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Pressure injury: incidence in critical units of a regional hospital

Lesão por pressão: incidência em unidades críticas de um hospital regional

Lesión por presión: incidencia en unidades críticas de un hospital regional

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ABSTRACT

Objectives: Measuring the incidence of pressure injury (PI) in users hospitalized in critical units of a public reference institution in southwestern Bahia. **Method:** Prospective longitudinal study. Data were collected between June and August of 2017, through a direct interview, medical records, medical prescription and inspection of the participant's skin. **Results:** Of the 83 participants, 39 (47%) developed PI. The medium stay in the study was 6.8 days. Most of them were male, black or brown and had low schooling. The mean age was 47.6 years (± 19.8). It was evidenced that the continuous use of vasoactive drugs and sedoanalgesia is associated with PI. Thirty-two (38.55%) participants presented a high risk for PI development. The calcaneal region (44%) was the most affected. The number of lesions per participant was 1.28, on average, with lesions in stage 1 (68%) predominating. The occurrence of an unfavorable outcome (death) was statistically significant. **Conclusion:** The multifactorial character of the emergence of PI requires the adoption of institutional measures focused on the prevention of this adverse event, and should be part of the process of permanent education of professionals.

DESCRIPTORS: Pressure injury; Critical care; Stomatherapy; Research on health services.

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RESUMO

Objetivo: Mensurar a incidência de lesão por pressão (LP) em usuários internados em unidades críticas de uma instituição pública de referência no sudoeste da Bahia. **Método:** Estudo longitudinal prospectivo. Os dados foram coletados entre junho e agosto de 2017, por meio de entrevista direta, prontuário, prescrição médica e inspeção da pele do participante. **Resultados:** Dos 83 participantes, 39 (47%) desenvolveram LP. A média de permanência no estudo foi de 6,8 dias. A maioria era do sexo masculino, de cor preta ou parda e tinha baixa escolaridade. A média de idade foi de 47,6 anos (±19,8). Foi evidenciado que o uso contínuo de drogas vasoativas e sedoanalgesia está associado à LP. Trinta e dois (38,55%) participantes apresentaram alto risco para desenvolvimento de LP. A região calcânea (44%) foi a mais acometida. O número de lesões por participante foi de 1,28, em média, predominando lesões no estágio 1 (68%). A ocorrência de desfecho desfavorável (óbito) foi estatisticamente significativa. **Conclusão:** O caráter multifatorial de surgimento das LP requer a adoção de medidas institucionais focadas na prevenção deste evento adverso, devendo fazer parte do processo de educação permanente dos profissionais.

DESCRITORES: Lesão por pressão; Cuidados críticos; Estomaterapia; Pesquisa sobre serviços de saúde.

RESUMEN

Objetivo: Mensurar la incidencia de lesión por presión (LP) en usuarios internados en unidades críticas de una instituida pública de referencia en el sudoeste de Bahia. **Método:** Estudio longitudinal prospectivo. Los datos fueron recolectados entre junio y agosto de 2017, por medio de entrevista directa, prontuario, prescripción médica e inspección de la piel del participante. **Resultados:** De los 83 participantes, 39 (47 %) desarrollaron LP. El promedio de permanencia en el estudio fue de 6,8 días. La mayoría era de sexo masculino, de color negro o pardo y tenía baja escolaridad. El promedio de edad fue de 47,6 años (±19,8). Se evidenció que el uso continuo de drogas vasoactivas y sedoanalgesia está asociado a la LP. Treinta y dos (38,55 %) participantes presentaron alto riesgo de desarrollar LP. La región calcánea (44 %) fue la más acometida. El número de lesiones por participante fue, en promedio, de 1,28, predominando lesiones de nivel 1 (68 %). La existencia de desenlace desfavorable (óbito) fue estadísticamente significativa. **Conclusión:** El carácter multifactorial de surgimiento de las LP requiere la adopción de medidas institucionales centralizadas en la prevención de este evento adverso, debiendo formar parte del proceso de educación permanente de los profesionales.

DESCRIPTORES: Lesión por presión; Cuidados críticos; Estomaterapia; Investigación sobre servicios de salud.

INTRODUCTION

Pressure injuries (PI) are defined as "localized damage to the underlying skin and/or soft tissues, usually on a bone prominence or related to the use of a medical device or another artifact "[1]. PIs have been highlighted as a public health problem because they are one of the main adverse events related to care in health units and institutions.

The occurrence of PI varies according to the clinical conditions of the individuals and the environment where they are inserted, especially those who need a prolonged period of hospitalization. The mechanism of lesion development is multifactorial and includes intrinsic factors, such as age, comorbidities, nutritional status, hydration, mobility conditions and level of consciousness; and extrinsic, such as pressure, shear, friction, and humidity[2].

In intensive care units, PIs are a frequent problem. Individuals usually present a severe clinical picture, associated with mobility restriction, loss of muscle mass and a longer period of hospitalization, and are still subjected to multiple therapeutic interventions, and such factors make them more susceptible to the onset of the injury[3].

