

Prevalence and Risk Factors for Pressure Ulcer in Hospitalized Adults

ORIGINAL

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Abstract

Background: Pressure ulcers represent a serious public health problem, serving as a quality indicator (negative) the assistance provided by the health services. The aim of this study was to identify the prevalence of pressure ulcers in the Intensive Care Unit of a University Hospital in João Pessoa-PB and check the associations between socio-demographic and clinical data of customers and risk factors for the development of these.

Methods: The study of the sectional, quantitative, carried out with 78 patients in the Intensive Care Unit of a University Hospital in João Pessoa. Data were collected from medical record information from January to December 2014.

Results: Ten patients had pressure ulcers, and 6 already admitted with injuries and the 4 developed during hospitalization in the studied sector. The prevalence of these lesions in the sample was 12.8%. Has been identified as risk factors associated with pressure ulcer ($p < 0.05$) the reason for hospitalization, pre-existing conditions, level of consciousness, ventilation, peripheral perfusion, hydration and the use of antidepressant/anti-inflammatory drugs.

Conclusion: The results underscore the importance of this study for academic and professional environment, with regard to the promotion of knowledge of some risk variables for ulcers, being able to influence

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behavior and thus expand excellence in care. The involvement of the whole multidisciplinary team regarding the prevention, improves the quality of life of individuals, decreases the rescue professionals, the burden of treatment and hospitalization time.

Keywords

Pressure Ulcer; Intensive Care Units; Prevalence; Risk Factors; Nursing.

Introduction

Pressure ulcers (PU) represent a serious public healthcare problem, serving as a quality indicator (negative) of the assistance provided by healthcare services, since prevention is easy and inexpensive. The emergence of this type of injury significantly reduces the individual's life quality by reason of disability that it causes, and also confers greater wear for the team and for the patient, in addition to raising the costs of treatment and increasing the time of hospitalization [1, 2].

These are complex wounds, which have affected about 3 million adults admitted to US hospitals, with estimated prevalence among 0.4% to 38% in admissions for acute care. [3]. In Brazil, the PU's prevalence varies according to the conditions of observation, reporting from 82% in hospital in the Amazonas State [4] to indexes between 13.95% and 57.2% in patients in intensive care units [5-6].

PU may be defined as injuries from ischemia resulting from prolonged compression of the skin and adjacent tissues normally in areas of bony prominences [7]. Given this, the most affected sites are the sacrococcygeal, heels and elbows regions [6].

Studies have been conducted in order to identify the incidence, prevalence and the factors that may be associated with this phenomenon, since the rates are alarming [8-10].

A research conducted with 134 patients in intensive care unit (ICU) at a hospital in Porto Alegre identified 32.1% prevalence of PU, being more affected patients with infections, using steroids and with sepsis, among other risk factors [11]. In Vitória-ES, a study carried out with 55 patients also in ICU,

identified 30.9% incidence of PU among the evaluated patients [12].

In the context of the assistance provided in ICU, the PU represents serious problem, once it has been verified high prevalence of these injuries in this sector. Such indexes can be related to high risk for PU development, which, in turn, is correlated to the seriousness and complexity of the individual's disease, as well as to his level of dependency on healthcare professionals [13].

The authors mentioned above picked up 22.2% incidence of PU in the ICU at a medium-sized hospital in the city of João Pessoa-PB and emphasizes the need for the involvement of a multidisciplinary team in order to adopt effective preventive measures.

Individuals more susceptible to the development of PU are those in critical state, since they present more serious medical conditions and require, therefore, more complex procedures and greater attention by the healthcare team [14]. This statement reinforces how essential is the implementation and execution of preventive actions of these lesions in sectors where patients are more vulnerable to this problem.

A study identified a significant reduction in the incidence of PU (from 41.02% to 23.1%) after the implementation of a risk assessment and prevention protocol. This reduction was associated with the knowledge of lesions contents, skin inspection and investigation of the risk factors for PU, since the admission until the appropriate intervention by the multidisciplinary team. Such measures allow the resizing of the team's actions for implementation of preventive measures [15].

