



# Nursing care to patients with sepsis: analysis in the light of Myra Levine's conceptual model

*Assistência de enfermagem ao paciente com sepse: análise à luz do modelo conceitual de Myra Levine*

*Cuidados de enfermería a pacientes con sepsis: análisis a la luz del modelo conceptual de Myra Levine*

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## ABSTRACT

**Objective:** encourage reflection on nursing care for patients with sepsis based on the four conservation principles proposed by Myra Levine's conceptual model. **Method:** theoretical-reflective study on the relationship between Levine's conservation principles and the patient with sepsis. **Results:** attentiveness to the principles of energy conservation, observing oxygen supply, patients' age and energy parameters (vital signs); of structural integrity by early recognition of organic dysfunctions in the hour-1 bundle; of personal integrity when preserving the identity of the client with difficulty to verbalize or another condition and social integrity when relating to the patient and family, including them in the care process. **Conclusion and implications for practice:** the conservation principles of the proposed model are presented in relation to assistance provided by the nursing team in maintaining the physical, personal and social balance of the patients with sepsis. Nurses are expected to articulate the general scientific knowledge of sepsis patient care with their specific knowledge, through a theoretical framework, to promote the individual's adaptation, conservation and integrity.

**Keywords:** Nursing Care; Nursing; Homeostasis; Sepsis; Nursing Theory.

## RESUMO

**Objetivo:** estimular a reflexão acerca da assistência de enfermagem ao paciente com sepse a partir dos quatro princípios de conservação propostos pelo modelo conceitual de Myra Levine. **Método:** estudo teórico-reflexivo sobre a relação existente entre os princípios de conservação de Levine e o paciente com sepse. **Resultados:** vigilância aos princípios da conservação da energia observando oferta do oxigênio, idade dos pacientes e os parâmetros energéticos (sinais vitais); da integridade estrutural ao reconhecer precocemente às disfunções orgânicas no pacote hora-1; da integridade pessoal ao preservar a identidade do cliente com dificuldade de verbalizar ou outra condição e da integridade social ao relacionar-se com o paciente e família incluindo-os no processo de cuidado. **Conclusão e implicações para a prática:** os princípios de conservação do modelo proposto apresentam relação com a assistência realizada pela equipe de enfermagem na manutenção do equilíbrio físico, pessoal e social do paciente com sepse. Espera-se que os enfermeiros articulem o conhecimento científico geral da assistência ao paciente com sepse ao seu conhecimento específico, por meio de um referencial teórico, para a promoção da adaptação, conservação e integridade do indivíduo.

**Palavras-chave:** Cuidados de Enfermagem; Enfermagem; Homeostase; Sepse; Teoria de Enfermagem.

## RESUMEN

**Objetivo:** estimular la reflexión acerca de la atención de enfermería al paciente con sepsis a partir de los cuatro principios de conservación propuestos por el modelo conceptual de Myra Levine. **Método:** estudio teórico-reflexivo sobre la relación entre los principios de conservación de Levine y el paciente con sepsis. **Resultados:** vigilancia de los principios de conservación de la energía, observando el aporte de oxígeno, la edad de los pacientes y los parámetros energéticos (signos vitales); de la integridad estructural mediante el reconocimiento temprano de las disfunciones orgánicas en el paquete hora-1; de la integridad personal al preservar la identidad del cliente con dificultad para verbalizar u otra condición e de la integridad social al relacionarse con el paciente y su familia, incluyéndolos en el proceso de cuidado. **Conclusión e implicaciones para la práctica:** los principios de conservación del modelo propuesto se relacionan con la atención brindada por el equipo de enfermería en el mantenimiento del equilibrio físico, personal y social del paciente con sepsis. Se espera que los enfermeros articulen el conocimiento científico general del cuidado del paciente con sepsis con sus conocimientos específicos, a través de un referencial teórico, para promover la adaptación, conservación e integridad del individuo.

