Clinical-epidemiological profile of patients with pressure injuries in the hospital context

Perfil clínico-epidemiológico dos pacientes com lesão por pressão no contexto hospitalar

Perfil clínico-epidemiológico de pacientes con lesión por presión en el contexto hospitalario

Lidiane Souza Lima¹*, Neylor Rodrigo Oliveira Aragão¹, Gleyce Kelly de Brito Brasileiro Santos², Eduesley Santana Santos³, Cátia Suely Palmeira⁴

ABSTRACT

Objective: describe the clinical-epidemiological profile of patients with pressure injuries admitted to a university hospital. Method: descriptive study with 122 patients with pressure injuries admitted to a university hospital between January 2018 and December 2019. Data were collected from patients’ medical records and from the Serviço Assistencial de Cuidados com a Pele (Skin Care Assistance Service) database. Descriptive statistics were used for data analysis. Results: pressure injuries predominated among adults and the elderly, browns, who studied up to elementary school and had no partner. There was a similarity between the sexes. The patients had, mainly, infectious disease, one or more comorbidities, nutritional alteration, mixed incontinence and used nutritional therapy, but did not present dermatitis associated with incontinence and smoking history. Most patients were classified as high risk of pressure injury. The study totaled 237 lesions, most of which were acquired before admission, not classifiable, located in the sacrococcygeal region, treated topically with hydrogel with alginate and hydrocolloid, and not healed at the time of hospital discharge. Conclusion: the study described important aspects of the characterization of pressure injuries, as well as the people affected by this serious health problem, which can optimize prevention and treatment actions.

DESCRIPTORS: Stomatherapy; Pressure injury; Epidemiology; Hospitals.
INTRODUCTION

Pressure injuries (PI) are a frequent phenomenon in health institutions at all levels of care. In Brazil, in 2017, there were 13,834 cases of PI and 5 deaths, for this reason, notified by health institutions, corresponding to 18.37% of notifications of adverse events and 1.14% of deaths resulting from this type of event. However, the real extent of this problem is still unknown, since the Agência Nacional de Vigilância Sanitária (National Health Surveillance Agency) admits the occurrence of underreporting admite a ocorrência de subnotificações1.

The National Pressure Injury Advisory Panel (NPIAP), an internationally recognized organization for its commitment to the prevention and management of PI, defines them as localized damage to the skin and/or underlying soft tissues, usually on a bony prominence or related to the use of a medical device or other artifact. The lesion may appear on intact skin or as an open ulcer and occurs as a result of intense and/or prolonged pressure in combination with shear2.

In general, PI results from a complex combination of risk factors intrinsic and extrinsic to the patient. The deficit in mobility, activity and perfusion are the most frequent predictors in the development of these lesions, as well as the presence of an area of unbleachable hyperemia in the skin (PI stage 1). Other factors can also be mentioned: nutrition, general health, hematological changes, age, skin moisture, body temperature, immunity, use of vasoactive drugs, sedation and comorbidities (e.g. diabetes mellitus and vascular disease)3.

As a consequence of the PI, there is an increase in the length of hospital stay and the rate of morbidity and mortality, which results in a considerable increase in health care costs related to the human, material and physical resources of the health system4,5.

In Brazil, a study carried out in a palliative care unit in Minas Gerais calculated an annual cost of approximately R$ 445,664.38 for the treatment of PI and concluded that...
the prevalence of these injuries and the inappropriate use of materials are directly proportional to the care costs. PI are classified in stages according to the layer of skin that has been affected. Stage 1 PI refers to a defined area of unbleachable hyperemia in the skin; in stage 2 PI there is exposure of the dermis; stage 3 PI reaches the subcutaneous tissue; stage 4 PI affects the deeper tissues, such as fascia, muscle, tendon, ligament, cartilage or bone; in the non-classifiable stage, a necrosis layer covers the wound bed, and it is not possible to classify it; the deep tissue PI is an area of dark red, brown or purple discoloration, persistent and that does not whiten. PI can also occur in the mucous membrane and/or in association with a medical device.

