# Factors associated to pressure ulcers in patients at Adult Intensive Care Units

FATORES ASSOCIADOS À ÚLCERA POR PRESSÃO EM PACIENTES INTERNADOS NOS CENTROS DE TERAPIA INTENSIVA DE ADULTOS

FACTORES ASOCIADOS A LA ÚLCERA POR PRESIÓN EN PACIENTES INTERNADOS EN UNIDADES DE TERAPIA INTENSIVA DE ADULTOS

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**ABSTRACT**

The objective of this a cross-sectional analytical study was to estimate the occurrence of pressure ulcers and their associated factors in adult ICUs in the city of Belo Horizonte, Brazil. The sample consisted of 142 patients aged 18 or older, admitted before midnight of the day prior to data collection, from a total of 316 beds distributed in 22 ICUs. Presence of at least one pressure ulcer per patient was 35.2% (CI 95% = 27.4-47.7). Of the 99 ulcers identified, the ones in the sacral region were most frequent (36.0%), followed by those in the calcaneus (22.0%). We observed that the presence of sepsis (OR = 6.04, CI 95% = 1.09-33.53), period of stay ≥ 10 days (OR = 7.61, CI 95% = 2.92-19.82) and being *high risk* and *very high-risk* in the Braden scale (OR = 4.96, CI 95% = 1.50-16.50) were independent factors significantly associated with the presence of pressure ulcers. Results suggest that sepsis, length of stay, and having high and very high risk" in the Braden scale are factors potentially associated to the development of ulcers in bedridden patients.

**KEY WORDS**

Pressure ulcer.
Risk factors.
Intensive Care Units.
Epidemiology.

**RESUMO**

Trata-se de um estudo seccional analítico com o objetivo de estimar a ocorrência de úlceras por pressão e seus fatores associados em CTIs de adultos, em Belo Horizonte. A amostra foi constituída por 142 pacientes, com 18 anos ou mais, internados até as 24h do dia anterior à coleta de dados, em 316 leitos, distribuídos em 22 CTIs. A presença de pelo menos uma úlcera por pressão, e por paciente, foi de 35,2% (IC 95% = 27,4-47,7). Das 99 úlceras identificadas, constatou-se que foram mais frequentes nas regiões sacral (36,0%) e calcânea (22,0%). Observou-se que presença de sepses (OR = 6,04; IC 95% = 1,09-33,53), tempo de internação ≥ 10 dias (OR = 7,61; IC 95% = 2,92-19,82) e risco alto e elevado na classificação da escala de Braden (OR = 4,96; IC 95% = 1,50-16,50) foram fatores independentes e significativamente associados à presença de úlcera por pressão. Conclui-se que sepses, tempo de internação e risco alto e elevado na classificação da escala de Braden são fatores potencialmente associados à formação de úlceras em pacientes acamados.

**DESCRITORES**

Úlcera por pressão.
Fatores de risco.
Unidades de Terapia Intensiva.
Epidemiologia.

**RESUMEN**

Se trata de un estudio seccional analítico que tuvo como objetivo estimar la ocurrencia de úlceras por presión y sus factores asociados en UTIs de adultos en Belo Horizonte-MG-Brasil. La muestra fue constituida por 142 pacientes, con edad de 18 años o superior, internados hasta las 24 hs. del día anterior a la recolección de datos, en 316 lechos distribuidos en 22 UTIs. La presencia de por lo menos una úlcera por presión por paciente fue de 35,2% (IC 95% - 27,4-47,7). De las 99 úlceras identificadas, se constató que fueron más frecuentes en las regiones sacra (36,0%) y calcánea (22,0%). Se observó que la presencia de sepsis (OR = 6,04; IC 95% = 1,09-33,53), tiempo de internación ≥ 10 días (OR = 7,61; IC 95% = 2,92-19,82) y riesgo alto y elevado en la clasificación de la escala de Braden (OR = 4,96; IC 95% = 1,50-16,50) fueron factores independientes y significativamente asociados a la presencia de úlcera por presión. Se concluye en que la sepsis, tiempo de internación y riesgo alto y elevado en la clasificación de la escala de Braden son factores potencialmente asociados a la formación de úlceras en pacientes acostados.

