

The mean total score increased from 2.50 (±1.23) on the pre-test to 5.95 (±1.14) on the post-test, a statistically

Figure 1 - Operational process employed in the study stages. Juiz de Fora, MG, Brazil, 2023.

Stage	Title	Description	Data Collection Instrument	Period
1	Pre-debriefing knowledge assessment	- Pre-test[21] (30 minutes) - Theoretical class (2 hours) - Practical class (2 hours)	Sepsis knowledge assessment[21]	Day 1
2	Pre-debriefing skills training in a simulated scenario	- Pre-briefing (5 minutes) - In-simulation: participant reads the case (1 minute) and engages in the validated and adapted clinical simulation scenario[22] (10 minutes) - Skills assessment using a checklist[22] - Individual feedback (1 minute)	Adapted skills assessment checklist[22]	Day 2
3	Structured debriefing session	- "Reflection session" (30 minutes). The following questions were addressed in this stage[22]: Emotional stage: How did you feel while caring for this patient? Descriptive stage: Could you describe the clinical picture encountered? Evaluative stage: What positive actions did you take? Analytical stage: What would you do differently if given another opportunity? Conclusive stage: What key learning aspect will you take into your clinical practice from this experience?		Day 2
4	Post-debriefing knowledge assessment	- Post-test[21] (30 minutes)	Sepsis knowledge assessment[21]	20 days after the intervention
5	Post-debriefing skills training in a simulated scenario	- Pre-briefing (5 minutes) - In-simulation: participant reads the case (1 minute) and engages in the validated and adapted clinical simulation scenario[22] (10 minutes) - Skills assessment using a checklist[21]	Adapted skills assessment checklist[22]	20 days after the intervention

significant difference (p<0.001, Wilcoxon test). The effect size was r = 0.81, indicating a strong intervention impact.

Regarding the assessment checklist used in the clinical simulation scenario before and after debriefing, it was observed that, initially, every item had at least one inadequate response. Notably, item 5 received no correct responses at this stage. In the post-debriefing assessment, items 3, 4, 9, and 10 were rated as fully adequate, as shown in Table 2.

The mean total score on the clinical simulation assessment checklist increased from 11.45 (±3.85) in the pre--debriefing period to 14.80 (±1.79) in the post-debriefing period. This difference is statistically significant (p=0.002), indicating a strong effect. Accordingly, score distribution was higher in the post-debriefing period.

In the present study, Cronbach's alpha for the clinical simulation assessment checklist was 0.889, indicating high internal consistency.

DISCUSSION

The present study, most participants were young women with no prior experience in sepsis management protocols. These findings are consistent with results from other studies that used simulation to teach sepsis management to undergraduate nursing students[12,23]. In another quasi-experimental study[24] that also employed clinical simulation for teaching sepsis management, participants had a mean age of 19.18 (±1.27) years, 84.5% were female, and demonstrated limited sepsis-related knowledge.

Table 1 - Distribution of students' correct answers per item in the pre-test and post-test periods. Juiz de Fora, MG, Brazil, 2023. (n=20).

Item	Pre--test(%)	Post--test(%)
1. Definition of sepsis	50,0	85,0
2. Organ dysfunctions in sepsis	25,0	70,0
3. qSOFA* components	35,0	65,0
4. Initial fluid resuscitation	10,0	75,0
5. Indication for vasopressors	15,0	45,0
6. Time to initiate antimicrobial therapy	35,0	95,0
7. Colloid contraindication	5,0	20,0
8. Blood culture collection	60,0	95,0
9. Bicarbonate administration in lactic acidosis	15,0	35,0
10. Perfusion markers during fluid resuscitation	0,0	10,0

* qSOFA = quick Sequential Organ Failure Assessment

Studies[25,26] have identified a significant gap in sepsis education for Nursing students, including both recognition and response to the condition. This gap may hinder professionals from recognizing changes in basic physiological parameters, which are crucial for applying triage tools, guidelines, and clinical protocols. Furthermore, a study[27] has shown that healthcare services expect newly graduated nurses to have sufficient knowledge and skills to manage patients with severe conditions, such as sepsis. Therefore, investment in Nursing education is essential to strengthen prevention, recognition, and management in sepsis care[25-27].

