



NURSING STRATEGIES FOR THE PREVENTION OF PRESSURE ULCERS IN INTENSIVE THERAPY: INTEGRATIVE REVIEW

ESTRATÉGIAS DE ENFERMAGEM NA PREVENÇÃO DE ÚLCERAS POR PRESSÃO NA TERAPIA INTENSIVA: REVISÃO INTEGRATIVA

ESTRATEGIAS DE ENFERMERÍA EN LA PREVENCIÓN DE ÚLCERAS POR PRESIÓN EN LA TERAPIA INTENSIVA: REVISIÓN INTEGRADORA

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ABSTRACT

Objective: to investigate the scientific evidence on the main nursing strategies for the prevention of pressure ulcers used in patients admitted to Intensive Care Units. **Method:** this is an integrative review to answer the question << What strategies have been used by the nursing team to prevent pressure ulcer in patients hospitalized in the Intensive Care Units? >> Three databases, CINAHL, Pubmed/Medline, and LILACS were used for the selection of articles. There was no limitation of the year of publication. The sample consisted of 13 articles. **Results:** six categories were identified: support surfaces; Programs and/or protocols for PU prevention; Preventive use of biological coverages; Change of position; Control of risk factors and computerized monitoring of skin pressure/support surface. **Conclusion:** the integrative review reinforced the importance of implementing scientifically based preventive measures in nursing care for the critical patient. **Descriptors:** Pressure Ulcer; Prevention; Intensive Care; Nursing Care.

RESUMO

Objetivo: investigar as evidências científicas sobre as principais estratégias de enfermagem para a prevenção de úlceras por pressão utilizadas em pacientes internados em Unidades de Terapia Intensiva. **Método:** revisão integrativa, com vistas a responder à questão: Quais estratégias têm sido usadas pela equipe de enfermagem para prevenir Úlceras por Pressão (UP) em pacientes internados em Unidades de Terapia Intensiva? Para a seleção dos artigos, utilizaram-se três bases de dados, CINAHL, PUBMED/MEDLINE e CINAHL. Não houve limitação quanto ao ano de publicação. A amostra constituiu-se de 13 artigos. **Resultados:** seis categorias foram identificadas: Superfícies de apoio; Programas e/ou protocolos para prevenção de UP; Uso preventivo de coberturas biológicas; Mudança de decúbito; Controle dos fatores de risco; e Monitorização computadorizada da pressão pele/superfície de apoio. **Conclusão:** a condução da revisão integrativa reforçou a importância de implementar medidas preventivas embasadas cientificamente na assistência de enfermagem ao paciente crítico. **Descritores:** Úlcera por Pressão; Prevenção; Terapia Intensiva; Cuidados de Enfermagem.

RESUMEN

Objetivo: investigar las evidencias científicas sobre las principales estrategias de enfermería para la prevención de úlceras por presión utilizadas en pacientes internados en Unidades de Terapia Intensiva. **Método:** revisión integradora para responder a la pregunta << ¿Cuáles estrategias han sido usadas por el equipo de Enfermería para prevenir úlcera por presión en pacientes internados en unidades de terapia intensiva? >> Para la selección de los artículos se utilizaron tres Bases de Datos, CINAHL, Pubmed/Medline y LILACS. No hubo limitación del año de publicación. La muestra fueron 13 artículos. **Resultados:** seis categorías fueron identificadas: superficies de apoyo; programas y/o protocolos para prevención de UP; uso preventivo de coberturas biológicas; cambios de decúbito; control de los factores de riesgo y monitorización computadorizada de la presión piel/superficie de apoyo. **Conclusión:** la conducción de la revisión integradora reforzó la importancia de implementar medidas preventivas basadas científicamente en la asistencia de enfermería al paciente crítico. **Descritores:** Úlcera por Presión; Prevención; Cuidados Intensivos; Atención de Enfermería.