**DESCRIPTORES**

Úlcera por presión.
Factores de riesgo.
Unidades de Terapia Intensiva.
Epidemiología.

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## INTRODUCTION

Pressure ulcers (PU) are generally defined as localized cell necrosis areas occurring on bony prominences exposed to pressure for sufficiently long time to cause tissue ischemia. Multiple factors are involved in ulcer development, but the main one is the pressure exerted on a capillary, between the skeleton and a surface, harming it and causing the tissue necrosis. The prevalence of pressure ulcer among adult hospitalized patients can range from 3 to 14%[1].

In the United States, a national study on pressure ulcer prevalence carried out in 1999 assessed 42,817 hospitalized patients, with the following distribution per clinic: medical (28%), surgical (13%), semi-intensive (9%), orthopedic (7%) and intensive care (7%). The global prevalence of patients with pressure ulcer in that study was 14.8%, with the highest level among intensive care patients (21.5%)[2].

In a study conducted during three consecutive months at a Brazilian university hospital[3], the identified pressure ulcer incidence rate was 39.8%, varying according to the hospital unit under analysis and corresponding to 41.0% at the intensive care unit. According to the authors' knowledge, few studies on this theme have been carried out in Brazilian health services.

## OBJECTIVE

The objective of this study was to estimate the occurrence of pressure ulcer and its associated factors at adult Intensive Care Units (ICU) in Belo Horizonte.

## METHOD

An analytic cross-sectional research was carried out. In descriptive cross-sectional studies, the intent is to estimate the prevalence or occurrence of a given event. In analytic cross-sectional studies, besides the occurrence, the intent is to verify whether events are associated. It is known, however, that the conclusions reached through *these study analysis are restricted to associations, instead of causal relations*[4].

The study population comprised patients aged 18 years or older, hospitalized until 24h on the day before data collection, in a universe of 316 beds distributed across 22 ICUs of 15 public and private hospitals in Belo Horizonte, Minas Gerais, who also provided Supplementary Health Services.

The software Epi Info 6.0 was used for drafting and sample size calculation, based on the following parameters: expected pressure ulcer prevalence of 30%, error 6%, confidence level 95% and 80% power, considering a universe of 316 beds available for the study. According to these parameters, the sample should comprise 134 patients. Forty percent was added for possible losses and analyses with more than two variables, resulting in an estimate of 187 patients.

Out of 187 beds drafted for the sample, 33 were vacant at the time of data collection. Among the 154 remaining patients, 12 were not available, as five refused to participate in data collection, three had been hospitalized for less than 24 hours, two could not be manipulated and assessed and two were younger than 18. Hence, the final sample comprised 142 patients.

Data were collected in July 2007 on one single day. The data collection instrument was a form with closed and open questions regarding information on the institution, person, sociodemographic profile and clinical data; score on the Braden Risk Scale, number, staging and location of pressure ulcers, besides adopted prevention measures.

The following variables related to prevention measures were also covered in the data collection form: use of preventive surface, use of oil or moisturizing cream, maintaining clean and dry skin, repositioning, incontinence control and nutritional support or supplementation.

These data were written down according to the medical and nursing records in the patient's file or according to information the professional team at the institution provided. Practice and compliance with these measures could not be assessed, however, due to the short data collection time.

The prevalence of pressure ulcer among adult hospitalized patients can range from 3 to 14%.

The following study variables were used: age, gender, skin color, hospitalization time, ICU hospitalization time, baseline disease, medication for continuous use, smoking, body mass index, number of pressure ulcers, ulcer location, staging. The variables sensory perception, moisture, activity, mobility, nutrition and friction and shear were used according to the Braden scale.

