

Teaching strategies for learning about sepsis

Estratégias de ensino para a aprendizagem sobre sepse

Estrategias de enseñanza para aprender sobre sepsis

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Abstract: Objective: to verify the effectiveness of the articulation of traditional and active teaching methods to develop nursing students' knowledge about sepsis. **Method:** quasi-experimental, cross-sectional, before-after study conducted with 27 nursing students through a sepsis workshop. Five teaching strategies were applied: expository lecture, sepsis parody, team debate, memory game and case study, followed by cognitive testing. After 3 months, there was a new application of the cognitive test. **Results:** there was an increase in the average of right answers in the immediate post-test with statistical significance ($p < 0.001$). Three months later, the average of correct answers was close to the previous test, but there was no significant relevance ($p > 0.05$) for knowledge retention. **Conclusion:** the articulation of traditional and active learning methods lead to the development of knowledge about sepsis. **Descriptors:** Education, nursing; Knowledge; Sepsis; Active methodologies; Teaching and learning strategies

Resumo: Objetivo: verificar a efetividade da articulação de métodos tradicionais e ativos de ensino para desenvolver conhecimento de estudantes de enfermagem sobre sepse. **Método:** estudo quase experimental, transversal, do tipo antes e depois, realizado com 27 estudantes de enfermagem por meio de um *workshop* sobre sepse. Houve aplicação de 5 estratégias de ensino: palestra expositiva, paródia sobre sepse, debate entre equipes, jogo da memória e estudo de caso, seguidas de teste cognitivo. Após 3 meses, ocorreu nova aplicação do teste cognitivo. **Resultados:** constatou-se aumento da média de acertos no pós-teste imediato com significância estatística ($p < 0,001$). Três meses após, a média de acertos foi próxima ao teste anteriormente realizado, porém, não houve relevância significativa ($p > 0,05$) para retenção do conhecimento. **Conclusão:** a articulação de métodos tradicionais e ativos de aprendizagem provocam desenvolvimento de conhecimento sobre a sepse.

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Descritores: Educação em enfermagem; Conhecimento; Sepsis; Metodologias ativas; Estratégias de ensino e aprendizagem

Resumen: Objetivo: verificar la efectividad de la articulación de métodos de enseñanza tradicionales y activos para desarrollar el conocimiento de los estudiantes de enfermería sobre la sepsis. **Método:** estudio cuasi-experimental, transversal, antes y después realizado con 27 estudiantes de enfermería a través de un taller de sepsis. Se aplicaron cinco estrategias de enseñanza: conferencia expositiva, parodia de sepsis, debate en equipo, juego de memoria y estudio de caso, seguido de pruebas cognitivas. Después de 3 meses, hubo una nueva aplicación de la prueba. **Resultados:** hubo un aumento en el promedio de respuestas correctas en la prueba posterior inmediata con significancia estadística ($p < 0.001$). Tres meses después, el promedio de respuestas correctas estuvo cerca de la prueba anterior, pero no hubo relevancia significativa ($p > 0.05$) para la retención del conocimiento. **Conclusión:** la articulación de los métodos tradicionales y activos de aprendizaje conduce al desarrollo del conocimiento sobre la sepsis.

Descritores: Educación en enfermería; Conocimiento; Sepsis; Metodologías ativas; Estrategias de enseñanza y aprendizaje

Introduction

Health education is still, in most cases, based on a teacher-centered fragmented model of knowledge, disregarding the needs practical learning and often founded in traditional methods of health teaching and learning.¹

The preference for exclusively traditional mechanisms to promote health learning, such as lectures, often adopted as an educational mode, can make it little attractive, inefficient and stressful for students, which negatively affects clinical practice by hindering the understanding of the relationship between the learned theory and desired experiences.²

In this way, a variety of additions, changes and new trends related to the health teaching and learning process, point directly to the need of adopting innovative strategies capable of motivating students, improving their learning outcomes.³