When assessing a patient’s risk of developing PI, several known risk factors should be considered. To guide this assessment, there are specific and scientifically proven predictive instruments, such as the Braden Scale. The patient is classified as risk-free or with low, moderate or high risk, according to the score obtained in the subscales: sensory perception, humidity, activity, motility, nutrition and friction/shear.

Health care, when well managed, can result in a positive impact on the safety and quality of the service offered, on the quality of life and the level of satisfaction of professionals and customers. Therefore, this study is justified by adding knowledge about the population most affected by PI, as well as the characteristics of these injuries, in order to help health professionals plan health care based on scientific evidence and local reality, optimizing the allocation of physical, human and financial resources.

**OBJECTIVE**

To describe the clinical-epidemiological profile of patients with PI admitted to a university hospital.

**METHOD**

Descriptive, documentary study, carried out at Hospital Universitário de Sergipe, campus Aracaju, a teaching hospital, fully integrated with the Unified Health System (Sistema Único de Saúde) and a reference in medical and hospital assistance of medium and high complexity in the State. The hospital has an installed physical capacity of 111 hospital beds, 36 of which belong to the Medical Clinic, 36 to the Surgical Clinic, 11 to Pediatrics, 10 to the Intensive Care Unit and 18 to Oncology.

All patients admitted to the study site with PI or who developed it during hospitalization, from January 2018 to December 2019, comprised the study population, which was made up of 122 participants, so no sample was extracted.

The data were collected from February to March 2020, in the patients’ medical records and in the database of the Skin Care Assistance Service (Serviço Assistencial de Cuidados com a Pele -SACP) in which the skin lesions of all patients being monitored are recorded, as well as the treatment instituted. It is noteworthy that due to the pandemic of Coronavirus Disease (COVID-19), in which social isolation was recommended, it was not possible to collect data on the clinical variables of all participants, since access to the patients’ medical files became restricted.

For data collection, a specific instrument developed by the authors was used, consisting of sociodemographic and clinical variables, such as: age, sex, education, marital status, race, diagnosis at admission, inpatient unit, comorbidities (diabetes mellitus, arterial hypertension, heart failure, anemia or depression), nutritional alteration (obesity or malnutrition), use of nutritional therapy (enteral and/or parenteral), presence of incontinence, dermatitis associated with incontinence and smoking. The classifications of schooling and marital status used correspond to those adopted by the place of study for purposes of registering hospitalization.

The data collection instrument also presented the risk classification for developing PI, according to the Braden Scale, and variables related to injuries: classification - according to NPIAP (2019) -, anatomical location, origin, initial topical treatment and situation of the injury at the time of hospital discharge.

The collected data was stored in a database in Microsoft Office Excel and later exported to Statistical Package for Social Science (SPSS), version 20.0, to be processed and analyzed. Categorical variables were described by absolute and relative frequencies and the items of scale and sum of total results by measures of central tendency and dispersion (mean and deviation).

The research was authorized by the Teaching and Research Management of the place of study and approved by the Research Ethics Committee of the Universidade Federal de Sergipe according to CAAE nº 09946119.40000.5546.
RESULTS

In this research, there were 122 patients, with a mean age of 54 ± 24 years and a predominance of adults (43.3%) and elderly (45.1%). Men and women had an equal participation in the study (50.0% each). Most participants studied up to elementary school (47.5%), declared that they did not have a partner (59.0%) and were of brown color (95.9%) (Table 1).