Considering the high rates of PU in hospitals, the damages to the patients, the increased treatment costs and hospitalization time, taking into account the need for the identification of risk factors and early diagnosis of susceptible individuals, this study is justified, aimed at identifying the prevalence of PU in the ICU of a University Hospital in João Pessoa-PB, and check the associations between patients' socio-demographic and clinical data and the risk factors for the development of PU.

Methods

It is a study of the sectional type, quantitative, conducted in the ICU of a University Hospital, located in the city of João Pessoa, Paraíba, Brazil.

The hospital in question is part of the Unified Healthcare System and is considered medium-sized. The patient care is carried out by a multidisciplinary team comprising nurses, doctors, technicians and nursing assistants, physiotherapists, occupational therapists, dentists and nutritionists.

The intensive care section of the university hospital involves the adult ICU, with 12 beds and two isolations, pediatric ICU, which has three beds and one isolation, and the neonatal ICU, with six beds. The present study used only the data corresponding to the adult ICU admissions.

For sample selection, were used data presented in admission, discharge and death record books, of the A and B areas of the hospital ICU. Of these, were picked up the numbers of records relating to hospitalizations in the period from January to December 2014, for further data collection.

In the researched books, there were 193 records that met the inclusion criteria of the study, namely: patients older than 18 years, admitted to the unit between January 1, 2014 to December 31, 2014 and with medical record number recorded in that book. The records' numbers were transcribed to a table, along with the initials of the names of each patient to avoid contradictions at the moment of searching Medical Records and Statistical Service.

Of these 193 records, 86 were not found, 20 were in bad record, 03 were in care clinics where the user was hospitalized, 03 were underage patients and 03 medical records were found, however, they were of another patient. Thus, 78 records met the research inclusion criteria.

In the process of records' capture for the purposes of the collection instrument, some difficulties were encountered, such as: medical records not found, incorrect registration data, patient records retained in the billing sector or in clinics of the hospital with the patient in period of hospitalization, and patient records containing incomplete data, containing only information from the latest outpatient consultations.

To achieve the objectives, instrument variables were used, developed during PhD thesis [16]. Variables have been added regarding risk factors for PU's development and adjustments were made for application of the instrument in hospital.

In this way, the instrument of the present research was composed of four parts: 1. Characterization of the demographic profile of the subjects; 2. Clinical data of the patients and data from laboratory tests in relation to aspects that influence the development of PU; 3. Information regarding risk factors for PU and; 4. Clinical data of the PU.

After collection, the data was transcribed into Microsoft Excel 2010 spreadsheet, from which it was drawn up a dictionary for later analysis in the program Statistical Package for Social Science version 20.0.

To perform the mathematical prevalence of PU in the ICU studied, was raised primarily a descriptive of patient hospitalization time, through which it was concluded that most of the subjects remained about 5 days in the hospital. Thus, the prevalence of the PU takes into account the appearance of lesions until the 5th day of hospitalization, i.e. patients that developed them after this time limit are not counted in the prevalence.

As for the clinical and demographic profile of the sample, this was done through descriptive data

(absolute numbers and percentages). Regarding the proposed objective of associating the prevalence of PU with risk factors found among the studied data, was required primarily to perform a search in the literature about the risk factors more listed with the occurrence of these. The items extracted bibliographically were added to the instrument of data collection in order to obtain information to enable these associations.

Regards the data statistical analysis, they were explored from the inferential statistics, by the construction of cross-tables with Chi-square and Fisher's Exact test application, meeting the proposed objectives. It should be noted that the significance level used in the decisions of the statistical tests was of 5% ($p < 0,05$) (Tables 1 and 2).

This research followed the legal procedures established by Resolution 466/2012 of the National Health Council, being approved by the Ethics Committee of the University Hospital Lauro Wanderley, under opinion nº 731.264/2014 and CAAE: 33749614.7.0000.5183.

Results

The sample was composed of 78 records, of which 6 patients were admitted in the ICU with PU and remained with it during the period of hospitalization, and other 4 patients developed it until the fifth day of hospitalization (estimated period for prevalence analysis). Thus, the PU prevalence in the ICU studied accounted for 12.8%.