Aiming to promote the development and retention of knowledge, specifically in the nursing context and in contrast to the traditional method in which the student passively receives the evidenced learning, usually as lectures, the use of active teaching methodology proposes the reverse movement, understanding the subject as an agent capable of acquiring an

active role in their learning, since they have their experiences, knowledge and opinions valued as a starting point for the construction of knowledge.⁴⁻⁵

Active teaching strategies, such as the elaboration of parodies on the proposed themes, debate between groups for reflection, memory game and case study, promote and enhance the critical thinking skills of the nursing student, removing him/her from the passive and exclusive listening of contents.⁴ In this way, it is important to articulate traditional and active teaching and learning strategies in nursing, aiming at developing knowledge, mainly, concerning the need for teaching of more complex themes, such as the nursing care to septic patients.⁶⁻⁷

In the last 30 years, the worldwide incidence of sepsis increased approximately 13.7% by year, estimating, every year, more than 18 million people affected by the syndrome and more than 5 million evolving to death.⁶⁻⁷ Estimates indicate the existence of approximately 600 thousand new cases of sepsis every year in Brazil, causing a direct impact on the indicators of morbidity and mortality in the country, representing 16.5% of death certificates issued.⁸

When a patient starts a framework of sepsis, defined by a set of severe manifestations throughout the body, such as hyperthermia, anorexia, myalgia, tachypnea, tachycardia, hypotension, oliguria, irritability and lethargy, produced by an infection, one of the biggest challenges for nursing is the low knowledge about the disease and the difficulty to early identify the signs and symptoms.⁹ The adoption of active teaching educational strategies for learning of sepsis, using innovative and attractive pedagogical mechanisms, can promote the development of knowledge about this issue and provide early identification of signs and symptoms and the differentiation of developmental stages by nursing, improving patients' prognosis.¹⁰⁻¹¹

However, in the nursing educational panorama, there is still a challenge to promote effective and motivating teaching and learning processes for developing students' cognitive abilities in sepsis, and lack of scientific studies addressing the articulation of traditional and active teaching strategies for this purpose, which makes the deepening of this issue relevant.¹¹

The teaching about the sepsis should be considered in the educational perspective of nursing students, promoting the articulation of varied teaching strategies that allow for the reflection and development of this knowledge.⁸ Therefore, the following question arises: is the articulation of traditional and active strategies of teaching of sepsis capable of improving the development of nursing students' knowledge? The objective of this study was to assess the effectiveness of the articulation of traditional and active teaching methods to develop nursing students' knowledge on sepsis.

Method

Quasi-experimental, cross-sectional, before-after study, performed at a university in the countryside of Minas Gerais, specifically at a nursing undergraduate course.

Thirty vacancies were offered to perform a workshop about sepsis, focused on nursing students. This number of vacancies was justified to meet the demand of undergraduate students of the period specified for this research. In this way, there were 27 participants, characterizing a convenience sample.

The inclusion criteria were: nursing students from the 4th semester of the undergraduate course, aged 18 years or more and who attended all phases of the proposed workshop. This graduation phase was determined because they already have knowledge about the functioning of the human body and the health-disease process and had no previous contact with critical patients.

The clinical experience in infirmaries, emergency care units and critical units, updating courses on the theme or other health professional training were characterized as exclusion criteria.

Data collection was performed by means of a workshop called: Sepsis: the golden hours, from August to December 2017. The main intent was to evaluate the development of knowledge

on sepsis of nursing students, before and after implementing traditional and active teaching strategies, immediately after the intervention and after three months.

To this end, a cognitive pre and post-test assessment instrument was used, developed by the researchers of this study and validated in relation to layout and content by a committee of five judges, experts on the subject and doctors in the area, selected by the Lattes curriculum platform.