Table 1. Sociodemographic aspects of the study population (n=122). Aracaju (SE), Brasil – 2020.

| Age range              | n (%)   |
|------------------------|---------|
| Elderly (60 years and over) | 55 (45.1) |
| Adults (20 - 59 years) | 53 (43.3) |
| Adolescents (11 - 19 years) | 6 (4.9)    |
| Schoolers (5 - 10 years) | 3 (2.5)    |
| Infant (0 - 2 years)   | 3 (2.5)    |
| Preschoolers (2 - 4 years) | 2 (1.6)   |
| Gender                 | n (%)    |
| Male                   | 61 (50.0) |
| Female                 | 61 (50.0) |
| Education              | n (%)    |
| Elementary School      | 58 (47.5) |
| None/Ignored           | 34 (27.8) |
| High School            | 27 (22.1) |
| Higher education       | 3 (2.4)    |
| Marital status         | n (%)    |
| Single/Widowed/Separated | 72 (59.0) |
| Married/Stable relationship | 38 (31.1) |
| Others                 | 12 (9.9)   |
| Race                   | n (%)    |
| Brown                  | 117 (95.9) |
| Black                  | 3 (2.5)    |
| Without declaration    | 2 (1.6)    |

Infectious diseases were more frequent (35.2%) among the causes of hospitalization of the research participants. As well as the medical clinic (54.1%) and intensive care units (21.3%) were those with the highest number of patients hospitalized with PI (Table 2).

Regarding the other clinical variables, most of the subjects had one or more comorbidities (68.9%), had changes in nutritional status (56.6%) and used nutritional therapy (45.9%) (Table 2).

Most of the subjects surveyed had urinary, fecal and / or mixed incontinence (60.7%). However, he did not have dermatitis associated with incontinence (51.6%), as well as a smoking history (84.4%) (Table 2).

Table 2. Clinical aspects of the study population. Aracaju (SE), Brasil – 2020.

| Inpatient unit (n=122) | n (%)   |
|------------------------|---------|
| Medical Clinic Unit    | 66 (54.1) |
| Intensive care unit    | 26 (21.3) |
| Oncology Unit          | 12 (9.8)  |
| Surgical Clinic Unit   | 10 (8.2)  |
| Pediatric Unit         | 8 (6.6)   |
| Diagnosis at admission (n=122) | n (%) |
| Infectious disease     | 43 (35.2) |
| Other(1)               | 42 (34.4) |
| Lung Disease           | 19 (15.6) |
| Gastrointestinal disease | 18 (14.8) |
| Comorbidities (n=113)  | n (%)    |
| One or more comorbidities | 84 (68.9) |
| No comorbidities       | 29 (23.8) |
| Nutritional alteration(n=118) | n (%) |
| Yes                    | 69 (56.6) |
| No                     | 49 (40.2) |
| Nutritional therapy (n=96) | n (%) |
| Yes                    | 56 (45.9) |
| No                     | 40 (32.8) |
| Incontinence (n=117)   | n (%)    |
| Mixed (urinary and fecal) | 66 (54.1) |
| Without incontinence   | 43 (35.2) |
| Urinary                | 5 (4.1)   |
| Fecal                  | 3 (2.5)   |
| Dermatitis associated with incontinence (n=107) | n (%) |
| No                     | 63 (51.6) |
| Yes                    | 44 (36.1) |
| Smoking (n=113)        | n (%)    |
| No                     | 103 (84.4) |
| Yes                    | 10 (8.2)   |

(1) It includes genitourinary, neuromotor, neoplastic, hematological, vascular, cardiac, metabolic, autoimmune, dermatological disease.
Most of the research participants were classified as high risk (68.9%) to develop PI, followed by moderate risk (18.0%), according to the Braden Scale (Table 3).

The total PI presented by the 122 patients was 237, an average of 1.9 injuries per patient and the majority of participants (63.1%) had only one injury. Most of the injuries studied were acquired prior to admission to the study site (79.3%) (Table 3).

