

# Incidence of pressure injuries in clinical and surgical patients in Tocantins: a retrospective study

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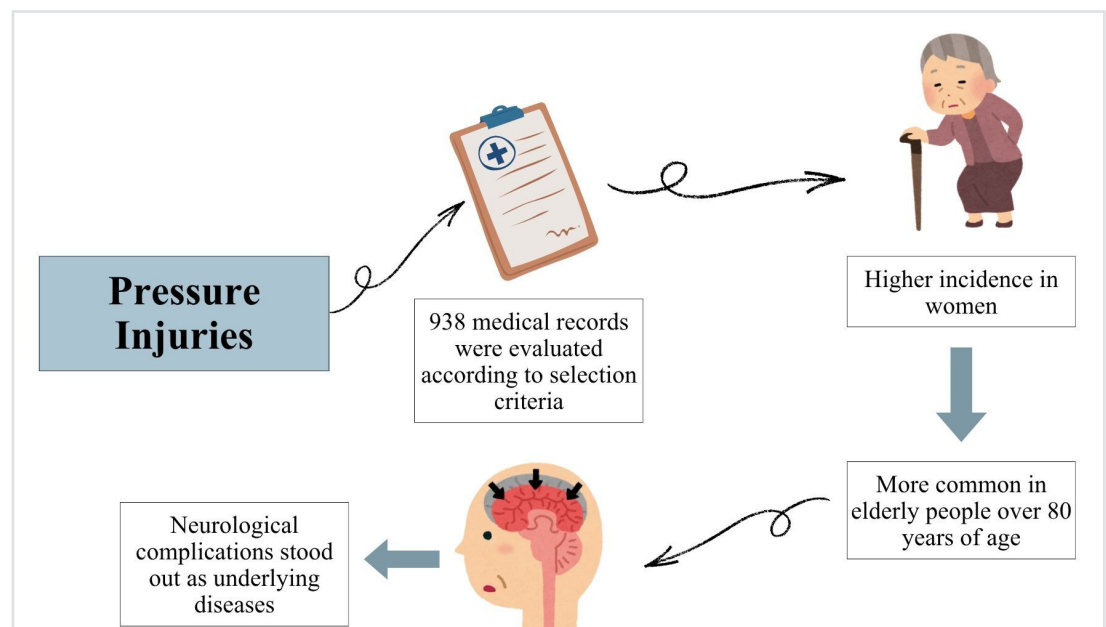
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## Graphical Abstract

### Highlights

- The incidence of PI was 2.23% among hospitalized patients.
- Older adults aged 80–89 years had the highest occurrence.
- The sacral and gluteal regions were the most frequently affected.
- The study reinforces the importance of improving clinical record quality.



### Abstract

Pressure injuries (PIs) are significant adverse events related to health care, associated with increased morbimortality, prolonged hospitalization, and elevated care costs. The objective of this study was to analyze the incidence of pressure injuries in patients admitted to the medical, surgical, and orthopedic wards of a public hospital in the state of Tocantins. This is a retrospective cross-sectional study conducted through the review of medical records of adult inpatients between January and June 2023. A total of 938 records of patients hospitalized for more than 24 hours were analyzed. The variables investigated included sex, age group, underlying disease, and anatomical location of the injury. The incidence of PI was 2.23% (21/938), with a predominance in female patients (61.9%) and in patients aged 80 to 89 years. The sacral and gluteal regions were the most frequently recorded locations. Patients with neurological diseases, pneumonia, and bone fractures presented higher frequencies of PI. The findings should be interpreted with caution due to the limitations inherent to retrospective studies based on medical records, including underreporting and inconsistencies in clinical documentation. It is concluded that the occurrence of PI was primarily associated with advanced age, presence of comorbidities, and reduced mobility, reinforcing the need for individualized preventive strategies, improvement of clinical record quality, and strengthening of institutional prevention protocols.