In general, the sample was characterized by predominantly male (55.1%), aged ≥ 60 years old (39.7%), followed by 40-59 years old (37.2%) and under 40 years old (23.1%). Ethnically, the brown skin color (32.1%) prevailed, followed by white (19.2%) and black (9.0%). The level of education corresponding to elementary school (44.9%) stood out accompanied by illiterates/literates (23.1%), high school (15.3%) and higher education (7.7%). Mostly they presented themselves married / stable union

Table 1. Association between sociodemographic variables and the presence of pressure ulcers. João Pessoa-PB, 2015.

Sociodemographic Profile	Presence of PU		Absence of PU		Significance (P-value)
	N	%	N	%	
Gender					
Feminine	4	40.0	39	57.4	0.330 ¹
Masculine	6	60.0	29	42.6	
Age group					
<40 years	2	20.0	16	23.5	1.000 ¹
40-59 years	4	40.0	25	36.8	
≥ 60 years	4	40.0	27	39.7	
Race					
White	3	30.0	12	17.6	0.261 ¹
Medium brown	3	30.0	22	32.4	
Black	2	20.0	5	7.4	
NR/NS	2	20.0	29	42.6	
Marital Status					
Married/Stable Union	5	50.0	38	55.9	0.519 ¹
Widower	1	10.0	8	11.8	
Single	2	20.0	11	16.2	
Divorced	1	10.0	7	14.3	
NR/NS	1	10.0	4	5.9	
Education					
No schooling	2	20.0	11	16.2	0.988 ¹
Literate	-	-	5	7.4	
Incomplete Primary Education	4	40.0	23	33.8	
Complete Primary Education	2	20.0	6	8.8	
Incomplete High School	-	-	3	4.4	
Complete High School	1	10.0	8	11.8	
Incomplete Higher Education	-	-	4	5.9	
Complete Higher Education	-	-	2	2.9	
NR/NS	1	10.0	6	8.8	

Source: Secondary data (medical records). 2015.
¹: Fisher's Exact Test - Monte Carlo Method.

Table 2. Association between clinical variables and the presence of pressure ulcers. João Pessoa-PB, 2015.

Clinical Variables	Presence of PU		Absence of PU		Significance (P-value)
	N	%	N	%	
Time of Hospitalization					
≤ 5 days	1	10	14	20.6	0.348 ²
6-10 days	1	10	20	29.4	
≥ 10 days	8	80	32	47.1	
NR/NS	-	-	2	2.9	
General State					
Serious	6	60.0	17	25.0	0.007 ¹
Regular	4	40.0	49	72.1	
Good	-	-	1	1.5	
NR	-	-	1	1.5	
Diag. Hypothesis					
Respiratory	3	30.0	12	17.6	0.007 ¹
Cardiovascular	1	10.0	7	10.3	
Postoperative	-	-	33	48.5	
Sepsis	6	60.0	9	13.2	
Digestive	-	-	2	2.9	
Immunological	-	-	3	4.4	
Neurological	-	-	2	2.9	
Total	10		68		
Pre-existing Diseases					
DM (n = 28)	5	17.9	23	82.1	0.481 ¹
HAS (n= 40)	5	12.5	35	87.5	1.000 ¹
Obesity (n = 15)	1	6.7	14	93.3	0.677 ¹
Cancer (n = 11)	-	-	11	100.0	0.341 ¹
Other (n = 33)*	8	24.2	25	75.8	0.015 ¹
N. of pre-existing diseases					
1 disease	2	20.0	19	27.9	0.609 ¹
2-3 diseases	7	70.0	32	41.7	
4-5 diseases	1	10.0	6	8.8	
6 or more	-	-	1	1.5	
No pathology	-	-	10	14.7	

Source: Secondary data (medical records). 2015.

*: It refers to: Pneumonia, Acute Renal Failure, Chronic Obstructive Pulmonary Disease, Acute Respiratory Failure.

1: Fisher's Exact Test - Monte Carlo Method.

2: Fisher's Exact Test.

(55.1%), single (16.7%), widowed (11.5%) and divorced (10.3%); with hospitalization time of less than 5 days (70.1%), followed by 5-10 days (11.6%) and more than 10 days (18.2%).

In relation to clinical variables, it was found that more than half of patients (67.9%) presented regular general conditions, followed by those in serious conditions (29.5%) and good conditions (1.3%). The reason for hospitalization in the ICU for 42.3% of the evaluated was postoperative, followed by sepsis (19.2%), respiratory diseases (19.2%), cardiovascular system diseases (10.3%), immunologic diseases (3.8%), neurological and digestive diseases, both of 2.6%.