The assessment criteria of the judges corresponded to a numerical gradation from 1 to 3 represented by: unsatisfactory; satisfactory and excellent, respectively, marked on an evaluation form prepared with the aid of the tool Google docs. For the topics assessed as unsatisfactory, they were guided to descriptively justify the decision.

In this way, 7 main topics were evaluated, namely: theme relevance; depth of approach; clarity; vocabulary relevance; updating and precision of the concepts; updating and quality of references; coherence. Of these, 5 were considered excellent: theme relevance; depth of approach; updating and precision of the concepts; updating and quality of references and coherence, a topic was considered satisfactory: clarity and, as unsatisfactory: vocabulary relevance. The clarity and vocabulary relevance were evaluated by researchers and structured, complying with the judges' suggestion for appropriateness and quality of the proposed instrument.

The self-administered structure of the questionnaire, scientifically grounded in the theoretical references promoted by the Latin American Sepsis Institute,¹² contains 6 closed questions. The first issue addressed the developmental stages of sepsis, the second characterized the presence of infection without dysfunction, the third defined the sepsis, the fourth defined septic shock, the fifth and sixth issues addressed the care strategies that compose the 3- and 6-hour treatment package for sepsis, respectively. Each question has 6 alternatives, and only one was correct. The score ranged from 0 to 6 points, and the mean score for

considering the knowledge on sepsis enough, in the present study, was greater than or equal to 4.0 points.

During the completion by students, researchers remained at a physical proximity that ensured that they would not consult any literature, minimizing the risks of clarification of doubts or exchange of information between them in order to avoid research bias. There were three steps, described below, for data collection.

The first step covered the invitation and registration of participants by e-mail, their reception at the event's location, explanation about the research proposal and protocol and consent to participate by signing the Informed Consent Form. Subsequently, the students completed the instrument of sociodemographic characterization and underwent the first stage of the cognitive test to assess prior knowledge about sepsis, considered pre-test.

Based on the guidelines for sepsis of the Latin American Sepsis Institute,¹² the following teaching and learning strategies were selected: expository lecture, considered in this study, the traditional educational strategy, associated with preparation and presentation of musical parodies on the sepsis, group discussion, memory game in team and case study, identified as active teaching strategies.

In the second step, a nurse, nursing professor, specialist in nursing care, focused on severely ill patients, with experience in the use of active nursing teaching methods implemented all strategies.

Initially, the participants attended a lecture, addressing the concept of sepsis and the characterization of its developmental stages. Then, the students attended a workshop to prepare and submit educational parodies about sepsis, based on the concepts acquired in the lecture. After that, there was a debate between teams on the concepts and characteristics of each stage of sepsis.

The second step addressed the nursing assistance relevant to the septic patient using the lecture modality, with subsequent application of the memory game about the care with the septic patient performed in group and resolution of a case study regarding a septic patient.

The case study described the clinical history of a patient with a medical diagnosis of sepsis, admitted to a hospital infirmary, based on the guidelines of the Latin American Sepsis Institute,¹² as theoretical reference. The participants were responsible for identifying the developmental phase and the nursing care necessary for subsequent group discussion and clarification of doubts. After that, the knowledge on sepsis was evaluated applying the post-test.

The third step of collection occurred three months after the educational intervention proposal. An in-person meeting was scheduled, with the participation of 27 students who attended the aforementioned steps, and assessment of cognitive knowledge about sepsis, in order to evaluate the retention of learning about the theme.

The collected data were tabulated on spreadsheets with Microsoft Excel program, and validated by dual typing. They were subsequently exported and processed in the program Statistical Package for Social Sciences (SPSS) version 22 for Windows for analysis. The qualitative variables were analyzed using descriptive statistics, by means of distribution of frequencies and percentages, i.e.; for each item of question in the questionnaire the frequency of each response and their respective percentage was raised and obtained. For comparison of results before and after the articulation of traditional and active teaching and learning strategies about sepsis, the ANOVA test with repeated measures was used. The significance level was $p < 0.05$.