**Keywords:** Patient Safety. Hospitalization. Adverse Events. Immobility. Nursing Care.

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## INTRODUCTION

Pressure injuries (PIs) are significant adverse events related to health care and represent a global patient safety problem<sup>1</sup>. According to the National Pressure Injury Advisory Panel (NPIAP), PIs are defined as localized damage to the skin and/or underlying tissues, generally over bony prominences or related to the use of medical devices, resulting from intense and/or prolonged pressure associated with shear force<sup>2</sup>.

PIs are associated with increased morbimortality, prolonged hospitalization, elevated hospital costs, and significant deterioration of patients' quality of life<sup>3</sup>. Furthermore, they represent an important indicator of care quality in health services, particularly in elderly, critically ill, and reduced-mobility patients<sup>4</sup>.

Various risk factors are related to the development of PIs, including advanced age, prolonged immobility, neurological alterations, incontinence, malnutrition, compromised tissue perfusion, and the presence of chronic diseases<sup>5</sup>. Recent studies indicate that hospitalized patients present greater vulnerability to developing these injuries, particularly when associated with functional dependency and increased length of hospital stay<sup>6</sup>.

Despite advances in preventive strategies and the implementation of institutional protocols aimed

at patient safety, PIs continue to represent an important challenge in health services<sup>7</sup>. Recent systematic reviews demonstrate that the occurrence of these injuries remains high in different hospital settings, being directly related to care quality, early identification of risk factors, and adherence of multi-professional teams to internationally recommended preventive measures<sup>8</sup>.

In Brazil, epidemiological studies demonstrate a relevant prevalence of PI in hospitalized patients, with associations with factors such as advanced age, length of hospital stay, comorbidities, and lower Braden scale scores<sup>9</sup>. Recent systematic reviews demonstrate wide variation in prevalence and incidence rates of PI in hospital settings, with significant differences among evaluated studies<sup>10</sup>.

Furthermore, retrospective studies based on medical records frequently present limitations related to underreporting, inconsistencies in clinical documentation, and absence of standardized injury assessment, which may compromise the epidemiological quality of analyses<sup>11</sup>.

Thus, this study aimed to analyze the incidence of pressure injuries in patients admitted to the medical, surgical, and orthopedic wards of a public hospital in the state of Tocantins.

## METHODS

### *Study design*

This is a retrospective cross-sectional study with a quantitative approach, conducted through the analysis of records of hospitalized patients. The present study followed the recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) for the conduct and reporting of observational studies<sup>12</sup>.

### *Study setting and period*

The study was conducted at the Hospital Regional de Paraíso Dr. Alfredo Oliveira Barros, located in the municipality of Paraíso do Tocantins, Tocantins, Brazil.

Records of patients admitted to the medical, surgical, and orthopedic wards between January and June 2023 were analyzed.

### *Population and sample*

Initially, 1,271 records corresponding to admissions during the study period were identified. After applying the inclusion and exclusion criteria, 938 records comprised the final study sample.

### *Inclusion criteria*

Adult patients admitted to the medical, surgical, and orthopedic wards between January and June 2023, with a length of stay exceeding 24 hours and whose records contained clinical information compatible with the study objectives, were included.

### *Exclusion criteria*

Patients whose records presented the following were excluded:

- illegibility;

- incomplete information;
- inconsistencies in the records related to the variables analyzed;
- insufficient information for the identification and characterization of PIs.

### **Data collection**

Data collection was conducted in person by four researchers previously instructed in the standardization of information extraction. A structured form developed by the authors was used for the standardized recording of the investigated variables. Data were obtained from the analysis of physical medical records, including multiprofessional records made by the care team. The identification of PI cases occurred through explicit description of “pressure injury” or equivalent terminology recorded in medical and nursing progress notes. Non-specific or incompatible records were excluded from the analysis.

### **Variables analyzed**

The following variables were analyzed: sex; age group; underlying disease; length of hospital stay; anatomical location of PI. Information related to injury staging and application of the Braden scale was only partially identified in the analyzed records, preventing complete standardization of these variables.