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INTRODUCTION

Decubitus ulcers or pressure ulcers (PUs) are localized lesions on the skin and/or underlying tissue, usually on a prominent bone, as a result of pressure or its combination with shear forces. Pressure ulcers are also associated with other factors, whose role has not yet been fully clarified.¹

There are intrinsic factors in PU among the risk factors involved: age, weight, inactivity, urinary and/or fecal incontinence, reduced blood flow, low blood pressure, motor and/or sensory neuropathy, malnutrition and psychological conditions. The extrinsic risk factors are pressure, friction, shear, moisture, positioning and treatments with some types of drugs (for example, analgesics and sedatives). The recognition and subsequent treatment of a pressure ulcer in a clinical setting is a significant indicator of quality of care.²

PUs are divided into four categories: Category I (unbleached erythema), Category II (partial loss of skin thickness), Category III (total loss of skin thickness) and category IV (loss of full thickness tissue). There are also additional categories, such as the unclassifiable, characterized by total loss of tissue thickness, in which the current depth of the ulcer is blocked by the presence of necrotic tissue. There is also the suspect of deep tissue damage, characterized by areas of dark red coloration, located on intact and bleached skin or phytocena filled with blood.¹

Patients have multiple factors that increase the risk of developing pressure ulcers in Intensive Care Units (ICUs). Patients are usually using mechanical ventilation, urinary catheters, sequential compression devices, multiple intravenous catheters infused with vasoactive drugs to revert hypotension, contributing to contraindicate decubitus changes and increasing the risk of developing PU.³

More than one million people develop pressure ulcer every year. The prevalence of pressure ulcers has increased in recent years due to the increase in life expectancy of the population, added to the advances of modern medicine, enabling the survival of patients with severe and previously lethal diseases, which have been transformed into chronic and slowly debilitating diseases. Despite these advances in health care, pressure ulcers are still an important cause of morbidity and mortality, with an impact on the quality of life of patients and their families.⁴

According to a study conducted in a tertiary hospital in Germany, the prevalence

rates of PU were 1.21% and incidence of 0.78%. (0.49-12.7%).² Another study carried out in Colombia found a prevalence of PU estimated at 2.21% in its population.⁵ National Study of Prevalence of PU in Spain in 2009 identified a prevalence of 7.2% in hospitalized patients.⁶

In Brazil, a study conducted in São Paulo estimated the incidence of PU in 20.6% of patients submitted to medium and large surgeries. Most of them (98.6%) were in categories I and II and those in category I occurred mainly in the calcaneus, thorax, sacrum and iliac crest. In a cross-sectional study carried out in a large university hospital in the south of the country, 19% of the analyzed patients had records in the nursing evolutions, such as hyperemia in the sacral region, dressing with trochanter hydrogel and papain use in gluteal injury, which pointed to the development of PU in their hospitalization.⁸ In the Central West of the country, a high incidence of PU was identified in three regional hospitals in Mato Grosso (25%, 31% 7% and 66.6%) in sectors such as medical, surgical, orthopedic and ICU.⁹

A study conducted in Fortaleza/CE, Brazil showed a total incidence of PU of 36% in patients hospitalized in a public hospital, a reference in Fortaleza-CE trauma in sectors such as medical, vascular and ICU.¹⁰

Pressure ulcers are mostly preventable events, so it is important to adopt methods and practices that potentiate prevention, which is initiated by an individualized risk assessment.¹¹ Pressure injuries afflict and discourage patients, and constitute an infection door, hindering to recover and increase hospitalization time and, consequently, costs.⁴

Pressure ulcers follow as a serious and routine problem in the health services, due to the high incidence, increased mortality and costs arising from it. Therefore, the importance of the commitment of the health team and particularly of nursing in the knowledge of risk factors and in the use of daily preventive measures to manage care in an integral way, to critical patients hospitalized in Intensive Care Units.¹¹⁻¹²

Therefore, nurses are constantly challenged in the search for scientific knowledge to promote better patient care to prevent PUs. In this sense, the use of the integrative review is highlighted as a valuable method, which contributes to the presentation of varied perspectives on a phenomenon of interest, being defended as important for Nursing Science, as well as for its practice.¹³

Integrative reviews are the broader types of research evaluations since they allow the simultaneous inclusion of experimental and non-experimental research to more fully understand a phenomenon studied.¹³ Being a tool capable of gathering quality material for consultation, helping professionals working in clinical practice, who report that they do not have time to read all available scientific knowledge because they spend most of their time in service. Also, this reading should be accompanied by a critical analysis of the studies, so quality assistance based on scientific knowledge can be offered.