Data were processed and analyzed in Statistical Package for the Social Sciences (SPSS) - version 15.0. Odds ratios (OR) and 95% confidence intervals (CI 95%) were calculated to test for associations between dependent variables and the presence of pressure ulcers, using the multivariate logistic regression technique.

Approval for the study was obtained from the Research Ethics Committee at FUMEC (Opinion No 265/2007). Patients or responsible persons were asked to read and sign the Free and Informed Consent Term to give their approval for participation.

## RESULTS

The sample was characterized according to gender, age, skin color, body mass index (BMI), smoking, total hospitalization time, ICU hospitalization time and health insurance category, described in Table 1.

**Table 1-** Sample patient characteristics. - Belo Horizonte - 2007

| Variables | N | % | Average | SD |
|---|---|---|---|---|
| **Gender** | | | | |
| Male | 75 | 53.0 | | |
| Female | 67 | 47.0 | | |
| Total | 142 | 100.0 | | |
| **Age range (years)** | | | | |
| 18 – 31 | 5 | 3.0 | | |
| 32 – 45 | 12 | 9.0 | | |
| 46 – 59 | 35 | 25.0 | | |
| 60 or more | 90 | 63.0 | | |
| Total | 142 | 100.0 | 64.0 | 16.7 |
| **Skin color** | | | | |
| White | 90 | 65.0 | | |
| Mulatto | 34 | 25.0 | | |
| Black | 14 | 10.0 | | |
| Yellow | 0 | - | | |
| Red | 0 | - | | |
| Total | 138 | 100.0 | | |
| **BMI (Kg/m²)** | | | | |
| < 18.5 | 3 | 5.0 | | |
| 18.5 – 24.9 | 20 | 33.0 | | |
| 25.0 – 29.9 | 37 | 62.0 | | |
| > 30.0 | 0 | - | | |
| Total | 60 | 100.0 | | |
| **Smoking** | | | | |
| No | 49 | 55.0 | | |
| Yes | 13 | 14.0 | | |
| Former smoker | 28 | 31.0 | | |
| Total | 90 | 100.0 | | |
| **Total hospitalization time (days)** | | | | |
| 1 – 10 | 77 | 54.0 | | |
| 11 – 20 | 25 | 18.0 | | |
| 21 – 30 | 11 | 8.0 | | |
| 31 – 40 | 9 | 6.0 | | |
| 41 – 50 | 7 | 5.0 | | |
| > 50 | 13 | 9.0 | | |
| Total | 142 | 100.0 | 18.0 | 26.16 |
| **ICU hospitalization time (days)** | | | | |
| ≤ 10 | 99 | 70.0 | | |
| 11 – 20 | 19 | 13.0 | | |
| 21 – 30 | 12 | 9.0 | | |
| 31 – 40 | 6 | 4.0 | | |
| 41 – 50 | 2 | 1.0 | | |
| > 50 | 4 | 3.0 | | |
| Total | 142 | 100.0 | 13.0 | 13.12 |
| **Health insurance** | | | | |
| SUS (Unified Health System) | 39 | 28.0 | | |
| Supplementary | 98 | 71.0 | | |
| Private | 2 | 1.0 | | |
| Total | 139 | 100.0 | | |

It should be clarified that total patient numbers can vary due to different non-response rates for the study variables.

With regard to the participating institutions, at one of the hospital, all drafted ICU beds (02) were vacant at the time of data collection. Among the drafted beds, 67.0% (04) was vacant at another hospital and 44.0% (08 and 04) at two other institutions. At four participating hospitals, all drafted beds were occupied.

The occurrence of at least one pressure ulcer per patient corresponded to 35.2% (CI 95%: 27.4-47.7). Hence, 111 patients (ranging between 87 and 151) were expected to present at least one pressure ulcer among all available ICU beds at the 15 institutions under assessment (316 beds).

Out of 50 patients with pressure ulcers, 27 (19.0%) had one single ulcer, 11 (7.7%) two ulcers, 12 (8.5%) three or more ulcers. Among the latter, in only one patient, 12 ulcers were identified. Among the 142 patients analyzed, 92 (64.8%) did not present any pressure ulcer at the time of data collection.