Regarding the classification of the lesions, 25.3% corresponded to the non-classifiable lesion, followed by the stage 2 (22.4%) and deep tissue lesions (12.2%). The predominant anatomical locations for the appearance of these injuries were the sacrococcygeal (36.3%) and calcaneus (21.1%) regions. Regarding treatment, alginate hydrogel (20.7%) and hydrocolloid (19.8%) were the most used initial topical treatments. Most injuries were not healed at the time of hospital discharge (46.5%) (Table 3).

| PI risk (n=122) n (%) |
|-----------------------|
| High Risk 84 (68.9)   |
| Moderate Risk 22 (18.0) |
| Low Risk 11 (9.0)     |
| No Risk 5 (4.1)       |

| Origin (n=237) n (%) |
|----------------------|
| Prior to hospitalization 188 (79.3) |
| Acquired in the institution 49 (20.7) |

| PI Classification (n=237) n (%) |
|-------------------------------|
| Unclassifiable PI 60 (25.3) |
| Stage 2 53 (22.4) |
| Deep Tissue 29 (12.2) |
| Stage 3 27 (11.4) |
| Stage 4 27 (11.4) |
| Stage 1 20 (8.4) |
| PI Associated with Medical Device 20 (8.4) |
| PI in mucous membrane 1 (0.4) |

| Anatomical location (n=237) n (%) |
|----------------------------------|
| Sacrococcygeal 86 (36.3) |
| Others(1) 70 (29.5) |
| Calcaneal 50 (21.1) |
| Ischia 31 (13.1) |
| Others(2) 65 (27.4) |
| Hydrogel with alginate 49 (20.7) |
| Hydrocolloid 47 (19.8) |
| Papan 22 (9.3) |
| Hydrocellular foam for sacral region 18 (7.6) |
| Collagenase 14 (5.9) |
| Rayon gauze with EFA 12 (5.1) |
| No topical treatment 10 (4.2) |
| Unhealed WITH SACP guidance 94 (39.7) |
| Does not apply (death) 65 (27.4) |
| Healed 62 (26.2) |
| Unhealed WITHOUT SACP guidance 16 (6.8) |

Regarding only the PI acquired at the study site, most were classified as stage 2 (40.8%), followed by the non-classifiable (24.5%), and the majority affected the sacrococcygeal region (55.1%). The most used treatments were also hydrocolloid (36.7%) and hydrogel with alginate (26.5%). Only 18.4% of the injuries were not healed at the time of hospital discharge (Table 4).
### DISCUSSION

In the present study, a greater number of injuries were identified in elderly people, which corroborates the literature. This fact may be related to the physiological changes inherent to aging, such as decreased skin turgor and elasticity; presence of comorbidities, such as hypertension and stroke, more frequent in this age group; and also the use of medications, such as painkillers, antihypertensives and anticoagulants. In the elderly, the involvement of chronic non-communicable diseases can not only affect the perceptual capacity, blood circulation, oxygenation, mobility, level of consciousness, levels of electrolytes and proteins, but also increase the probability of complications resulting from the long period of hospital stay, including risk of PI. Therefore, the importance of meeting the needs and maintaining the functional capacity of this population in order to prevent complications.

In this study, there was no difference in the number of patients according to sex for the occurrence of PI. A study conducted with patients hospitalized for external causes shows a higher incidence of males. However, research carried out in the Intensive Care Unit of a general hospital indicates a predominance of females or similar incidence between the sexes, which demonstrates the absence of consensus on the topic.

Infectious diseases were the main diagnosis that justified the admission of research participants, followed by lung diseases. Among infectious diseases, infections specifically of the respiratory tract appear among the predominant pathologies in patients with PI. It is known that in the face of dyspnea, patients become restricted to the bed and feel more comfortable with the head of the bed elevated above 30°. This reduces the ability to relieve pressure on bony prominences and increases the intensity and duration of pressure in the sacral region.

The medical clinic and intensive care units had a higher frequency of PI, which corroborates other studies. This finding may be associated with the clinical profile of patients seen at these locations, as they are more likely to experience debilitating conditions, advanced age, comorbidities, immobility, incontinence, in addition to the use of medications that interfere with the ability to maintain and recover skin tissue, impair mobility and sensory perception, such as sedatives and painkillers.