**Palabras clave:** Atención de Enfermería; Enfermería; Homeostasis; Sepsis; Teoría de Enfermería.

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## **INTRODUCTION**

The conceptual model proposed by Myra Strin Levine is based on the idea that the human being is a complex and dynamic individual capable of adapting to constant interactions with the environment.<sup>1</sup> In it, three fundamental concepts are discussed: adaptation; conservation; and integrity. Adaptation is the process by which conservation is acquired and the functional stability of the organism is achieved by coping with physiological and behavioral responses in an adequate manner and with the lowest possible expenditure of energy.<sup>2</sup>

In this sense, conservation means defending the totality of living systems from responding appropriately to the changes suffered.<sup>3</sup> In clinical practice, conservation aims to balance the roles played by the nurse-patient within a space-time continuum.<sup>4</sup> While integrity encompasses the totality of the being and the sense of independence and individuality, which means being in control of one's own life, of having the freedom to make one's own choices.<sup>3,5</sup>

In this context, nursing is considered a humanistic science, of a holistic nature, where the human being must be seen as a "whole", in addition to developing their thinking and, with their team, their doing towards the maintenance of people's health.<sup>6</sup> Thus, care for life can only be exercised by understanding the human being in their entirety, while being strongly influenced by biological, psychological, social and spiritual factors.<sup>7</sup> In this perspective, Levine proposed four conservation principles: energy conservation; conservation of structural integrity; conservation of personal integrity; and conservation of social integrity.<sup>4</sup>

In this model, the effectiveness of nursing interventions is based on maintaining the integrity of the individual in each of the domains, promoting therapeutic and support actions that favor the adaptation process, in the facing and solving of problems.<sup>8</sup> In addition to considering that interventions should be based on nursing diagnoses, seeking to operationalize the nursing process.

Thus, in the face of situations that generate some type of imbalance, as occurs in patients with sepsis, for example, nursing actions must be aimed at preserving the integrity of the individual as a whole. Therefore, we chose to use a nursing theory that would provide to the practice the necessary subsidies to act with a view to maintaining the body's homeostasis and the biopsychosocial understanding of the human being, including the psychosocial aspects that involve the patient and their family.

According to the new definitions, sepsis can be understood as a potentially fatal organ dysfunction, caused by a disordered response of the host to an infection, whose high rates of morbidity and mortality require the adoption of urgent measures to deal with due to its implications for collective and individual health.<sup>9,10</sup> This condition demands early identification and appropriate management in the initial hours of diagnosis, which are crucial for the effectiveness of treatment.<sup>11</sup>

Thus, the nursing team has a fundamental role in the early recognition of signs and symptoms, implementation of actions that optimize treatment and improve clinical outcomes and quality of care. However, the need to implement a sepsis

protocol and nurses without satisfactory knowledge regarding the identification, treatment and clinical management of a person with this condition has also been observed.<sup>12</sup> The scarcity of original or reflective study that addressed care to the patient with sepsis using Levine's Theory, as proposed in the present study, was also identified. In view of the above, the study aims to stimulate reflection on nursing care for patients with sepsis based on the four conservation principles proposed by Myra Levine's conceptual model.

## **METHOD**

This is a theoretical-reflective study originated from the discipline of Theoretical and Conceptual Basis of Nursing Care of the Academic Master's Course in Nursing at Universidade Regional do Cariri – URCA, which took place during the second semester of 2019.

The idea of this reflection arose from the experience in the field of care practice of a professor and a student, being the latter responsible for the training on sepsis of a regional hospital team in the southern region of Ceará. Thus, from these experiences, the surviving sepsis campaign package<sup>13</sup> and a reference on nursing interventions for patients with sepsis<sup>14</sup> were used as base which initially made it possible to observe the similarity between biomedical knowledge and specific nursing knowledge to achieve a holistic care.

In this perspective, we sought to discuss from the perspective of Myra Strin Levine's conceptual model, for being concerned with the health establishment of patients who need assistance in the face of their altered health status. In order to make the reading more didactic and promote greater appropriation of the theme, it was decided to subdivide Levine's conservation principles: principle of conservation of energy; principle of conservation of structural integrity; principle of conservation of personal integrity; and principle of conservation of social integrity.<sup>4</sup> In this way, the model centralizes the nursing intervention, in the adaptation and reaction of patients to the disease.<sup>2</sup> In addition to presenting less abstract concepts that can detail the practice of nursing.