The most frequent comorbidity was systemic arterial hypertension (SAH) (51.3%), followed by Diabetes Mellitus (35.9%), Obesity (19.2%), Cancer (14.1%) and other less recurrent. In addition, 50% of patient records showed patients with two or three pre-existing diseases, while only 14.7% of evaluated patients did not present other associated diseases.

To analyze the association between the PU prevalence and the clinical and demographic characteristics, were performed statistical tests, which showed significant statistical association for clinical variables, diagnostic hypothesis ($p = 0.007$) and pre-existing diseases ($p = 0.015$); the other variables presented p -value > 0.05 (**Tables 1 and 2**).

Concerning the association between the risk factors for the emergence of PU and the prevalence of this, it is observed that they were statistically associated with the level of consciousness ($p = 0.004$), ventilation ($p = 0.017$), peripheral perfusion ($p = 0.016$) and hydration ($p = 0.035$). Although the physical mobility of the upper limbs presented p -value > 0.05 (0.052), this focused quite close to the cutting values, therefore, this should be highlighted from the results. The other variables were not associated ($p \geq 0.05$) to the presence of PU (**Table 3**).

As a complement to the risk factors, associations were made between the presence of PU and the

Table 3. Association between risk factors for PU and the presence of pressure ulcers. João Pessoa-PB, 2015.

Risk Factors	Presence of PU		Absence of PU		Significance (P-value)
	N	%	N	%	
Smoking (n = 15)	1	6.7	14	93.3	0.677 ¹
Alcoholism (n = 8)	2	25.0	6	75.0	0.271 ¹
Level of Consciousness					
Unconscious	4	40.0	4	5.9	0.004 ¹
Conscious	3	30.0	53	77.9	
Sedation	3	30.0	8	11.8	
NR	0	-	3	4.4	
Physical mobility of the MMSS					
Preserved	2	20.0	31	45.6	0.052 ¹
Paresis	1	10.0	-	-	
NR	7	70.0	37	54.4	
Physical mobility of the MMII					
Preserved	2	20.0	22	32.4	0.687 ¹
Palsy	-	-	1	1.5	
Decreased motor strength	2	20.0	8	11.8	
NR	6	60.0	37	54.4	
Ventilation					
Spontaneous	2	20.0	40	58.8	0.017 ¹
VMNI	1	10.0	12	17.6	
VMI	6	60.0	15	22.1	
NR	1	10.0	1	1.5	
Peripheral Perfusion					
Preserved	4	40.0	28	41.2	0.016 ¹
Decreased	4	40.0	5	7.4	
NR	2	20.0	35	51.5	
Hydration					
Hydrated	5	50.0	52	76.5	0.035 ¹
Dehydrated	4	40.0	6	8.8	
NR	1	10.0	10	14.7	
Edema					
Yes	2	20.0	6	8.8	0.271 ¹
No	8	80.0	62	91.2	

Risk Factors	Presence of PU		Absence of PU		Significance (P-value)
	N	%	N	%	
Nutritional status					
Eutrophic	6	60.0	31	45.6	0.733 ¹
Obese	1	10.0	15	22.1	
Emaciate	2	20.0	7	10.3	
Malnourished	-	-	3	4.4	
NR	1	10.0	12	17.6	
Vesical Eliminations					
Spontaneous	2	20.0	19	27.9	0.818 ¹
SVD	8	80.0	46	67.6	
NR	-	-	3	4.4	
Intestinal eliminations					
Continent	2	20.0	12	17.6	0.101 ¹
Diarrhea	1	10.0	-	-	
NR	7	70.0	56	82.4	
Skin integrity					
Preserved	2	20.0	31	45.6	0.177 ¹
Impaired	-	-	-	-	
NR	8	80.0	37	54.4	
Ambulation					
Partially dependent on	-	-	5	7.4	0.134 ¹
Dependent on	1	10.0	3	4.4	
Pain on movement	1	10.0	-	-	
Don't ramble	1	10.0	5	7.4	
NR	7	70.0	55	80.9	

Source: Secondary data (medical records). 2015
1: Fisher's Exact Test, Monte Carlo Method.

medical findings of the collected records. As noted in **Table 4**, only the class of anti-depressants/anti-anxiety drugs was statistically associated ($p = 0.030$) to the presence of PU.

