

APPLICATION OF AN EDUCATIONAL TECHNOLOGY IN SEPSIS PROTOCOL IN OBSTETRICS UNITS

Aplicação de tecnologia educativa na sensibilização do protocolo de sepse em unidade de tocoginecologia

Aplicación de tecnología educativa en la sensibilización del protocolo de sepse en unidad de tocoginecología

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ABSTRACT

Objective: This study's goal has been to evaluate how often health care workers followed the Sepsis Protocol after training in detecting the early signs of sepsis in obstetrics units. **Method:** This action study was carried out from January to March 2016 with 63 workers from an obstetrics unit in a reference hospital. **Results:** Fifty-one percent of the participants were trained in the Sepsis Protocol of the institution. Then 50% of patients who met systemic inflammatory response syndrome (SIRS) criteria were included in this protocol. Three of these patients were discharged and two were transferred to an intensive care unit (ICU) due to severe sepsis. These two patients took antibiotics for about 50 minutes, received the results from the complete blood count test after 46.25 minutes from the request and the lactate value after 30 minutes. **Conclusion:** More health care workers need to follow the Sepsis Protocol to treat sepsis.

Descriptors: Sepsis, New mothers, Educational technology.

RESUMO

Objetivo: avaliar o impacto da sensibilização no setor e adesão ao protocolo de sepse em unidade de tocoginecologia. **Método:** Trata-se de uma pesquisa-ação no período de janeiro a março/2016, com 63 profissionais que trabalham em unidade de tocoginecologia de um hospital de alta complexidade. **Resultados:** 51% dos profissionais receberam o treinamento sobre o protocolo de sepse e após, 50% dos pacientes que tinham critérios de SIRS foram incluídos no protocolo de sepse, sendo que o desfecho de 03 destas, foi alta hospitalar e 02 foram transferidas para UTI devido sepse grave. O tempo médio de administração do antibiótico foi 50 minutos, da solicitação do hemograma foi 46,25 minutos e do resultado do lactato foi acima de 30 minutos. **Conclusão:** Ainda há necessidade de melhoria em relação à adesão pela equipe de Enfermagem para implantação de medidas de combate à sepse.

Descritores: Sepse, Puérperas, Tecnologia educativa.

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RESUMÉN

Objetivo: evaluar el impacto de la sensibilización en el sector y la adhesión al protocolo de sepsis en unidad de tocoginecología. **Método:** Se trata de una investigación-acción en el período de enero a marzo/2016, con 63 profesionales que trabajan en unidad de tocoginecología de un hospital de alta complejidad. **Resultados:** 51% de los profesionales recibieron el entrenamiento sobre el protocolo de sepsis y después, 50% de los pacientes que tenían criterios de SIRS fueron incluidos en el protocolo de sepsis, siendo el desenlace de 03 de ellas, fue alta hospitalaria y 02 fueron transferidas a UTI Debido a la sepse grave. El tiempo promedio de administración del antibiótico fue de 50 minutos, de la solicitud del hemograma fue 46,25 minutos y el resultado del lactato fue de más de 30 minutos. **Conclusión:** Aún hay necesidad de mejora en relación a la adhesión por el equipo de Enfermería para implantación de medidas de combate a la sepsis.

Descriptor: Sepse, Puérperas, Tecnología educativa.

INTRODUCTION

Until the 1990s, the terms “sepsis”, “septicemia”, “septic syndrome” and “septic shock” were used in medical literature without an objective definition, often interchangeably, causing confusion and hindering scientific research in this field. Also, data from different intensive care units (ICU’s) could not be compared.¹ We can define sepsis as a set of serious manifestations in a body produced by an infection, being the main cause of death in ICUs.²

According to many studies, a large number of patients have sepsis, taking about ¼ of ICU beds, and 60% of them die due to septic shock. The occurrence of sepsis in ICUs has increased over time, but the death rate has decreased little. Moreover, several procedures for dealing with sepsis are used among hospitals. Thus, standard protocols based on scientific evidence could reduce the risk of death.³

In a study carried out in the Brazilian capitals, 67.1% of maternal deaths were due to direct obstetric causes. Regarding the specific diagnoses, antihypertensive disorders were present in 25% of the cases. Hypertensive disease of pregnancy (preeclampsia and eclampsia) was the cause of 37% of all direct obstetric deaths. Hemorrhagic complications, particularly due to placenta previa and placental abruption, were responsible for 9% of the deaths and 13.3% of direct obstetric deaths. Nevertheless, about a quarter of the deaths were due to indirect obstetric causes. These data indicate that the qualification of assistance in Brazilian institutions should be focused on both the causes of death directly related to pregnancy and the clinical conditions before pregnancy.⁴

Sepsis is an etiology that can put many mothers at risk or even kill them. In developing countries, over 100,000 mothers have sepsis each year, being a greater threat than bleeding or thromboembolism during pregnancy.⁵

In 2012, the Sepsis Committee was created at the *Fundação Santa Casa de Misericórdia do Pará*, Pará State, Brazil, which took simple measures for minimize the time to care for patients who met the criteria for the Sepsis Protocol. Then the health care team was trained in this protocol, which was followed only in obstetric screening. Also, the workers followed this protocol until the patients’ discharge, with monthly follow-ups to verify the achieved goals and the patients’ status. However, the Sepsis Protocol was not followed in other departments, which directly interfered with the care for patients with sepsis.