Considering these dimensions and given the similarity with the practical intervention of nursing professionals, which is still empirical, we sought to articulate the theoretical framework and studies in the fields of nursing that contemplated the theme. Thus, we sought to structure the presentation of these principles, which served as topics to correlate the clinical practice of nurses in the execution of care in the first hours of patients with sepsis and the principles of conservation of the theory.

## **RESULTS AND DISCUSSION**

### **Principle of conservation of energy**

As mentioned earlier, for Levine Nursing has as its purpose the maintenance or recovery of the individual's health based on four conservation principles. In the first one, referring to energy conservation, the idea is defended that in situations of disease

there is an imbalance between the metabolic supply and demand of the organism with consequent additional expenditure of energy.<sup>15</sup>

In patients with sepsis, the main mechanisms that increase energy consumption are the reduction of the tissue oxygen supply and cell damage resulting from the exacerbated immune response. In addition, the presence of hemodynamic instability plus microvascular and endothelial dysfunction with consequent inadequate supply of oxygen to tissues are identified as the main factors responsible for the development and maintenance of the multiple organ dysfunction syndrome.<sup>16</sup>

However, it should be noted that each person has a unique adaptive response, built from their life experiences and the organism's integrated response to external and internal stimuli that result in a realignment of their own substance.<sup>4</sup> Thus, the adaptive process that involves acute diseases, such as sepsis, is influenced by a series of factors related to the environment and the organism itself that vary from person to person, such as pre-existing underlying diseases, lifestyle habits (smoking, alcoholism), continuous use of medicines, among others.

Regarding the age of the patients, for example, in the elderly, the presence of organic dysfunctions, such as acute lowering of the level of consciousness or hypotension, can often be the only clinical manifestation triggered by sepsis. This is due to the changes typical of senescence, the signs of Systemic Inflammatory Response Syndrome (SIRS) such as fever or hypothermia, tachycardia and tachypnea that may not be present in response to the decrease in physiological organic reserves and the functional decline of defense mechanisms.<sup>17</sup>

Considering the signs of SIRS, these are relevant for the diagnosis of infection and even though it is no longer part of the definition of sepsis, one of the signs such as the presence of tachycardia, for example, usually occurs in response to the decrease in vascular resistance, aiming to guarantee adequate cardiac output. Tachypnea, on the other hand, may result from increased production of carbon dioxide due to respiratory failure caused by hypoxemia.<sup>18</sup>

Given the above, the nursing team plays a key role in the constant monitoring of energy parameters such as temperature, heart rate, respiratory rate, blood pressure, capillary blood glucose and oxygen saturation. In addition to providing an indirect estimate of the energy expenditure triggered by the physiological changes caused by sepsis, they also represent an important set of measures capable of assisting in early recognition and rapid initiation of treatment in the first hours after diagnosis.

Thus, when present, any and all the changes in vital signs must be appreciated, reported and recorded by nursing, as it is based on the identification of specific patterns of adaptation that nurses will look for, through the nursing process (NP), to develop an individualized care plan seeking to meet the real and potential needs of each patient. In this sense, the data investigated refer to the process of energy production and expenditure, which demand specific interventions to improve tissue perfusion and reduce unnecessary energy expenditure through actions such as multiparametric monitoring, surveillance of the level of

consciousness, nutrition and adequate hydration, administration of medication as indicated, among others.

Regarding this systematic view of the phenomenon, nurses can plan interventions for the patient's recovery and identify the specific patterns of adaptation of each one. These patterns are presented as an individual's response to the forces of the environment (holism) and stability in the physiological aspects by saving and conserving energy (homeostasis).<sup>4</sup> Given the above, when seeking a therapeutic meaning, nursing interventions are able to change the course of adaptation for better patient comfort and safety, targeting social well-being. On the contrary, when such interventions fail to alter the course of adaptation, that is, when best efforts can only maintain the status quo or even fail completely, the nurse is acting in a supportive sense.<sup>5</sup>

In this way, when conceiving nursing professionals to be responsible for caring and interacting with others, they produce effects through the exercise of care with competencies that favor reflection and questioning. In addition to informing and helping the patients to face their problems, according to the balance of energy they have available to help them adapt to the environment and the individual experience that can limit them to bed, as well as loss of privacy and self-esteem. Since adult patients hospitalized, especially in an intensive care unit, have stressful factors such as physiological, emotional/psychological and social, which can lead to loss of autonomy and, consequently, this feeling of helplessness needs to be identified and taken care of by nursing to enable the recovery process.<sup>19</sup>

In this sense, the assistance of the nursing team is intended for the patient to be able to adapt to the changes that sepsis causes, especially, to the organic system. As well as participate in their care process with some autonomy when possible through a visit from a close relative to ensure privacy.