Another important finding in this study was the high percentage of people hospitalized with comorbidities, such as diabetes mellitus, systemic arterial hypertension and heart failure, which reflects the complexity of the clinical conditions of the research participants. These diseases are considered important risk factors for PI, since the different pathophysiology alter the skin’s blood perfusion with the possibility of tissue ischemia. In addition, your pharmacological therapies can also affect blood flow and make tissues more susceptible to pressure.

Still concerning clinical conditions, it is worth mentioning that more than half of the participants in this study had nutritional changes at the time of admission. Nutritional deficit and dehydration play a role in the genesis and healing of PI, since they can cause loss of muscle mass, exposure of bony prominences, edema, reduced mobility and cutaneous blood flow, in addition to other pathophysiological changes that result in ischemic skin lesions. Adequate intake of calories, proteins, vitamins,

#### Table 4. Continuation...

| Anatomical location         | n (%)  |
|-----------------------------|--------|
| Sacrococcygeal              | 27 (55.1) |
| Others                     | 9 (18.3)  |
| Calcaneal                   | 6 (12.2)  |
| Trochanters                 | 5 (10.2)  |
| Dorse                       | 2 (4.1)   |

| Initial topical treatment   | n (%)  |
|-----------------------------|--------|
| Hydrocolloid                | 18 (36.7) |
| Hydrogel with alginate      | 13 (26.5) |
| Hydrocellular foam for sacral region | 7 (14.3) |
| Others                      | 6 (12.2)  |
| No topical treatment        | 5 (10.2)  |

| Condition of PI at hospital discharge | n (%)  |
|---------------------------------------|--------|
| Does not apply (death)                | 22 (44.9) |
| Healed                                | 18 (36.7) |
| Unhealed WITH SACP guidance           | 7 (14.3) |
| Unhealed WITHOUT SACP guidance        | 2 (4.1)   |

PI = Pressure injury; Includes elbows, occiput, shoulder blades, buttocks, ribs, malleoli, ear, nose, mouth, backbone; Includes rayon gauze with EFA, collagenase, papain, polyurethane foam without silver and siliconized foam; SACP = Serviço Assistencial de Cuidados com a Pele (Skin Care Assistance Service).
Because of these situations, special attention is required frequently, which allows the early detection of the first signs of PI, must have the sacrococcygeal region and buttocks inspected demand repeated cleaning of the genitalia and anal region Scale, it was observed that most patients were classified as having moderate or high risk, although patients without risk or with low risk also developed PI. It is observed that this scale has moderate predictive validity and could be improved if it considered the attributes of the study subjects, that is, other important risk factors for PI, such as age, medication use, level of consciousness, comorbidities, among others. However, the ease of application of the scale justifies its wide use.

It is worth mentioning that the number of patients admitted with PI was higher than that of those who developed it after hospitalization in the researched place. Similar finding is observed in other studies. It is believed that the advent of the Programa Nacional de Segurança do Paciente (National Patient Safety Program), in 2013, which provides for preventive actions for PI, was important in reducing the incidence rates of PI in health institutions.

When considering only injuries acquired at the study site, the predominance of stage 2 PI is observed, which coincides with the literature. This may mean that in a hospital there is greater surveillance of skin conditions, causing the first signs of PI to be detected early, leading to a lower frequency of more serious injuries. It is also necessary to consider the fact that at the place of study there are protocols for skin evaluation and prevention of PI, which helps professionals in decision making and, therefore, more effective care.

The aforementioned protocols are carried out by the SACP, which is responsible for planning actions and preparing institutional documents within the PI prevention and treatment program; carry out training and updating of assistance teams; request standardization and purchase of products and materials for the prevention and treatment of these injuries; and supervise assistance. A survey conducted in 2016 found a 69% reduction in the incidence of PI after applying a prevention program, with potential cost savings of approximately US$ 1 million.