Concerning the compliance of the ethical precepts, the research was sent to the ethics committee to meet the requirements of Resolution 466/12 of the National Health Council, which regulates the standards for researches involving humans, obtaining approval under opinion

number: 2.096.720 on 02 June 2017. To participate in the study, the students were consulted about their interest and availability and signed the Informed Consent Form.

Results

Most of the 27 participants were women (92.6%), aged 18 - 22 years (44.4%), with mean age of 20.70 and standard deviation of 7.467. Aiming to evaluate the knowledge on sepsis of nursing students, before and after the articulation of traditional and active teaching strategies, the cognitive assessment instrument was applied. Next, frame 1 initially presents the number and percentage of nursing students who correctly answered each question of the proposed instrument during the pre- and post-test, immediately after the educational intervention and after three months.

Frame 1. Identification of the number, percentage and mean of students who correctly answered the questions related to the cognitive assessment instrument on sepsis, during the pre- and immediate post-test and after 3 months. Uberaba, 2018. (N=27)

Questions	Pre-test		Post-test immediately after the intervention		Post-test 3 months after the intervention		Students' mean
	N	%	N	%	N	%	
Question 1: Developmental stages of sepsis	11	40.74%	22	81.48%	20	74.07%	17.66
Question 2: Presence of infection without dysfunction	8	29.63%	15	55.55%	13	48.14%	12.00
Question 3: Sepsis definition	9	33.33%	9	33.33%	8	29.62%	8.66
Question 4: Septic shock definition	11	40.74%	14	51.85%	14	51.85%	13.00
Question 5: Strategies that compose the 3-hour treatment package	7	25.92%	21	77.77%	19	70.37%	15.66
Question 6: Strategies that compose the 6-hour treatment package	7	25.92%	20	74.07%	17	63.00%	14.66

Considering the number of nursing students that correctly answered each question belonging to the cognitive assessment instrument on sepsis, the knowledge improved, when comparing the results of pre and post-test immediately after intervention, especially regarding the question addressing developmental stages of sepsis, with an average of 17.66, and care strategies that compose the 3- and 6-hour treatment package for the septic patient, with averages of 15.66 and 14.66, respectively. After 3 months, although post-test scores decreased, the results were close to the immediate assessment of the intervention, which may indicate the development of knowledge and the potential of articulating active and traditional teaching strategies.

Table 1 shows the comparison between the averages of knowledge on sepsis of nursing students through the application of the ANOVA test for repeated measures. For this reason, the scores obtained in the pre and post-test, immediately after the intervention and after three months were identified.

Table 1. Comparação entre as médias de conhecimento dos estudantes de enfermagem sobre a sepse, obtidos no pré e pós-teste, imediatamente após a intervenção e depois de três meses, Uberaba, 2018. (N=27)

Variables	Mean	Standard Deviation	p
Pre-test	1.96	1.93	
Immediate post-test	4.44	1.15	<0.001
Post-test - 3 months	4.33	0.92	