### **Principle of conservation of structural integrity**

The principle of conservation of structural integrity focuses on the prevention of physical breakdown and the healing process. For Levine, the main objective of healing is to limit the extent of tissue damage by maintaining or promoting the individual's adaptation to the changes suffered.<sup>8,20</sup> Faced with this damage, the ability with which the human body responds to these changes will direct the actions of the nurse from the adaptive pattern exhibited by the specific needs of each patient.<sup>4</sup> Thus, "the conservation of structural integrity recognizes the organism's ability to sustain its totality, as well as to overcome insults and injuries, and to restore their structure and healing function".<sup>21:40</sup>

In patients with sepsis, for reasons that are still unknown, the inflammatory response of the body to the infection occurs in an exacerbated way, leading to the emergence of potentially life-threatening organic dysfunctions.<sup>18</sup> In this case, the effectiveness of nursing care is directly related to the early recognition of changes resulting from changes in physiopathological functions and processes that led to homeostatic imbalance and consequent threat to structural integrity.<sup>4</sup>

In view of this, nursing interventions focus on the creation/implementation of a protocol through initial measures of early recognition of sepsis, treatment within the first hours of diagnosis to preserve and/or restore functional and structural changes, constitute a fundamental aspect to ensure good clinical outcomes.<sup>18,22</sup>

In this scenario, nursing professionals play a substantial role with regard to early recognition and implementation of specific interventions aimed at optimizing treatment and preventing possible complications, since the adoption of initial care measures such as those recommended by the one-hour package of treatment (hour-1 bundle) of the Surviving Sepsis Campaign are essential for a more favorable prognosis.

Thus, among the strategies aimed at preserving structural integrity that can be implemented by the nursing team, the following elements that make up the hour-1 bundle stand out: measurement of arterial lactate, obtaining blood cultures before antibiotic administration, administration of broad-spectrum antibiotics, rapid administration of 30 mL/kg of crystalloid for hypotension or lactate level  $\geq 4$  mmol/L, and administration of vasopressors in case of hypotension during or after fluid resuscitation to maintain mean arterial pressure  $\geq 65$  mm Hg.<sup>13</sup>

In view of the above, all efforts must be ensured so that the patient is fully assisted and recovers the structure of the body through strategies capable of reestablishing metabolic homeostasis and preventing the functional collapse of the organism. Thus, individualized and continuous nursing care should encourage patients to adapt and accommodate themselves to the environment, through rest, to reduce fatigue, conserve energy integrity and stabilize the clinical condition. As long as nurses seek this theoretical basis of the profession, they can develop specific care, as well as corroborate with interdisciplinary care to be outlined together with the multidisciplinary team.

### Principle of conservation of personal integrity

This principle is related to the maintenance or recovery of the individual's identity and refers to the perception they have of themselves, of their beliefs, values and attitudes, as well as the idea of wanting or not to share with the other a portion of their privacy.<sup>23</sup> However, this sense of identity can be threatened, since the disease can create a dangerous dependence on self-esteem and negatively affect the individual's perception of themselves.<sup>24</sup> Thus, it becomes essential that the maintenance of the "I" is preserved in the relationship between nurse and patient, since the latter has the right to participate in decision-making related to their health care.<sup>4,24</sup>

Furthermore, it is necessary to understand that the patient will not always act according to the nurse's perspectives and often ignore, deny or even disrespect the instructions given to them. In fact, true conservation requires that these professionals act to strengthen self-respect, accepting patients as they are, in their own way, without censorship.<sup>4</sup>

On the other hand, the understanding of these needs permeates not only verbal communication, but also the non-verbal language established in the care relationships between

the nursing team and the client, especially in the Intensive Care Units (ICU), where it is required of the subject who cares the sensitivity of perceiving through gestures and body movements the needs of the body being cared for.<sup>25</sup> In this context, the importance of nursing actions aimed at preserving the identity of those who cannot express themselves through verbal language is highlighted, whether due to the presence of a medical device (such as an orotracheal tube, for example) or of their preexisting underlying condition (neurological sequelae, for example).