A study[28] conducted in China with 157 Nursing students revealed that using clinical simulation as a teaching strategy outperforms traditional methods, enhancing students' skills and clinical judgment. Furthermore, simulation enables participants to link theoretical knowledge with the practical skills required to solve clinical problems.

In this study, it was noted that students' overall theoretical knowledge on sepsis identification, treatment, and management improved significantly. These results are consistent with another study assessing the knowledge of 30 nurses using the same instrument as in the present research, which showed favorable outcomes. It was also noted that items 08 and 06, related to blood culture collection and the recommended timing for initiating antimicrobial administration, achieved the highest success rates (90% and 50%, respectively[21]. Thus, these data reinforce the present study's findings, in which the same items also showed the highest accuracy rates.

Regarding performance in the simulated scenario, assessed pre- and post-debriefing, students in this investigation demonstrated significant gains in clinical skills and overall performance, as measured with the checklist. These results underscore the importance of simulation-based education, with a particular emphasis on the debriefing phase.

Studies[13,16] indicate that debriefing is, in fact, the most relevant stage in a Nursing clinical simulation, and it is regarded as essential for reflective learning. During this phase participants examine their experience, discuss events, and learn from both errors and correct decisions so they can apply these insights effectively in their future practice[31]. Thus, debriefing functions as the moment when practice meets theory and, through a metacognitive process, learning becomes firmly grounded[29].

Table 2 - Distribution of students' responses, per item, on the clinical simulation evaluation checklist in the pre- and post-debriefing periods. Juiz de Fora, MG, Brazil, 2023. (n=20)..

Item	Pré-debriefing			Pós-debriefing		
	I† n* (%)	PA‡ n* (%)	A§ n* (%)	I† n* (%)	PA‡ n* (%)	A§ n* (%)
1. Provides proper identification to the patient and family member	5 (25,0)	1 (5,0)	14 (70,0)	3 (15,0)	0	17 (85,0)
2. Conducts specific anamnesis	1 (5,0)	0	19 (95,0)	0	2 (10,0)	18 (90,0)
3. Consults the triage form for information	1 (5,0)	0	19 (95,0)	0	0	20 (100,0)
4. Recognizes alterations in vital signs	1 (5,0)	0	19 (95,0)	0	0	20 (100,0)
5. Performs proper hand hygiene and puts on PPE correctly	20 (100,0)	0	0	3 (15,0)	13 (65,0)	4 (20,0)
6. Conducts a specific abdominal physical examination and identifies other abnormal systemic findings	4 (20,0)	12 (60,0)	4 (20,0)	0	8 (40,0)	12 (60,0)
7. Identifies and relates tachycardia, tachypnea, and hyperthermia to SIRS|| manifestation	3 (15,0)	7 (35,0)	10 (50,0)	6 (30,0)	7 (35,0)	7 (35,0)
8. Identifies and correlates signs of altered consciousness, hypotension, and oliguria with organ dysfunction	3 (15,0)	11 (55,0)	6 (30,0)	2 (10,0)	9 (45,0)	9 (45,0)
9. Raises sepsis suspicion	2 (10,0)	0	18 (90,0)	0	0	20 (100,0)
10. Initiates the sepsis protocol	7 (35,0)	0	13 (65,0)	0	0	20 (100,0)
11. Notifies the medical team	5 (25,0)	1 (5,0)	14 (70,0)	1 (5,0)	0	19 (95,0)
12. Announces blood test and culture collection.	4 (20,0)	0	16 (80,0)	1 (5,0)	1 (5,0)	18 (90,0)
13. Explains the need for Serum Lactate and two-site blood culture collection, as well as their relation to sepsis	4 (20,0)	10 (50,0)	6 (30,0)	1 (5,0)	7 (35,0)	12 (60,0)
14. Announces antibiotic administration immediately after culture collection	8 (40,0)	1 (5,0)	11 (55,0)	4 (20,0)	5 (25,0)	11 (55,0)
15. Indicates the one-hour limit for initiating antibiotic administration	8 (40,0)	0	12 (60,0)	2 (10,0)	0	18 (90,0)
16. Initiates fluid resuscitation and announces the respective volume as defined by the protocol	7 (35,0)	7 (35,0)	6 (30,0)	0	5 (25,0)	15 (75,0)
17. Assesses the response to fluid resuscitation and perfusion	2 (10,0)	7 (35,0)	11 (55,0)	1 (5,0)	13 (65,0)	6 (30,0)
18. Assesses the need for qSOFA¶ monitoring	17 (85,0)	1 (5,0)	2 (10,0)	2 (10,0)	6 (30,0)	12 (60,0)