Given the above, this study aims to investigate the scientific evidence on the main nursing strategies for the prevention of pressure ulcers used in patients hospitalized in Intensive Care Units.

METHOD

This is an integrative review¹³ elaborated from the stages: establishment of the hypothesis and objectives of the integrative review; Establishment of inclusion and exclusion criteria of the articles (sample selection); Definition of the information to be extracted from the selected articles; Analysis of results; Discussion and presentation of the results, and the last step was to presenting the review.¹⁴

The synthesis of the results of relevant and globally recognized research facilitates the incorporation of evidence, that is, it accelerates the transfer of new knowledge to practice, contributing to the improvement of the care provided to the patient and family.¹⁴

The guiding question for the elaboration of the integrative review was based on the strategy PICO¹⁴ (P = population, I = intervention, C = control, O = outcomes) and consisted of: What strategies have been used by the Nursing team to prevent PU in patients in Intensive Care Units?

The scientific productions were searched in the following databases LILACS (Latin American and Caribbean Literature in Health Sciences), PUBMED/MEDLINE, CINAHL (Cumulative Index to Nursing and Allied Health Literature). The choice of these bases has been adopted by the researchers under a study review.¹⁴

The English words pressure ulcer AND prevention, AND intensive care AND NOT treatment were used to perform the searches in the bases. There was no limitation of the year of publication.

The inclusion criteria were: complete articles available electronically; Articles available in Portuguese, English or Spanish; Complete articles of research that address the preventive nursing interventions of PU in the scope of intensive therapy. The exclusion criteria were: general population served outside the Intensive Care Units; Articles that did not describe the preventive interventions and publications of abstracts and research projects. The search was performed by online access and, using the inclusion criteria, the final sample of this integrative review was 13 articles. Following, there is the flowchart of this selection:

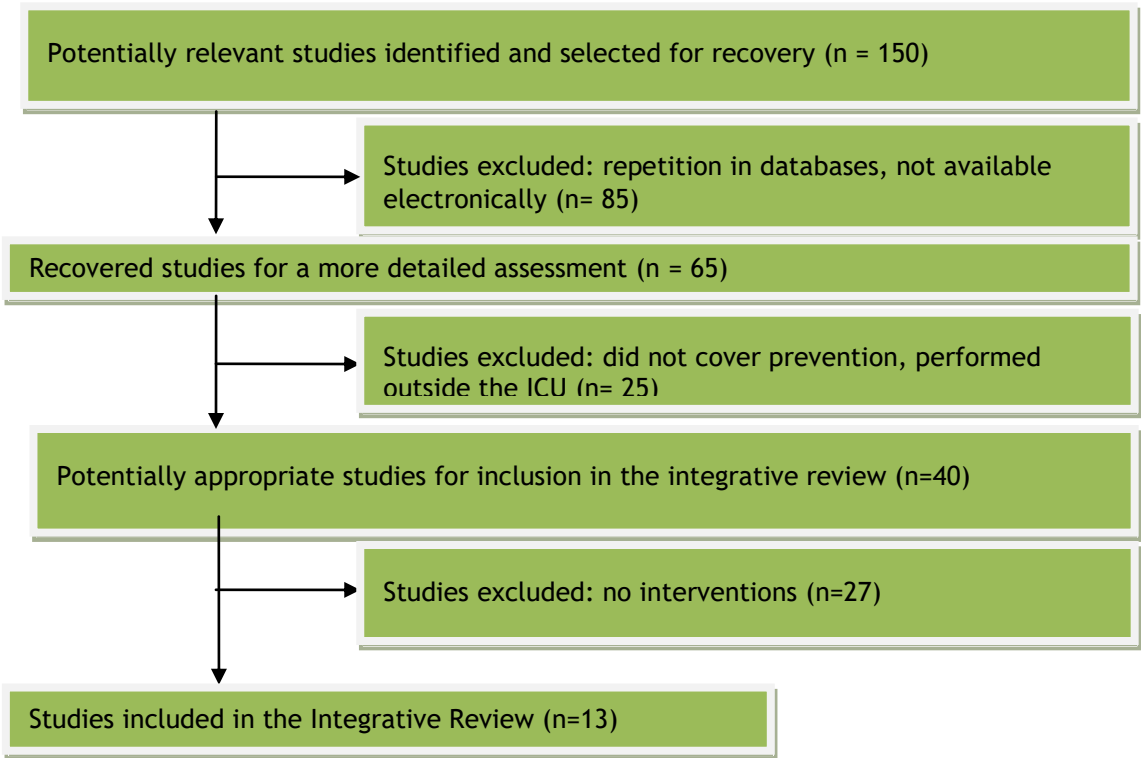


Figure 1. Flowchart for selection of included articles of the integrative review. Fortaleza (CE), Brail, 2014.

The selection of the articles was from November to December 2014. After this stage, the data of the articles were extracted by an adapted data collection instrument constructed and validated in a study performed by a nurse. This instrument includes: the identification of the original article, the methodological characteristics of the study, the evaluation of methodological rigor, the interventions measured and the results found.¹⁴

The synthesis of the extracted data is presented in a descriptive way, contemplating the fifth and sixth stages of the integrative review. The classification of studies was based on the analysis of the research design by the level of evidence.¹⁵

RESULTS AND DISCUSSION

The discussion was based on the knowledge synthesis evidenced in the articles analyzed on the subject to contribute to a better understanding of the effective care in the prevention of PU in Intensive Care Units.

The sample consisted of 13 primary studies. Of them, one article was indexed in CINAHL, nine in PUBMED/MEDLINE and three in LILACS. Of them, 10 were published in English and three in Portuguese. Concerning the year of publication, the concern with this theme was in 2008; Following a constancy in subsequent years, increasing in 2012 and 2014, with three and four publications respectively for each year. Regarding the type of journal, ten articles were published in international journals and three in Brazilian journals, four in critical care specialized journals; Three in journals from other areas of health and six in General Nursing magazine. The main country responsible for publications was the United States of America (USA) with five of the studies; Next in Brazil, with three of the publications, Spain with two of the publications. Finally, England, Japan, Australia, with one article.

Regarding the type of research design, six descriptive studies, five Quasi-experiment studies, one pre/post cohort study and one randomized clinical trial were included.

The studies were classified into levels of evidence (LE): Level I: the evidence comes from a systematic review or meta-analysis of all relevant randomized controlled trials or clinical guidelines based on systematic reviews of randomized controlled trials; Level II: Evidence derived from at least one well-delineated randomized controlled trial; Level III: Evidence obtained from well-delineated clinical trials without randomization; Level IV:

Evidence from well-delineated cohort and case-control studies; Level V: evidence from a systematic review of descriptive and qualitative studies; Level VI: evidence derived from a single descriptive or qualitative study; Level VII: evidence from the opinion of authorities and / or report of expert committees.¹⁵

About the focus of the publications included in the study, six empirical thematic categories emerged.