When assessing the anatomical location of the PI of the participants in this research, a higher frequency is observed in the sacrococcygeal region, coinciding with other studies. This region is more frequently affected in the elderly and in patients with an additional diagnosis of urinary and/or fecal incontinence due to the fragility of the skin with aging and the action of moisture, urine acidity and proteolytic enzymes present in the feces, as previously discussed.
The treatment of PI is based on the reduction or elimination of the pressure source and general care for the wound, that is, cleaning, control of humidity, temperature and microbial load and debridement of necrotic tissue. For this, topical products are used that favor the ideal means for healing. Hydrocolloid and alginate hydrogel, the main coatings adopted in the researched location, are products capable of providing moisture retention, mechanical protection, isolation, barrier against bacteria and autolytic debridement.

Although foams, collagen and growth factor are the most effective options for the treatment of PI, there is a lack of robust research that can consider the wide heterogeneity of the coverings, the dynamics of the healing process and the other factors that influence healing. Thus, it is not possible to safely determine which coverings are more likely to heal PI. In this context, when selecting a coverage, the characteristics of the lesion and its anatomical location must be analyzed, in addition to the specific functions of each product, its availability and the cost-benefit ratio.

It can be highlighted as limitations of the study: (1) difficulty in accessing the medical records of the research participants, which made it impossible to consider the totality of data related to clinical variables; (2) how the data were recorded in the SACP database, which did not allow the use of a cross-sectional approach; (3) unincentric study. Therefore, it is recommended to carry out multicenter studies on the subject.

Despite the limitations, the study allowed to know important aspects of PI, as well as the people who are affected by this serious health problem. Despite the findings reflecting a local reality, it is believed that they can guide the decision making of care teams and managers regarding the prevention and treatment of PI, in addition to assisting in the prediction of human, physical, material and care costs in various scenarios in the health sector.

CONCLUSION

PI affected mainly adults and the elderly with infectious diseases, comorbidities, nutritional changes, some type of incontinence and were classified as having high risk of PI. The lesions, mostly, were located in the sacrococcygeal region, were in an unclassifiable stage, were treated with hydrogel with alginate and hydrocolloid and were not healed at the time of hospital discharge.

Because they are a multifactorial condition and can reach different body topographies, PIs should always be investigated, prevented and treated early and regularly during hospitalization. For this, it is essential to form a multidisciplinary work team, known generically as the Skin Commission, with a focus on defining the institutional standards and protocols for the prevention and treatment of PI, as well as supporting the care teams in clinical practice.

AUTHORS ‘CONTRIBUTION

Conceptualization: Lima LS, Aragão NRO and Santos GKB; Formal analysis: Santos ES and Palmeira CS; Investigation: Lima LS and Aragão NRO; Methodology: Lima LS, Aragão NRO, Santos GKB, Santos ES and Palmeira CS; Writing - First version: Lima LS and Aragão NRO; Writing - Review & Editing: Lima LS, Aragão NRO and Palmeira CS.

REFERENCES

1. Agência Nacional de Vigilância Sanitária (BR). Boletim segurança do paciente e qualidade em serviços de saúde n. 18: incidentes relacionados à assistência à saúde – 2017. [Cited 3 Jan 2020]. Portal ANVISA 2018. Available at: https://www20.anvisa.gov.br/seguranca-paciente/index.php/publicacoes/ item/boletim-seguranca-do-paciente-e-qualidade-em-servicos-de-saude-n-18-avaliacao-dos-indicadores-nacionais-das-infeccoes-relacionadas-a-assistencia-a-saude-iras-e-resistencia-microbiana-do-ano-de-2017

2. European pressure ulcer advisory panel, National pressure injury advisory panel, Pan pacific pressure injury alliance. Prevention and treatment of pressure ulcers/ injuries: clinical practice guideline. 3ª ed; [Cited 2020 Feb 6]; 2019:408. Available at: https://www.biosanas.com.br/uploads/outros/artigos_cientificos/127/956ee02196892d7140b9bb3cdf116d13b.pdf