No significant difference in pressure ulcer occurrence was found according to gender (p = 0.27) – 40.0% among men and 30.0% among women – and skin color (p = 0.53) – mulatto (38.0%), white (35.0%) and black (21.0%). Occurrence levels were higher among patients between 45 and 59 years (71.4%) when compared with the ranges aged 60 years or more (40.0%), 32 to 45 years (27.3%) and 18 to 31 years (20.0%), but there were no significant differences ($p$ = 0.45).

Pressure ulcer occurrence according to BMI categories (n = 60 patients) amounted to 50.0% in eutrophic and 16.2% in overweight patients. No pressure ulcer was found in any of the three malnourished patients. No statistically significant differences in pressure ulcer frequencies were found according to nutritional status ($p$ = 0.179).

With regard to smoking (n = 90 patients), pressure ulcer prevalence corresponded to 42.6% among smokers, 30.6% among non-smokers and 14.3% among former smokers. No statistical association was found between these variables ($p$ = 0.085).

According to the sample patients' total hospitalization time, pressure ulcer prevalence progressively increased among patients hospitalized for more than 10 days, with statistically significant differences ($p$ = 0.00).

In comparison with patients' ICU hospitalization time, the accumulated pressure ulcer frequency was higher among groups hospitalized at ICUs for more than 10 days. All patients who had spent more than 50 days at the ICU displayed pressure ulcer. The relation between ICU hospitalization time and presence of pressure ulcer was statistically significant ($p$ = 0.00), according to Table 2.

**Table 2 -** Pressure ulcer prevalence according to total hospitalization time and ICU hospitalization time - Belo Horizonte - 2007

| Hospitalization time (in days) | Pressure ulcer | | | | | |
|---|---|---|---|---|---|---|
| | Yes | | No | | Total | |
| | N | % | N | % | N | % |
| **In hospital** | | | | | | |
| 1 – 10 | 9 | 11.7 | 68 | 88.3 | 77 | 54.2 |
| 11 – 20 | 14 | 56.0 | 11 | 44.0 | 25 | 17.6 |
| 21 – 30 | 6 | 54.5 | 5 | 45.5 | 11 | 7.7 |
| 31 – 40 | 5 | 55.6 | 4 | 44.4 | 9 | 6.3 |
| 41 – 50 | 5 | 71.4 | 2 | 28.6 | 7 | 4.9 |
| > 50 | 11 | 84.6 | 2 | 15.4 | 13 | 9.2 |
| **Total** | **50** | **35.2** | **92** | **64.8** | **142** | **100.0** |
| **At ICU** | | | | | | |
| 1 – 10 | 22 | 28.6 | 77 | 71.4 | 99 | 69.7 |
| 11 – 20 | 11 | 59.9 | 8 | 42.1 | 19 | 13.5 |
| 21 – 30 | 9 | 75.0 | 3 | 25.0 | 12 | 8.4 |
| 31 – 40 | 3 | 50.0 | 3 | 50.0 | 6 | 4.2 |
| 41 – 50 | 1 | 50.0 | 1 | 50.0 | 2 | 1.4 |
| > 50 | 4 | 100.0 | 0 | 0 | 4 | 2.8 |
| **Total** | **50** | **35.2** | **92** | **64.8** | **142** | **100.0** |

Pressure ulcer prevalence showed no statistical differences ($p$ = 0.52) according to health insurance. Among patients who received care in the Unified Health System (SUS), 38.5% presented ulcers. Among patients with a supplementary health agreement, 34.7% had pressure ulcers. Only two patients paid for their own hospitalization and did not present any pressure ulcers.