Title	Prevention measures	LN	Conclusions/Recommendations
Prospective, nonrandomized controlled trials to compare the effect of a silk-like fabric to standard hospital linens on the rate of hospital-acquired pressure ulcers.	Use of synthetic tissue (overlays) of silk on the incidence of PU in ICU.	III	Synthetic textile materials have the potential to reduce the development of pressure ulcers and contribute to better outcomes for patients at risk or who have pressure ulcers.
Comparison of alternating pressure mattresses and overlays for prevention of pressure ulcers in ventilated intensive care patients: a quasi-experimental study.	Use of alternating pressure air mattress compared to the use of overlays in patients submitted to mechanical ventilation in ICU.	III	Alternating pressure air mattresses were more effective than alternating air pressure overlaid in the prevention of pressure ulcers in critical patients undergoing mechanical ventilation.
Use of pneumatic mattress in reducing pressure ulcers: efficacy and perceptions of nursing.	Use of pneumatic mattress in the reduction of PU in coronary units in a cardiological hospital.	VI	Mattresses were effective in reducing the incidence of pressure ulcers. There is a need to update the teams that work in intensive care for the use of pneumatic mattresses.
Continuous bedside pressure mapping and rates of hospital-associated pressure ulcers in a medical intensive care unit.	Use of special overlaid continuous bedside pressure mapping (CBPM) on ICU mattresses.	III	CBPM helped the ICU team to improve efficacy in patient repositioning, based on the significant reduction in the formation of new and smaller PU.
Using an alternating pressure mattress to offload heels in ICU.	Use of pressure-alternating pressure air mattress at the end of the mattress.	VI	None of the patients who used this mattress developed calcaneal ulcers during the evaluation period. Such a mattress offers an integrated system of redistribution of pressure to the body, while also providing an innovative method to lower the pressure in the heel.

Figure 2. Titles, prevention measures, the level of evidence and recommendations of the publications relevant to the first category. Fortaleza (CE), Brazil, 2014.

In category 1, composed of 5 articles,^{4,16,17,18,19} the focus was on the use of support surfaces. All the studies of this category affirm that the use of these technologies, especially those related to the alternation of pressure or synthetic tissues, reduces the incidence of PU in critically ill patients at high risk for lesion development. A study conducted in Spain¹⁷ to compare the effectiveness of air pressure mattresses alternating vs. overlaps with alternating air pressure in avoiding PU in patients submitted to mechanical ventilation evidenced that mattresses were more effective in preventing PU than overlaps.

Support surfaces such as mattresses, cushions, and pillows used for pressure redistribution help reduce the risk of PU. The incidence of pressure ulcer formation is significantly lower in patients using these devices to distribute pressure and protect bone prominences.¹²

Title	Prevention measures	LE	Conclusions/Recommendations
Evaluation of the Pressure Ulcer Prevention Clinical Decision Report for Bedside Nurses in Acute Care Hospitals.	Daily report program for pressure ulcers (PU daily) with information on the risk factors to develop PU of the patients and the current state of PUs to help nurses prevent the development of PU.	IV	Interventions were successful in reducing total PU, and decreasing the conversion from Category I from PU to Category II of PU. "PU daily" demonstrated that nurses could use patient-specific information promptly.
Quality Improvement Program to Reduce the Prevalence of Pressure Ulcers in an Intensive Care Unit.	Program strategies for patient outcomes by reducing the prevalence of PU, identifying areas of improvement in pressure ulcer prevention, and increasing the adoption of preventive strategies in an ICU.	III	The program was successful in reducing the prevalence of PU among critically ill patients at risk and indicates that quality improvement is a highly effective formula for improving patient outcomes and easily implemented using clinical experience and existing resources.
Pressure Ulcers in the Intensive Care Unit: New Perspectives on an Old Problem.	Protocol of prevention and management of pressure ulcer of a Hospital of New York.	VI	The key point to reduce the incidence of PU includes modifying our understanding of the importance of the integumentary system and strong collaboration among members of the multidisciplinary team.

Figure 3. Titles, prevention measures, the level of evidence and recommendations of the publications relevant to the second category. Fortaleza (CE), Brazil, 2014.

Regarding the use of PU prevention protocols observed in category 2, the three studies found²⁰⁻² on the subject presented homogeneous results regarding the success of the implementation of these interventions in the total reduction of PU. Research²⁰ aimed to evaluate the impact of a daily nursing report for PU (PU daily) on the reduction of PU in critical patients showed that, besides to the reduction of the PU indexes, nurses could use patient-specific information promptly, contributing to the multidisciplinary discussions.