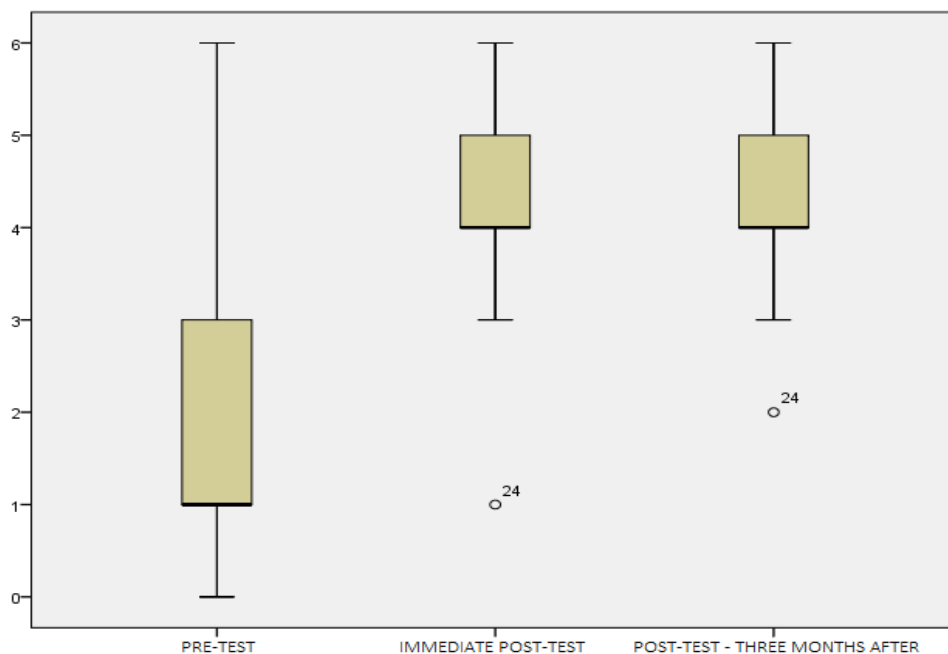
In relation to the comparison between the averages of nursing students' knowledge about the sepsis obtained in the pre and post-test immediately after the intervention and after three months, carried out by means of the ANOVA test for repeated measures, there was a significant increase in the average of correct answers in the immediate post-test and post-test 3 months

after the intervention, when compared to the results of the pre-test. Statistical significance occurred with $p < 0.001$.

Despite the evidence of a statistically significant result for the development of nursing students' knowledge, concerning the articulation of active and traditional teaching and learning strategies, it is necessary to consider that these students had not had previous contact with the sepsis theme, considering the inclusion criteria defined for the present study, which led to the expectation that they would obtain a greater number of right answers during the post-test, immediately after the teaching strategies applied.

The Boxplot graph represented in the following figure allows for analyzing and comparing the variation of knowledge in different moments of evaluation by means of quartiles, indicating the degree of dispersion, data obliquity and outliers.

Figure 1. Comparison of the variation of knowledge in pre-test, immediate post-test and post-test three months after the proposed intervention. Uberaba, 2018. (N=27)



There was a significant dispersion of the number of correct answers regarding the pre-test in relation to the performance identified in the immediate post-test and after three months.

Furthermore, there was only one discrepant participant, in both post-test moments, relating to the development of cognitive knowledge, presenting the lowest number of right answers on sepsis.

Discussion

The predominance of female students identified in this study corroborates the current scenario of nursing that points to the female figure as dominant among workers in this area in the world and in Brazil.¹³⁻¹⁵ This sets a historical outline, characterized by nurses who provided maternal care, of the sick in their homes, subjects in situation of risk or vulnerability.¹⁴ Although the number of women is still much higher, the number of male nursing undergraduate students has been increasing, which allows for affirming that there is a new trend in this field, moving toward gender equality in the category.¹⁵

A profile of young students was also identified in this study, with age ranging from 18 to 22 years. Confirming this scenario, cross-sectional, descriptive study developed in April 2011 through March 2012, in four nursing undergraduate courses in Brazil, covering 705 academics, highlighted a youthful profile of students, with age ranging from 20 to 24 years (50%), and mean age of 24.21 years.¹⁴

The presence of young students in nursing undergraduate courses can be related to the encouragement of the Brazilian government for admission to higher education. However, as a young population, the choice of profession can be immature and cause a higher rate of course abandonment.¹⁴

Regarding the assessment of the cognitive development on sepsis, the knowledge improved, with an emphasis on themes such as the developmental stages of sepsis and the care strategies that compose the 3- and 6-hour treatment packages for the septic patient.