Hence, this study aimed to evaluate how often health care workers follow the Sepsis Protocol in obstetrics units. This study is relevant for improving the early sepsis detection in new mothers and the care that they receive, for qualifying health care teams in obstetrics units, and for reestablishing the Sepsis Committee. Consequently, this protocol could be a reference for other institutions.

METHODS

This is an action study with an interpretative approach. It is carried out by identifying a social and/or institutional problem, collecting data, analyzing the results obtained from the participants, considering possible changes, making conclusions, and testing the results to link research and action.⁶

This study was carried out in the *Fundação Santa Casa de Misericórdia do Pará*, Pará State, Brazil. Founded on 24 February 1650, it is a reference institution in maternal and child care having 138 beds.

Sixty-three workers from the obstetrics unit participated in this study: 40 nurse technicians (50%), 14 nurses (63%), and nine doctors (45%). All of them had been working at the institution for over two years.

This study was approved by the Ethics Research Committee from the institution under the *Certificado de Apresentação para Apreciação Ética (CAAE)* [Certificate of Presentation for Ethical Appraisal] No.: 46002215.3.0000.5171.

Data collection occurred from January to March 2016, in all work shifts. Groups of 30 workers were trained in sepsis protocol at the institution for about 20 minutes. Then each participant received a folder and clear and objective instructions for identifying the symptoms of sepsis. Furthermore, any doubts about sepsis etiology were removed.

Banners were placed in workplaces and strategic points (next to the nursing station), which displayed the steps for identifying sepsis early. Pink folders were also placed containing the forms for starting the Sepsis Protocol. Also, other information about the patients were recorded in these forms, such as the time of sepsis onset, start time of antibiotic administration, laboratory tests, hemoculture results and time of lactate measurement result.

After the training, the participants' doubts were removed and they were informed about the factors that hinder the early sepsis detection. Furthermore, the medical team and the nursing team were responsible for filling out the protocol forms.

The data was tabulated and subsequently analyzed by the Bioestat 5.0 software. For statistical analysis, $\alpha = 5\%$ and $p\text{-value} \leq 0.05$ were used. Chi-square tests and G-tests were also applied.

RESULTS

Sixty-three employees were trained in the Sepsis Protocol. Considering these people, 62 participants were women. The average age of the participants was 38.5 years and the average employment period was 8.07 years.

Regarding the employment period, the participants, on average, had worked at the institution for over five years, demonstrating that they know how to care for new mothers, but their knowledge of the etiology and early detection of sepsis is little.

Only 51% of the multiprofessional team members were trained, among them doctors, nurses, and nurse technicians. Additionally, ten Sepsis Protocol forms were filled out, but only five patients met Sepsis Protocol criteria. The other five patients had puerperal fever (body temperature over 38°C for two consecutive days) and were not included in the study. The Sepsis protocol was followed in three patients in *Santa Marta* ward, aimed at pregnant women at medium risk and new mothers who had curettage; three patients from *Santa Rita* ward, aimed at pregnant women at high risk; one patient from *Santa Terezinha* ward, aimed at mothers that had cesarean delivery; one patient from *Sant'Ana* ward, aimed at mothers who had normal delivery; and two patients from *Santa Clara* ward, aimed at new mothers separated from their children.

Concerning the patients' birth status, three were in the puerperal period and two in labor. In the present study, puerperal sepsis with abdominal focus (uterus region) was the source of the infection, including the pregnant women in which the Sepsis Protocol was followed.

Considering the antibiotic administration time, the average was 50 minutes, which was a positive result according to the protocol because the administration occurred within the first hour after sepsis detection. Three patients were treated with the correct antibiotic. One patient was treated with an unnecessary antibiotic and the dosage of another one was adjusted.

Observing the complete blood count (CBC) test, the protocol was not followed only in one patient because this test was not requested. Moreover, the average time of CBC results was 46.25 minutes.

Regarding the lactate measurement, it was requested in four patients. The result of lactate measurement could not be obtained under 30 minutes, as requested by the Sepsis Protocol because it is available together with the CBC results. Two hemoculture tests were requested, according to the Sepsis Protocol, in three patients.