Thus, the language of signs is expressed through gestures, looks, actions and movements (involuntary or not) and requires the nurse to be able to identify them and plan care according to the variables found.<sup>26</sup> Therefore, in this principle, depending on the clinical situation and the environment in which the patient is, it is up to the nurse to use care as an indispensable act to maintain life and ensure their identity and self-esteem. These must be rescued during patient care in order to preserve their autonomy, dignity and human right in all their dimensions.

### Principle of conservation of social integrity

The health-disease-care process includes the epidemiological, biological, psychological, cultural, social and spiritual aspects of users, which reveals the way of thinking and acting to obtain solutions to emerging questions in the production of care. In this way, it relies on all elements/services and need to be interconnected and contextualized in order to offer comprehensive and quality care for the human being.<sup>27</sup>

To ensure comprehensive care, Levine defends the idea that the individual must be recognized as a social being in constant interaction with their family and the environment to which they belong to. Thus, in situations of stress, such as in disease/sepsis, the presence of people considered important to them has a substantial character in the healing and hospitalization process.<sup>23</sup> Thus, to achieve the objective of integrality and humanization to the patient with sepsis, in an ecosystem configuration, one must respect the planning of the environment, the development of coordinated and integrated efforts to improve care and safety, implying in meeting the needs and exceeding the expectations of users, professionals and family members.<sup>27</sup>

Understanding these interconnections means covering the diversity and circularity of relationships, interactions and interdependencies that move and preserve life in its different expressions and manifestations.<sup>28</sup> With this, the nursing team must relate to those under their care, in an interpersonal process in which the quality of this relationship and the communication established impact the way people face their state of health and illness. To achieve this quality therapeutic relationship and understand the experiences of others, professionals are required to have a deep personal knowledge of the cultural and social context of the people cared for.<sup>29</sup>

Nurses must be able to extrapolate the limits of disciplinary knowledge, institutionalized systems and the contours of the physiological disease, with a view to integrating a systemic, paradoxical and interactive view of social and health issues.<sup>30</sup> In

addition to health professionals interacting with patient and family, they must include them in the care and hospitalization process, to guarantee the principle of social integrity in the individual's social and family context.

The maintenance of the person's integrity should be considered in the work process of nurses who deal with patients with sepsis undergoing continuous invasive procedures and involving sudden changes, suffering and risk of death. In this process, interaction with the patient should be stimulated, valuing them as a social being, in the face of the stress they experience, therefore, these are ways to maintain balance with view to healing and should be valued by nursing and the multidisciplinary team.

## CONCLUSION AND IMPLICATIONS FOR PRACTICE

The principles of conservation of the proposed model are related to the assistance provided by the nursing team in the maintenance of patients with sepsis. It was noticed that in attentiveness to the principles of energy conservation, the focus is on the supply of oxygen, the age of the patients and the patient's energy parameters (vital signs). Regarding structural integrity, organ dysfunctions must be recognized early in the hour-1 bundle. As for personal integrity, the nursing team must preserve the identity of the client who has difficulty verbalizing or allow their participation in the care process. Finally, in terms of social integrity, it requires relating to the patient and family.

It is believed that the incorporation of the principles discussed here in the care practice of nurses and their team is in fact capable of contributing to the reestablishment of the organism's homeostasis and their psychosocial needs. In addition to the theoretical framework allowing the planning of care, together with their team in the promotion of adaptation, conservation and integrity of the individual.

As a limitation of the study, the reduced number of articles in the national and international literature on the practical application of the theory stands out, thus giving rise to the need to carry out further research that expands reflection and understanding about the use of conservation principles proposed by Levine in nursing care practice.

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