The baseline diseases registered on the forms were classified according to the affected system, with those in the neurological (13), digestion (13), bone-muscle (6) and genitourinary (1) sub-groups grouped under *others*. According to Table 3, the highest prevalence of pressure ulcers was found among patients with sepsis, followed by respiratory illnesses like acute pulmonary respiratory failure, pulmonary thromboembolism and pneumonia, with a statistically significant association ($p$ = 0.00).

**Table 3 -** Pressure ulcer prevalence according to patient's baseline disease - Belo Horizonte - 2007

| Baseline disease | Pressure ulcer | | | | | |
|---|---|---|---|---|---|---|
| | Yes | | No | | Total | |
| | N | % | N | % | N | % |
| **System** | | | | | | |
| Circulatory | 9 | 16.6 | 45 | 83.4 | 54 | 38.0 |
| Respiratory | 24 | 54.5 | 20 | 45.5 | 44 | 31.0 |
| Other | 10 | 30.3 | 23 | 69.7 | 33 | 23.3 |
| **Sepsis** | 7 | 63.6 | 4 | 36.4 | 11 | 7.7 |
| **TOTAL** | **50** | **35.2** | **92** | **64.8** | **142** | **100.0** |

The data collection forms showed more than one baseline disease and more than one drug for continuing use by patients. The most prescribed medication classes were bronchodilators, analgesics, steroidal and non-steroidal anti-inflammatory drugs and anticoagulants (n = 141), followed by diuretics (n = 140), antihypertensives (n = 139) and cardiotonics (n = 137). The item **others** included medication like antidepressants, anxiolytics, mucolytics, hypoglycemic drugs (insulin), gastric mucosal protectors, antibiotics, thyroid hormone, vitamins, antiarrhythmics and intravenous solutions.

A significant association was observed between the use of bronchodilators and pressure ulcer ($p$ = 0.00), but not with other drugs.

**Table 4 –** Pressure ulcer prevalence according to medication for continuous use by the patient - Belo Horizonte - 2007

| Drugs | Pressure ulcer | | | | |
|---|---|---|---|---|---|
| | Yes | | No | | p |
| | N | % | N | % | |
| Antihypertensives | 27 | 29,9 | 50 | 70,1 | 0,94 |
| Cardiotonics | 12 | 31,6 | 26 | 68,4 | 0,58 |
| Bronchodilators | 28 | 60,9 | 18 | 39,1 | 0,00 |
| Analgesics | 25 | 40,3 | 37 | 59,7 | 0,37 |
| Anti-inflammatory drugs | 18 | 43,9 | 23 | 56,1 | 0,25 |
| Diuretics | 24 | 43,6 | 31 | 56,4 | 0,16 |
| Anticoagulants | 32 | 36,4 | 56 | 63,6 | 0,91 |
| Others | 44 | 37,9 | 72 | 62,1 | 0,27 |

Note: (n = 50)

Pressure ulcer location was registered on all forms. Some patients had more than one ulcer though, totaling 99 ulcer, distributed among the following regions: ear lobes (3.0%), occipital (1.0%), shoulder blades (3,0%), spinous process (2.0%), ilium (6.0%), sacrum (36.0%), elbows (3.0%), trochanters (9.0%), ischiatic prominences (4.0%), shinbones (4.0%), malleoli (4.0%), toes (2.0%) and heels (22.0%).

The 99 ulcers were staged from I to IV. Stage I ulcers represented 25.0%; stage II 57.0%; stage III 9.0% and stage IV 6.0%. Three wounds (3.0%) were not staged as they were totally covered by necrosis.

The application of the multivariate logistic regression technique showed that the presence of sepsis (OR = 6.04; CI 95% = 1.09-33.53), hospitalization time ≥ 10 days (OR = 7.61; CI 95% = 2.92-19.82) and high and very high risk on the Braden scale (OR = 4.96; CI 95% = 1.50-16.50) were independent factors significantly associated with the presence of pressure ulcer.