A study carried out in the city of São Paulo evaluated the implementation of a protocol for the prevention of pressure ulcers in patients of the Intensive Care Unit and, corroborating with the results of this review, found a marked decrease in the incidence of PU in the institution after implementation of the protocols of risk assessment and prevention, confirming that these tools are fundamental and impact in the control of the incidence of PU, when used systematically.²³

Title	Prevention measures	LE	Conclusions/Recommendations
Comparison of two repositioning schedules for the prevention of pressure ulcers in patients on mechanical ventilation with alternating pressure air mattresses.	Change of decubitus in alternating pressure mattresses (comparison between 2/2 and 4/4 hours) in ICU patients submitted to mechanical ventilation.	II	The strategy of increasing the frequency of repositioning (2h vs. 4h) in patients under MV and using mattresses with alternating air pressure did not reduce the incidence of PU. However, it has contributed to increasing the incidence of adverse events related to invasive devices besides increasing the daily load of nursing work.
Effects of turning on skin-bed interface pressures in healthy adults.	Change of decubitus (Examining the effects of lateralized positions on the incidence of skin-bed interface pressures).	VI	The decubitus patterns used by experienced ICU nurses do not reliably relieve all areas of the high-pressure skin-bed interface. These areas remain at risk of skin rupture, which helps explain why pressure ulcers occur despite the implementation of standardized preventive measures. Support materials for lateral decubitus can also influence pressure relief and triple risk areas.

Figure 4. Titles, prevention measures, the level of evidence and recommendations of the publications relevant to the third category. Fortaleza (CE), Brazil, 2014.

In category 3, referring to the change in decubitus, the studies found have had impressive results widespread assistance practice of the repositioning protocols. A study²⁵ conducted in the USA examined the effects of lateralized positions on the

incidence of skin-bed interface pressures and their efficacy in relieving tissue pressure at risk and found that the change in decubitus patterns used by ICU nurses did not relieve all pressure areas and some lateral pressure support materials may also influence pressure relief. This result helps to explain the reason for the development of PU despite the implementation of standardized preventive measures.

Corroborating with the results of this study mentioned above, a randomized clinical trial

conducted in the USA aimed to compare the incidence of PU in ICU patients repositioned every 2 hours or every 4 hours, submitted to mechanical ventilation for more than 24 hours and using mattresses with pressure (2h vs. 4h) in patients under MV and the use of mattresses with alternating air pressure did not reduce the incidence of PU. However, it has contributed to increasing the incidence of adverse events related to invasive devices besides increasing the daily workload of nursing.²⁴

Category	Title	Preventions measures	LE	Conclusions/Recommendations
4	Prevention of pressure ulcers in the heel with transparent polyurethane film.	Use of transparent polyurethane film on the calcaneus.	III	The transparent polyurethane film associated with the clinical guidelines of pressure ulcers was effective in the prevention of pressure ulcer in the heel.
5	Ulcer by Pressure in ICU: risk factors and prevention measures	- Identification of risk factors; - Use of “egg box” mattress; - Use of protective cushions; - Use of hydrocolloid plaques; - Use of moisturizing solutions for the skin.	VI	The quality of nursing care directly related to patient assessment, individualized and systematized care planning, nurses' ability and competence in the evaluation of intrinsic and extrinsic factors for the occurrence of PU.
6	Continuous monitoring of interface pressure distribution in intensive care patients for pressure ulcer prevention.	Monitorização contínua da pressão dos colchões de pacientes no pós-operatório em UTI através de um sensor.	VI	It was demonstrated the feasibility of this approach, as well as a tool to explore the relationship between interface pressure and PU development.

Figure 5. Titles, prevention measures, the level of evidence and recommendations of relevant publications to the fourth, fifth and sixth category, respectively. Fortaleza (CE), Brazil, 2014.

In category 4, the use of transparent film as a preventive cover of PU in a Brazilian article is verified.²⁶ The transparent polyurethane film associated with the clinical guidelines of the PU was effective in the prevention of calcaneal lesions.