Discussion

In general, the sample was characterized by predominantly male (55.1%), aged ≥ 60 years old (39.7%) and ethnicity/mulatto (32.1%). The education level

Table 4. Association between drug profile and the presence of pressure ulcers. João Pessoa-PB, 2015.

Drug profile	Presence of PU		Absence of PU		Significance (P-value)
	N	%	N	%	
Corticoids	3	12.5	21	87.5	1.000 ¹
Antimicrobial	9	14.1	55	85.9	1.000 ¹
Antihypertensive	-	-	17	100.0	0.192 ¹
Analgesic	10	13.5	64	86.5	1.000 ¹
Antidepressant/ anxiolytic	8	26.7	22	73.3	0.030 ¹
Antihistamine	1	50.0	1	50.0	0.431 ¹
Antiplatelet	8	14.0	49	86.0	1.000 ¹
Antacid	5	9.6	47	90.4	0.450 ¹
Hypoglycemic	2	8.7	21	91.3	0.780 ¹
Diuretic	1	7.7	12	92.3	1.000 ¹
Immunosuppressant	10	13.2	66	86.8	1.000 ¹
Others*	9	13.8	56	86.2	1.000 ¹
Qty. of medicines					
<5	-	-	1	1.5	0.545 ¹
5-10	5	50.0	44	64.7	
>10	5	50.0	21	30.9	
NR/NS	-	-	2	2.9	
Source: Secondary data (medical records). 2015					
*: It refers to: Bronchodilators, Antiemetic, Antiulcer.					
1: Fisher's Exact Test, Monte Carlo Method.					

corresponding to the elementary school (44.9%) as well as the married/stable union (55.1%), and hospitalization time less than 5 days (70.1%). Clinically presented regular general state (67.9%), admitted to postoperative (42.3%), with 2-3 associated comorbidities (50.0%).

The clinical and demographic profile of the sample matches the delimitation of this study. There were sought individuals in adult range, admitted to a hospital that is a reference in performing medium and high complexity surgeries by the Unified Health System, therefore, requiring shorter hospitalization time in ICU and featuring state of regular health.

Taking into account only the characterization of the cases presented PU during the internment pe-

riod, there is the prevalence of subjects with corroborating properties to other Brazilian studies, being most male [2, 17-18], 40 years old or more [6,18-19], color/white or brown race [16-17,20], married, with elementary school, and in severe general condition [8]. The PU prevalence found among the records evaluated was of 12.8%.

Prevalence and incidence rates of PU differ between studies, since they depend directly of the conditions in which these are carried out, as well as the inclusion and exclusion criteria of analysis. A recent study carried out with 358 patients of legal age in India, points overall PU hospital prevalence of 7.8% [21], while studies developed in Brazilian States point indexes between 13.9%, 30.9% and 82.0% [4-5, 12].

The associations between clinical and demographic profile and the presence of PU were statistically significant only for diagnostic hypothesis ($p = 0.007$) and pre-existing diseases/others ($p = 0.015$). Sepsis and respiratory diseases were expressed in percentage terms more among individuals who developed PU, corroborating similar studies [2,6,11]. Sepsis causes high consumption of oxygen, systemic hypoperfusion and metabolic acidosis, and hyperdynamic circulatory state, in order to harm the cellular metabolism, factors that enhance ulcers [22].

Furthermore, the variable "others" of preexisting disease item, corresponds to pathologies such as pneumonia, acute respiratory failure, chronic obstructive pulmonary disease related to the respiratory system. Similarly, studies have found that 31.4% of patients with PU had pneumonia and 86% had acute respiratory failure as preexisting conditions on admission [6, 11].

Among the investigated risk factors, there are exposed as significantly associated with the presence of PU ($p < 0.05$) the level of consciousness ($p = 0.004$), ventilation ($p = 0.017$), peripheral perfusion ($p = 0.016$) and hydration ($p = 0.035$). Although the physical mobility of the upper limbs has obtained p -value > 0.05 , this was very close to the association

threshold, the reason why we considered it relevant to the study.