**Table 5** - Factors associated with pressure ulcer, odds ratio and 95% confidence interval - Belo Horizonte - 2007

| Variables | OR | CI 95% |
|---|---|---|
| Sepsis | 6.04 | 1.09 - 33.53 |
| Hospitalization time > 10 days | 7.61 | 2.92 - 19.82 |
| High to very high risk on Braden scale | 4.96 | 1.50 - 16.50 |

The 140 patients' average Braden score was 13.86; according to gender, the average score was 14.13 (sd = 4.63) for men and 13.56 (sd = 4.91) for women, without statistical differences ($p$ = 0.48). According to age, the average scores corresponded to 15.22 (sd = 4.41) for patients younger than 60 and 13.03 (sd = 4.79) for patients aged 60 years or more, with a statistically significant difference ($p$ = 0.00).

## DISCUSSION

The researchers characterized the sample of 142 patients, determined the prevalence of pressure ulcers at Intensive Care Units and established the factors associated with ulcer development.

The sample's description in terms of body mass index (BMI) and smoking habits was impaired by subnotification. The BMI variable considered weight and height records of 60 patients only. This finding can be justified by the impossibility to find these data in the patients' files and difficulties to determine these measures at the ICUs.

As for the smoking habit, for example, many patient files did not contain information on this variable or the patient or companion could not provide the information. Hence, in 52 forms, the fields reserved for this variable were not completed.

With regard to pressure ulcer occurrence at the ICUs in the sample, rates exceeded literature findings, although Brazilian studies on the subject are scarce. The pressure ulcer occurrence levels found in studies carried out in other countries are worth mentioning, such as: Germany (21.1%)[5], Sweden (13.2%)[6] and Singapore (18.1%)[7]. In another study, pressure ulcer prevalence in adult patients ranged from 3% to 11% in hospitalized patients and could reach 18% among bedridden patients, like in ICUs[8]. An occurrence level of 3% is found in acute hospital care, against 45% in clinical hospitals[9].

In a study carried out to identify pressure ulcer incidence rates among patients hospitalized at the University Hospital of the University of São Paulo (USP), a global incidence rate of 39.8% was found, with variations according to the hospital unit under analysis: medical clinic (42.6%), intensive care unit (41.0%) and surgical clinic (39.5%)[3].

In a literature review considering articles published between 1994 and 1998, 47 studies were selected, "considering the theme categories of the guidelines for pressure ulcer preview and prevention by the American Health Care, Policy and Research Agency" (AHCPR)[10]. This review highlighted the inexistence of studies on the incidence and prevalence of pressure ulcers in Brazil, a panorama that has changed little in the last ten years.

As for the ulcers' location, in a study carried out in Brazil[3], it was verified that the sacral (33.6%), heel (24.6%) and gluteal (23.9%) regions were the predominant sites for the development of these ulcers, with 53% analyzed as stage II, similar to the present study findings.

In this study, pressure ulcer development was not associated with age. Studies reveal, however, that advanced age is a triggering factor for these ulcers, with 50% to 70% of these injuries developing in patients older than 70 years[11-12]. An association was found, however, between age (≥ 60 years) and low average Braden scale scores (13.0), that is, elderly people were at risk of developing these ulcers, as people scoring 17 or higher are considered at risk in this population[11]. Although the elderly population was more prone to the development of pressure ulcer, the association with age was not maintained in the final model[12].

Regarding aging, it is known that decreased skin elasticity, texture, circulation, cell replacement level and scarring process, as well as reduced peripheral sensitivity, are inherent in advanced age and undoubtedly lead to increased skin trauma risks[12].

To investigate the association between mortality and pressure ulcer, a study was carried out in the United States between 1990 and 2001, using death records coded per cause. The authors reported that approximately 80% of deaths associated with pressure ulcers occurred in people aged 75 years or older. This mortality rate was higher among black than white people[13]. When comparing pressure ulcer occurrence according to skin color among patients hospitalized at ICUs in Belo Horizonte, no differences were found.