Regarding the use of biological coverages for PU prevention, a comparative secondary analysis survey showed that transparent film was more cost-effective than hydrocolloid in the prevention of sacral pressure ulcer in patients of an ICU, with values of 3.8 and 9.4 times less onerous than the hydrocolloid for the intermediate and final outcomes respectively.²⁹

Regarding the influence of risk factors on the appearance of PU, presented in category 5, it is known that knowledge of these risk factors associated with preventive measures may contribute to decreasing the incidence of this complication among ICU patients, ensuring the improvement of the quality of care.²⁷ The importance of nurses' ability and competence in assessing the intrinsic and extrinsic factors for the occurrence of PU are shown.²⁷

A study developed using two sources to obtain information about PUs, considering the Nursing Process described in medical records and the notification of the incident in the PU care quality indicator, found that although the indicators of quality of care obtained through the use of scales of risk assessment of PU represent a great advance in the qualification of the care, they need to be evaluated permanently in the health institutions to become real instruments qualifying the assistance. Also, it was verified that the nursing evolutions analyzed presented important records, with essential clinical evidence to verify the reliability of the development of PU during the hospitalization of patients at risk for this condition.⁸

The last significant aspect was the continuous monitoring of the pressure in the mattresses, which compose category 6. An article shows the feasibility in clinical practice of continuous monitoring of the pressure of the mattresses of patients in the postoperative ICU through sensor embedded in the mattress.²⁸

In the sense of viability of mattress/patient pressure monitoring, a study conducted in

Australia aimed to compare the distribution of central body pressure among volunteers lying in hospital beds using a pressure redistribution belt, providing protection for the hips and coccyx areas, among volunteers without the device. Such a study measured mean pressure, contact area, and pressure distribution to quantify any differences that may have occurred, showing that device use results in reduced pressure spikes and prevents pressure from increasing over time.³⁰

In the analysis of the 13 articles, it was verified that the ulcer prevention measures were grouped as follows: five articles addressing the use of support surfaces, three articles using the use of programs/protocols, two articles covering change of decubitus, one article about the preventive of biological coverages, one article of the influence of risk factors and one article on computerized monitoring of skin pressure/support surface.

This division allowed to infer that the studies on measures of prevention of PU in intensive care are of great magnitude since they involve the improvement of technologies of nursing care, material resources, and human resources.

The selected studies had the following classification as the level of evidence: six articles with level VI,^{4,19,22,25,27-28} one with level of evidence IV,²⁰ five articles with level of evidence III^{16-18,21,26} and one with level of evidence II.²⁴

It was also observed in this review that the leaders in publications involving research on PU in intensive care are the United States of America.^{16,18,20,22,25} In Brazil, only three studies^{4,26-27} were conducted in 2010, 2013 and 2014. However, only one showed almost experimental design, while the other, observational delineations, with lower levels of evidence.

The need for investment in clinical research in this area is evident to understand the efficient measures that are in line with the reality of the ICUs in our country, as well as the survey of the economic impact of PUs on health institutions and the evaluation of the effectiveness of the care provided to the critical patient.

CONCLUSION

Concluding this present integrative review, searching for the best available evidence, regarding effective nursing interventions for the prevention of pressure ulcers in intensive care services, it is understood that nurses' decision-making on critical patient care should be performed based on a careful and

individualized evaluation, taking into account the peculiarities of the condition of this type of hospitalization. For this evaluation, it is necessary that the professional is scientifically based on implementing effective interventions that meet the patient's real needs.

This integrative review reinforced the importance of implementing preventive measures based on scientific evidence in nursing care for critical patients. In this sense, the recommendations most described in the literature were related to the use of varied support surfaces, mostly pressure-alternating mattresses, followed by the adherence of PU prevention protocols, and to decubitus change routines.

It was also verified that through this study, it is possible to develop protocols of nursing interventions for the prevention of PUs aimed at critical patients since evidence has been found in the literature that contemplates most of the possibilities of preventive measures applicable to the Intensive Care Units of Brazil.

There was an evident gap in the Brazilian literature regarding the preventive nursing interventions for PU in intensive care since the minority of the studies found contemplates the Brazilian population. In view of the gaps highlighted and the results pointed out in the articles included in this integrative review, it is understood that it is necessary to intensify efforts for the development of research with designs that produce strong evidence related to the subject investigated, especially in the reality of nursing practice in the scope of intensive therapy, subsidizing and strengthening Evidence-Based Practices in our activity area.

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Submission: 2016/04/08

Accepted: 2017/01/22

Publishing: 2017/05/01

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