As for the level of consciousness, the "unconscious and sedation" variable was more prevalent among cases where ulcers were developed. Both situations promote sensory decrease and physical immobility of the patient, factors known in the literature, as the risk of PU development [9, 23].

Regarding the association between PU and invasive mechanical ventilation, the literature contains very significant amounts of patients using these devices and, therefore, more vulnerable to PU. Studies indicate the prevalence of 44.7% to 93% of PU in patients under invasive mechanical ventilation condition [11, 18].

In similar research on the PU association in patients with mechanical ventilation, it points to the statistical relationship between the appearance of lesions and the amount of time that patients remained submitted to the procedure [24]. The loss related to it can be guided in the movement limitation, i.e., reduction of mobility and therefore increased pressure over bony prominences [11].

Peripheral perfusion committed/decreased is related to low arteriolar pressure, which reduces skin pressure tolerance and increases the risk of ischemia with complication of external pressure. Hypotension promotes reduction of cutaneous tolerance to pressure, friction and shear; and it may be an indicator of patient at high risk for PU development [25]. Conditions in the studied sample corroborate the presence of PU, and act in order to potentiate, given that the existence of respiratory diseases, sepsis, lowered level of consciousness, and need for mechanical ventilation, among other features, are strong predisposing to the emergence of PU.

On the maintenance of adequate hydration, its importance is known with regard to the prevention of diseases to the skin, as this combined with other factors can maintain the integrity of the skin for a longer period of time, even in patients restricted to bed or presenting critical general state

[20]. Hydration of the patient's skin is a preventive measure to be employed so that the risk of PU development is minimized. In the meantime, research shows that well-hydrated patients have higher scores when evaluated by risk scales than those who do not have it [26].

During hospitalization in ICU, patients are often subjected to polypharmacy, making use of various medicines. In this study, the drugs most widely used by individuals with PU were analgesics, chemotherapeutics, and immunosuppressant; however, these did not show the presence associated to PU ($p = 0.030$).

The use of drugs, particularly analgesic, antihypertensive and antiplatelet is characterized as a risk factor for the development of PU [27]. According to a study, antidepressants/anxiolytics drugs cause damage to mobility, causing the individual more subject to pressure and, in addition, the continued use of drugs may contribute to the development of PU [8].

Other studies, however, report higher use of antimicrobial drugs [17], vasoactive drugs and corticoids [13] and analgesics/anti-inflammatories [15] to the detriment of patients without PU.

Given the association of elucidated factors in this and in other studies as influencers of the PU's development, we emphasize the importance of identifying risk factors for these injuries by healthcare professionals through continuous assessments that promote effective prevention actions, in an attempt to reduce the incidence and prevalence of these lesions and to improve the individuals' life quality [28-29].

The multidisciplinary teamwork, intrinsically related to inpatient at ICUs, needs to think critically and act systematically, preventing the impact of this disease. Meanwhile, it is noted conducting research to investigate the incidence and prevalence of pressure ulcers, aiming to direct and uniform procedures, by demonstrating the reality of each patient.

Conclusion

Considering the findings, the prevalence of PU in adults admitted to the studied hospital's Intensive Care Unit was of 12.8% of the cases. Has been identified as risk factors associated with PU ($p < 0.05$) the reason for hospitalization, pre-existing diseases, level of consciousness, peripheral perfusion, ventilation, hydration and the use of antidepressants/anti-inflammatory drugs.

It follows, therefore, that the objectives were met, so that the results highlight the importance of this study for academic and professional environment, with regard to the promotion of knowledge of some risk variables for PU, being able to influence behavior and thus expand excellence in care. The involvement of the whole multidisciplinary team with regard to the PU's preventive actions improve the life quality of the individuals reduces wear of professionals, the burden of treatment and hospitalization time.

As in other studies, working with medical records involves patience and adversities, as many records have incorrect registration number, incomplete information and even losses, limiting factors to the development of this study.

The results show the importance of the PU prevalence in ICU, although the adopted methodological process has raised important issues regarding the registration of these diseases. It is suggested that additional research may be undertaken, with a view to performance assessment and nursing record in this sector, as well as strategies that promote professional awareness of the importance of the information documented in the hospitalization period.

List of abbreviations

PU: Pressure ulcer

ICU: Intensive Care Unit

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