### **Statistical analysis**

The collected data were organized in electronic spreadsheets and subjected to statistical analysis using BioEstat software, version 5.3. Descriptive statistical analysis was performed on the studied variables, with calculation of absolute and relative frequencies for the categorical variables analyzed.

Given the limited number of identified PI cases (n=21), the heterogeneity of the observed clinical categories, and the presence of low frequencies in some variables, priority was given to descriptive data analysis, avoiding statistical inferences that could compromise the methodological robustness of the results.

### **Ethical considerations**

The study followed the ethical principles established by Resolution No. 466/2012 of the National Health Council. The research was approved by the Research Ethics Committee involving Human Subjects under CAAE No. 73708923.3.0000.5518.

The authors used the artificial intelligence tool ChatGPT (OpenAI) exclusively for support in linguistic review, grammatical adequacy, and textual organization of the manuscript. All scientific interpretations, data analyses, discussions, and conclusions were developed entirely by the authors.

## **RESULTS**

A total of 938 records of patients admitted to the medical, surgical, and orthopedic wards between January and June 2023 were analyzed. Of these, 21 patients developed PI during hospitalization, corresponding to an incidence of 2.23%. A predominance of female patients was observed among the identified cases, representing 61.9% (13/21), while male patients accounted for 38.1% (8/21).

Regarding age group, the highest frequency of PI occurred in patients aged 80 to 89 years, representing 42.9% (9/21) of cases. Patients under 60 years of age accounted for 28.6% (6/21), while individuals aged 60 to 79 years represented 23.8% (5/21). Only one patient was over 90 years of age, corresponding to 4.8% of cases.

The most frequently observed underlying diseases among patients with PI were bone fractures

and pneumonia, both accounting for 19% (4/21) of cases. Neurological complications and stroke each represented 14.3% (3/21). Diabetic complications accounted for 9.5% (2/21), while pleural effusion, chronic obstructive pulmonary disease, generalized infection, cancer, and rectal abscess each represented 4.8% (1/21).

Regarding the anatomical location of injuries, higher frequency was observed in the sacral and gluteal regions, corresponding to 28.6% (6/21) and 19% (4/21) of cases, respectively. Dorsal region injuries represented 14.3% (3/21), while the trochanteric region and calcaneus each accounted for 9.5% (2/21). Records in the malleolus corresponded to 4.8% (1/21). Furthermore, other anatomical regions totaled 14.3% (3/21). The sociodemographic and clinical characteristics of patients with PI are presented in Table 1.

**Table 1** - Sociodemographic and clinical characteristics of patients with PI. Paraíso do Tocantins, TO, Brazil, 2023.

Variables	N	%
<b>Sex</b>		
Female	13	61.9
Male	8	38.1
<b>Age group</b>		
< 60 years	6	28.6
60–79 years	5	23.8
80–89 years	9	42.9
> 90 years	1	4.8
<b>Underlying disease</b>		
Bone fracture	4	19
Pneumonia	4	19
Stroke (CVA)	3	14.3
Neurological complications	3	14.3
Diabetic complications	2	9.5
Pleural effusion	1	4.8
Chronic obstructive pulmonary disease (COPD)	1	4.8
Generalized infection	1	4.8
Cancer	1	4.8
Rectal abscess	1	4.8
<b>Anatomical region</b>		
Sacral	6	28.6
Gluteal	4	19
Dorsal	3	14.3
Trochanteric	2	9.5
Calcaneus	2	9.5
Malleolus	1	4.8
Other anatomical regions	3	14.3

CVA: cerebrovascular accident;  
COPD: chronic obstructive pulmonary disease.

However, some anatomical records identified in the medical records presented non-specific or poorly standardized descriptions – particularly in regions less fre-

quently associated with PIs in the specialized literature – limiting more robust anatomical analyses and direct comparisons with previous studies.