By following the Sepsis Protocol, the status of three patients improved and they were discharged soon. However, two patients were transferred to the ICU due to severe sepsis.

DISCUSSION

This is the first interventional prospective study carried out with the multiprofessional team (doctors, nurses, and nurse technicians) of the institution. This study aimed to evaluate how often the team members followed the Sepsis Protocol after training in detecting the early signs of sepsis. Sepsis continues to be a global challenge and one of the main causes of death in ICUs. The degree of severity of the septic syndrome in sepsis, severe sepsis, and septic shock represent the temporal evolution of the same disease.⁷

The early identification of sepsis is the most important step to improve treatment. Therefore, it is of paramount importance to adopt selection strategies that allow the identification of patients with sepsis in the initial phase of the disease, for example, the presence of acute myocardial infarction. Delaying sepsis treatment can compromise the prognosis.⁸

The research participants had puerperal sepsis originated in the uterus region, including the pregnant women treated according to the Sepsis Protocol. The placental insertion site is the most common site of infection in sepsis puerperal. Other places also frequent, such as abdominal or perineal wounds resulted from surgeries or even genital tract lacerations.⁹ Moreover, other factors can also be directly related to the puerperal infection that can be identified in the prenatal period and in obstetric care such as cesarean surgeries, premature membrane rupture, prolonged labor, internal fetal monitoring, as well as the frequency of cervical tests.¹⁰

After the training in the Sepsis Protocol, ten protocols were requested, and half of these protocols did not correspond to the signs of sepsis. The patients were followed up during hospitalization and those who only met only one systemic inflammatory response syndrome (SIRS) criterion (body temperature $>36^{\circ}\text{C}$) were excluded from the research. Five patients met SIRS criteria. We evaluated their hospital admission, time of hospitalization, site of infection, time of antibiotic administration, time of CBC results and time of lactate measurement results.

After the publication of the latest update of the international guidelines for the treatment of severe sepsis and septic shock, the study from the International Multicenter Prevalence Study on Sepsis (IMPRESS), in 2013, showed the prevalence of sepsis and the adherence to the bundles of the survival campaign against sepsis.¹¹ A total of 1794 patients from 62 countries, including Brazil, participated in this study, and 39% of them developed severe sepsis and septic shock. Moreover, only 19% showed compliance with the 3-hour intervention package and 36% fulfilled the goal of the 6-hour bundle.⁵

Regarding the correct antibiotic, three patients took the correct antibiotics, and their administration started less than 1 hour after the first signs of sepsis, according to the protocol. Broad-spectrum antibiotics should be administered immediately after the identification of septic shock or severe sepsis, according to the institutional protocol, essentially in 1 hour. The time for early treatment with antibiotics is 70 minutes for the intervention group and 67 minutes for the control group.¹² The average time was 50 minutes for the research patients, which reaches the goal of the institutional protocol. However, it is of fundamental importance not only the antibiotic administration at the correct time but also the correct dosage, as well as the appropriate antibiotic.¹³

Bearing in mind the test requests, the Sepsis Protocol included the CBC test, two hemoculture tests, arterial lactate measurements and tests for C-reactive protein, glucose, urea, creatinine, and procalcitonin. We observed that these tests were not performed in one patient because they were not requested and the result of the arterial lactate measurement do not follow the protocol, which stated that this result must be reported in less than 30 minutes. Furthermore, the results from CBC and lactate tests could only be analyzed at the same time, hindering the treatment since the lactate test is a marker in the inflammatory process according to the Sepsis Protocol.¹⁴

Considering the economic point of view, sepsis is expensive for the health system, causing a significant loss of productivity due to a long hospital stay and high mortality rates. The direct costs of sepsis in the United States are approximately 17 billion dollars per year, which represents only 30% of the total cost of the disease including the social ones. Following the Sepsis Protocol may improve the quality of care and reduce hospital stay, assistance costs, the morbimortality related to sepsis.¹⁵ Performing cost-effectiveness and cost-benefit analyses of procedures for detecting and treating sepsis early are essential for their implementation in the Brazilian Health Network.

CONCLUSIONS

It is concluded that despite operational problems and the small number of Sepsis Protocol forms available, this study showed that the obstetrics unit presents difficulty in

identifying sepsis early because their health care workers have no knowledge of the Sepsis Protocol. However, this study contributes to improving the health care practices because the patients' stay and the number of deaths due to sepsis in this unit may be reduced if the Sepsis Protocol is followed.

It is important to clarify that the training in Sepsis Protocol is the beginning of a long work that will be done in other units of the institution. The employees' permanent education this subject is also important, as well as the evaluation of medical records to improve the early detection of sepsis.

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