3. Rocha SS, Falcone APM, Pontes EDS, Rocha SRS. Análise da presença de lesão por pressão em pacientes hospitalizados...
Clinical-epidemiological profile of patients with pressure injuries in the hospital context

13. Kennerly S, Boss L, Yap TL, Batchelor-Murphy M, Horn SD, Barrett R et al. Utility of braden scale nutrition subscale ratings as an indicator of dietary intake and weight outcomes among nursing home residents at risk for pressure ulcers. Healthcare. 2015;3(4):879-97. https://doi.org/10.3390/healthcare3040879

14. Hyun S, Li X, Vermillion B, Newton C, Fall M, Kaewprag P et al. Body mass index and pressure ulcers: improved predictability of pressure ulcers in intensive care patients. Am J Crit Care 2014 Nov;23(6):494-501. https://doi.org/10.4037/ajcc2014535

15. Li C, DiPiro ND, Cao Y, Szlachcic Y, Krause J. The association between metabolic syndrome and pressure ulcers among individuals living with spinal cord injury. Spinal Cord 2016 Nov;54(11):967-72. https://doi.org/10.1038/sc.2016.53

16. Beeckman D. A decade of research on incontinence-associated dermatitis (AD): evidence, knowledge gaps and next steps. J Tissue Viability 2017 Feb;26(1):47-56. https://doi.org/10.1016/j.jtv.2016.02.004

17. Gray M, Giuliano KK. Incontinence-Associated Dermatitis, characteristics and relationship to pressure injury: a multisite epidemiologic analysis. J Wound Ostomy Contience Nurs 2018 Jan;45(1):63-67. https://doi.org/10.1097/WON.0000000000000390

18. Sousa Júnior BS, Mendonça AEO, Duarte FHS, Silva CC. Riscos para o desenvolvimento de úlceras por pressão em idosos utilizando as subescalas de Braden. Rev Gaúcha Enferm 2016;37(espe):e68075. https://doi.org/10.1590/1983-1447.2016.esp.e68075

19. Hödl M, BlanaÃº V, Amir Y, Lohrmann C. Association between incontinence, incontinence-associated dermatitis and pressure injuries: a multisite study among hospitalised patients 65 years or older. Australs J Dermatol 2020 Feb;61(1):e144-e46. https://doi.org/10.1111/ajd.13163

20. Chianca TCM, Gonçales PC, Salgado PO, Machado BO, Amorim GL, Alcoforado CLGC. Dermatite associada à incontinência: estudo de coorte em pacientes críticos. Rev Gaúcha Enferm 2016;37(espe):e68075. https://doi.org/10.1590/1983-1447.2016.esp.e68075

21. Park S-H, Choi Y-K, Kang C-B. Predictive validity of the Braden Scale for pressure ulcer risk in hospitalized patients. J Tissue Viability 2015 Aug;24(3):102-13. https://doi.org/10.1016/j.jtv.2015.05.001

22. Swafford K, Culpepper R, Dunn C. Use of a comprehensive program to reduce the incidence of hospital-acquired pressure ulcers in an intensive care unit. Am J Crit Care 2016 Mar;25(2):152-5. https://doi.org/10.4037/ajcc2016963

23. Boyko TV, Longaker MT, Yang GP. Review of the current management of pressure ulcers. Adv Wound Care 2018 Feb;7(2):57-67. https://doi.org/10.1089/wound.2016.0697

24. Lionelli GT, Lawrence WT. Wound dressings. Surg Clin North Am 2003 Jun;83(3):617-38. https://doi.org/10.1016/S0039-6109(02)00192-5

25. Furuya-Kanamori L, Walker RM, Gillespie BM, Clark J, Doo SAR, Thalib L. Effectiveness of different topical treatments in the healing of pressure injuries: a network meta-analysis. J Am Med Dir Assoc 2019 Apr;20(4):399-407. https://doi.org/10.1016/j.jamda.2018.10.010