## DISCUSSION

The results of this study demonstrated a PI incidence of 2.23% among the hospitalized patients evaluated. However, this finding should be interpreted with caution, considering the limitations inherent to retrospective studies based on medical record review – particularly regarding the possibility of underreporting, inconsistencies in clinical documentation, and the absence of complete standardization of the documented information<sup>11</sup>.

Although the observed incidence was lower than that reported in part of the national and international literature, recent studies demonstrate wide epidemiological variability related to institutional characteristics, patient clinical profiles, quality of care records, and methods used for injury identifi-

cation<sup>6,8</sup>. Therefore, it is not possible to assert that the reduced incidence observed directly reflects greater effectiveness of institutional preventive measures, since the present study did not assess care protocols, multiprofessional team adherence, or specific prevention indicators.

The predominance of PI in elderly patients observed in this study is consistent with the international literature, which recognizes aging as an important risk factor for the development of these injuries<sup>13</sup>. Physiological changes associated with aging – such as reduced skin elasticity, decreased tissue perfusion, loss of subcutaneous tissue, and greater presence of comorbidities – significantly increase the vulnerability of elderly patients to developing PIs<sup>5</sup>.

Furthermore, patients with neurological diseases, pneumonia, and bone fractures presented higher frequency of PI – a result similar to that found in studies involving hospitalized clinical and orthopedic patients<sup>14</sup>. These conditions are frequently associated with functional limitation, prolonged immobility, and dependency on continuous care – factors recognized as related to the onset of PIs.

The sacral and gluteal regions were the anatomical locations most frequently recorded in the analyzed records. These findings are consistent with previous studies indicating greater occurrence of PI in areas subjected to prolonged pressure in patients confined to bed, especially in dorsal and lateral decubitus positions<sup>15</sup>. However, some records presented non-specific anatomical descriptions, making complete standardization of anatomical analyses difficult and limiting more detailed comparisons with the international literature.

Another relevant aspect identified in this study relates to the weaknesses in clinical documentation. Partial absence of records regarding injury staging, application of the Braden scale, and standardized anatomical detailing was observed – factors that compromise the epidemiological quality of data and hinder more robust clinical analyses<sup>16</sup>. Recent studies reinforce that failures in clinical

records represent an important challenge for retrospective studies involving PIs, potentially contributing to underreporting, information bias, and diagnostic inconsistencies<sup>11</sup>.

Furthermore, it should be considered that case identification occurred from descriptions recorded in the multiprofessional progress notes present in the physical medical records. Therefore, the analysis was directly conditioned on the quality and completeness of the information documented by the care teams during the study period.

The methodological limitations of this study include the retrospective design, dependence on clinical record quality, absence of complete data standardization related to injuries, and the limited number of identified cases – factors that restrict causal inferences and broader generalization of the results. Additionally, the absence of complete information on institutional prevention protocols made it impossible to assess the effectiveness of the care strategies eventually employed by the institution.

Despite these limitations, the study is relevant in providing regional epidemiological data on PIs in a public hospital setting, contributing to the strengthening of institutional patient safety strategies, care qualification, and prevention of adverse events related to hospitalization.

## CONCLUSION

The results of this study demonstrated a PI incidence of 2.23% in patients admitted to the medical, surgical, and orthopedic wards of a public hospital in the state of Tocantins, with higher occurrence in elderly patients, individuals with reduced mobility, and patients with comorbidities associated with functional limitation. The sacral and gluteal regions stood out as the main affected sites, corroborating evidence previously described in the scientific literature on hospitalized and bedridden patients.

The findings reinforce the importance of implementing individualized preventive strategies, contin-

uous monitoring of risk factors, and strengthening of institutional protocols aimed at PI prevention. Furthermore, they highlight the need to improve clinical record quality – particularly regarding the standardization of information related to injury classification, anatomical location, and risk assessment.

Therefore, strengthening institutional surveillance practices, training multiprofessional teams, and improving the documentary quality of medical records are recommended, with the aim of enhancing patient safety, care quality, and clinical outcomes related to PIs.

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## CRedit author statement

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All authors have read and agreed to the published version of the manuscript.



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## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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