Currently, few studies explore the teaching of sepsis in nursing undergraduate courses,¹⁰⁻¹¹ which highlights the need for deepening on this issue, given the importance of the theme for the teaching and learning process in this profession and its crucial role in early identification of signs and symptoms of the disease.¹⁶

Studies that used active methodology as in the present study, with a focus on the teaching of sepsis, also concluded that the investment in the articulation of educational strategies, with an emphasis on active methods, is relevant to nursing faculty and institutions, once their positive impact on the development of students' knowledge was favored by this association.¹⁰⁻¹¹

The present study showed that, in general, the results were statistically significant, immediately after the educational intervention applied. This can subsidize that associating traditional and active teaching strategies is a pedagogical method effective for the learning of sepsis. In this way, the exclusive use of the expository lecture may not appreciate a space for participation where students expose their doubts, ideas and arguments in a meaningful way, hindering the development of knowledge about the sepsis.¹⁷

The doubts focus on this strategy once it is seen only as a method of knowledge transmission and does not stimulate the student's reasoning, but only the receptive-type learning.¹¹ Thus, the development of clinical reasoning for a practice is intrinsically related to the use of different teaching strategies.¹⁸

Based on the above, the present study emphasized the association of lecture, as traditional teaching strategy, with varied strategies that enhance students' participation, which included the preparation and presentation of parodies with the theme of sepsis.

A study conducted with 44 students from two municipal schools of Pelotas, Rio Grande do Sul, showed that, after the activity using parody, 100% of the students were successful in the learning proposal.¹⁹ This result corroborates the present research, for adopting the elaboration

of an educational parody on the sepsis and its presentation, characterized as an efficient strategy, easy to use and fun for learning.¹⁹

In the same line of reflection, the debate between teams promotes dialog, group work, leadership, persuasion, according to the knowledge created through the collective process.²⁰⁻²²

In turn, the memory game has been regarded as a playful activity, used in classrooms in recent years, due to the students' acceptance, being capable of guaranteeing the construction of knowledge through the interaction between the students,²³ which is similar to the memory game applied in this study about sepsis, and to the availability evidenced by nursing students in its implementation.

A study conducted with students from a nursing undergraduate course at the Federal University of Viçosa, Minas Gerais evidenced the adoption of case study. In this study, small groups were divided under the guidance of a tutor and a clinical case was applied, identifying participants' satisfaction and positive impact on their knowledge,²⁴⁻²⁵ which corroborates the result identified on the teaching of sepsis, in this study, with the use of a clinical case about the theme and students' cognitive improvement.

Despite the lack of a result of statistical significance regarding the development of knowledge of the nursing students three months after the educational intervention on sepsis, it is worth pointing out that the scores identified resemble the result presented in the immediate post-test.

The main limitations of this study were the number of participants exposed to the proposed intervention, which may have contributed to the decrease in the statistical power of the sample and the small number of scientific researches addressing the learning of sepsis in nursing through the articulation of educational strategies.

The contribution of this study is characterized by the presentation of a new perspective to the teaching of complex themes for nursing, such as the identification and assistance to the

septic patient, articulating traditional and active teaching strategies to facilitate the evidence-based practice.

Conclusion

The articulation of traditional and active teaching and learning methods is able to promote the development of cognitive knowledge in nursing students about sepsis. There was an important statistical significance immediately after the educational intervention applied, composed of expository lecture, parody, debate between teams, memory game and case study.

Three months after applying the intervention, there were no statistically significant results for the development of knowledge about the sepsis. Nevertheless, it is worth noting that nursing students' mean number of right answers was similar to the results presented in the immediate post-test. Therefore, experimental, well-delineated studies should be developed, comparing the application of traditional and active teaching strategies regarding the theme of sepsis for nursing students.

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Study design; data collection; Data analysis and interpretation, discussion of results.

4 – Fabiana Cristina Pires

Study design; discussion of results, writing and critical review of the content; review and approval of the final version.

5 – Juliana da Silva Garcia Nascimento

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