Regarding the association between BMI and the occurrence of pressure ulcer, although data were not obtained for all patients in this study, it is known that people with low body weight and pronounced bony prominences are at high risk for the development of these ulcers. People with excess body weight are also more prone to these ulcers, due to the fact that fat tissue is not very vascularized and elastic like other tissues, becoming more vulnerable to pressure and inclined to rupture[14].

Several other additional factors can also influence the development of this type of ulcer, including smoking, although no association was found between those two factors in this study.

Regarding hospitalization time, in this study, it was observed that the prevalence of pressure ulcer increased with the time the patient remained in hospital. In multivariate analysis, the association between hospitalization time of more than 10 days and pressure ulcer occurrence was very strong. According to literature, pressure ulcers usually develop within the first two weeks of hospitalization. Fifteen percent of elderly patients develop ulcers during the first week of hospitalization[14].

Pressure ulcer occurrence is frequently related with advanced age, incontinence, weakness, paralysis and unconscious patients. People with certain conditions, such as neurological or cardiovascular illnesses, dehydration or malnutrition, anemia, hypotension, alterations in skin turgor and elasticity or previous pressure ulcer, as well as patients submitted to anesthesia for prolonged periods or surgical patients are more susceptible[11,15].

The presence of sepsis was independently and strongly associated with pressure ulcer occurrence in this study. These infections affect patients in all age ranges, with higher frequencies at extreme ages and a worse prognosis in patients over 50 years of age. Clinical manifestations are not specific and include: fever or hypothermia, tachycardia, tachypnea and respiratory alkalosis, leukocytosis or leukopenia with an increased number of band cells, systemic hypermetabolism and malnutrition, high oxygen consumption, systemic hypoperfusion and metabolic acidosis and hyperdynamic circulatory state, factors that can trigger ulcer development[11].

Systemic hypotension, which characterizes the clinical evolution of sepsis, is a sign of insufficient peripheral circulation and tissue perfusion. Diastolic blood pressure levels below 60 mmHg can indicate patients at high risk for the development of pressure ulcer[11-12].

Nursing care for patients with pressure ulcers include comprehensive monitoring of clients at risk of developing lesions by using risk prediction scales[16]. In this study, the Braden scale was chosen, which is the most used and widely tested until date, due to its good performance on validation tests and in line with other studies on the theme[17].

Score categorization on the Braden scale showed a strong association with the presence of pressure ulcer, which was more intense in the groups categorized as High and Very Risk, and even greater in case of ICU hospitalization.

In the attempt to decrease pressure ulcer prevalence levels and improve patients' quality of life, prevention and systematic action methods have been proposed. With a view to developing effective prevention strategies, people "at risk" need to be identified. Specific assessment instruments are used for risk identification. A test's predictive value, however, depends on the condition's prevalence in the target population. Hence, when prevalence levels are high, the probability that a positive test will better predict the condition increases[18].

Further research is important to investigate the incidence and prevalence of pressure ulcers, with a view to guiding and standardizing conducts by demonstrating each patient's reality[16].

## CONCLUSION

The occurrence of at least one pressure ulcer per patient corresponded to 35.2%. In the consulted literature, in general, pressure ulcer prevalence in adults ranges from 3 to 14% and can reach 21% in intensive care units. Hence, the levels found in this study exceeded those found in literature.

Total and ICU hospitalization time of more than 10 days, sepsis and high and very high risk on the Braden scale were strongly associated with pressure ulcer.

In total, 99 pressure ulcers were identified, frequently located in the sacral (36.0%) and heel regions (22.0%), with 57.0% of all ulcers in stage II, i.e. superficial, whose partial skin loss involves either the epidermis or dermis, or both.

Prevention measures still have not been systematically adopted and some go against recommendations for good clinical practice, such as practicing "comfort massage on bony prominences" and repositioning every 6 hours.

Pressure ulcers are difficult to treat, and treatment tends to be long and costly, supporting the premises of prevention. Therefore, in case of people at risk for the development of pressure ulcers, the multiprofessional team is responsible for putting in practice prevention measures so as to decrease the impact of this problem.

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