*n = Number of participants; †I = Inadequate; ‡PA = Partially Adequate; §A = Adequate; ||SIRS = Systemic Inflammatory Response Syndrome; ¶qSOFA = quick Sequential Organ Failure Assessment

Table 3 – Total scores obtained on the clinical simulation assessment checklist in the pre- and post-debriefing periods. Juiz de Fora, MG, Brazil, 2023. (n=20).

Score distribution on the checklist					
Period	Mean (CI 95%*)	±SD†	Minimum/Maximum	P-value‡	ES§
Pre-debriefing	11,45 (9,64; 13,25)	3,85	0/ 16,5	0,002	0,74
Post-debriefing	14,80 (13,96; 15,63)	1,79	11,6/ 17,5		

*CI 95% = Confidence Interval; †SD = Standard Deviation; ‡Wilcoxon test for paired samples; § ES = Effect Size

Table 4 – Overall assessment on the clinical skills checklist in the pre- and post-debriefing periods. Juiz de Fora, MG, Brazil, 2023. (n=20).

Period	Avaliação global						VP-value §
	Inadequate*		Minimally Adequate†		Adequate‡		
	n||	%	n||	%	n||	%	
Pré-debriefing	2	10,0	8	40,0	10	50,0	0,048
Pós-debriefing	0	0	3	15,0	17	85,0	

*Inadequate= <50% success rate; †Minimally adequate = 50–70% success rate; ‡ Adequate = >70% success rate; §P-value=McNemar test for paired proportion data; ||n= number of participants

In this regard, a study[30] conducted at a university hospital in Jordan reported a significant improvement in nurses' sepsis management and decision-making following the debriefing stage in a clinical simulation training program. Another study[18] recruited 120 Nursing undergraduates to evaluate clinical performance in simulation-based learning scenarios delivered with and without debriefing. The findings indicated that debriefing was effective, resulting in a significant improvement in the experimental group's performance compared to the control group ($p < 0.001$)[18].

The findings from the present study contribute to advancing simulation-based Nursing education in higher education, demonstrating that debriefing improves knowledge and skill acquisition required to develop clinical competencies. In addition, the results underscore the value of simulation-based strategies, demonstrating their strong potential to enhance learning and improve students' performance. However, there is still a clear shortage in quasi-experimental or experimental studies that employ clinical simulation to teach sepsis, even with numerous debriefing models and methods available. This study therefore emphasizes the need for future investigations to expand our understanding of how debriefing enhances the learning process and equips nurses to better detect and manage this condition.

Among the limitations of this study, the failure to administer a theoretical knowledge test immediately after the simulation and before debriefing stands out. This prevents measuring the impact from the simulated scenario in isolation, without debriefing influence. Additionally, the small number of participants restricts the ability to generalize findings, limiting their relevance to similar contexts.

Despite these limitations, this study makes valuable contributions to nursing by highlighting how the combination of debriefing and clinical simulation can serve as an effective teaching strategy for sepsis management. The results highlight the need to integrate active methodologies into undergraduate nursing curricula, focusing on building essential clinical skills for professional practice. The study also points to the need for further research on clinical simulation and debriefing in diverse educational settings, thereby supporting the establishment of evidence-based training practices in Nursing education.

CONCLUSION

The study allowed evaluating nursing students' knowledge and skills in sepsis management through a simulated clinical scenario, conducted both before and after debriefing. Regarding knowledge, students demonstrated significant improvement in their understanding of sepsis identification, treatment, and management. Regarding the competencies assessed before and after the debriefing stage, a notable improvement was observed in students' clinical skills and overall performance, as measured by the checklist.

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