Continuous use of certain medications can also lead to the onset and/or progression of the lesion, such as sedatives and analgesics, to reduce pain sensation and impair mobility, and hypotension as it can lead to reduced blood flow, thereby reducing tissue perfusion and making them more susceptible to pressure; in addition, predisposing factors are: general compromised status, age, altered body weight, urinary incontinence, and inadequate care for bedridden or impaired mobility patients, among others[4,5].

In 2015, the Brazilian Institute for Patient Safety (IBSP) emphasized that risk assessment, skin evaluation and early treatment, mechanical overload (change of position) and use of support surfaces and education for professionals/family and the patient are the guidelines for the prevention of these lesions[6].

Risk factors for PI development can be identified from the use of scales already validated and used worldwide, being the Braden scale[7] the most applied. It is composed of six subscales: sensory perception, activity, mobility, moisture, nutrition and friction and shear, ranging from six to 23 points and classifying the individual at severe, high, medium or low risk.

In Brazil, there are few investigations on the incidence and prevalence of PI, and punctual studies indicate a high rate of occurrence, especially in the hospital network, with rates varying from 10.62 to 44.1%[8]. There is no data in the national literature regarding the expenses generated by PIs for the healthcare system. International research shows that the treatment of each injury can cost from US$ 2,000 to US$ 30,000, and the annual cost of treating PIs at health facilities can reach US$ 1.3 billion[9].

Considering the implications for the user and for the institutions, the prevention of LP associated with health care is part of a set of national and international goals, aiming to prevent damages, promote patient safety and qualify the assistance offered in health services[10,11].

In view of the above, this research arises from the need to identify the extent of the problem and aspects related to PI, considering the high levels of striking and their deleterious effects. This research may alert professionals and managers, as well as direct the actions and services for prevention and control of this iatrogenic event, as well as serve as an evaluation tool for the practices involved in the work process.

OBJECTIVES

To measure the incidence of PI in users hospitalized in critical units of a public reference institution in southwestern Bahia (Brazil).

METHODS

This is a longitudinal prospective study.

The research was carried out in the stabilization room (SR) and in the two intensive care units (ICU) for adults, considered as critical units, of a reference hospital in southwestern Bahia. The SR is one of the sectors that make up the hospital emergency and its structure has six beds, where the assistance is provided by a multi-professional team composed of a nurse, two nursing technicians, a physiotherapist, and the prescribing physician;the two adult ICUs have a total of 18 beds and are attended by two nurses, four nursing technicians, one doctor, and one full-time physiotherapist. Because they are general care units, the profile of patients is quite variable, including mainly polytraumatized youngsters, adults who are victims of brain vascular events, cancer patients and patients in the postoperative period of major surgeries.

The sample comprised the universe of eligible patients hospitalized in these units, totaling 83 participants. The inclusion criteria in the study were: age equal to or over than 18 years; the presence of full skin at admission; remain hospitalized in the unit for at least 48 hours; and consent to participate voluntarily in the study or have their participation authorized by the person in charge. Patients considered to be largely burned (burned body surface area above 20%), due to the difficulty of evaluating the skin and identification of PI were excluded.

The collection was carried out for a period of 90 days, between the months of June and August of 2017. Direct interview, medical records, medical prescription and inspection of the participant's skin were used as a data source at the time of admission and, subsequently, during the participation period. The collection was performed by a team of nurses duly trained by the principal investigator.

During the period of the research, the participant or his/her supervisor was approached during the first 24 hours of admission to the reference units, at the time of the request for consent and inclusion in the study. Consequently, the research form was applied and the first inspection of the skin was performed. Subsequent evaluations occurred on alternate days, respecting the local institutional protocol, and occurred until detection of PI, discharge or death of the participant.

The 83 participants were evaluated using a research form developed by the researchers, based on the studies of Bernardes[8] and Costa[12], being this submitted to a validation pre-test. The instrument consisted of two parts: the first, which included demographic and clinical data, and the second, which contained questions regarding the data obtained after the participant's skin inspection.

For the purposes of PI diagnosis and staging, was used the criteria established by the National Pressure Ulcer

Advisory Panel (NPUAP) (2016). The risk assessment for lesion development was measured using the Braden scale, internationally recognized and validated for the Portuguese language.

The demographic data investigated were: age, sex, color, and schooling. Clinicians included previous comorbidities, medical diagnosis, use of invasive devices, use of diet, use of vasoactive drugs and continuous sedoanalgesia, type of mattress used, the record of a systematic change of decubitus and protection of bony prominences. The variables weight and height, when they could not be mentioned, were obtained through the medical record; for body mass index (BMI) was used the recommendation of the World Health Organization (WHO) (1995). In participants whose height could not be reported or was not available in the medical record, it was estimated from the Chumlea formula[13].

Demographic data, diagnoses, and previous comorbidities and record of the systematic change of decubitus were transcribed from the medical records to the research instrument every 2 hours. Information regarding pharmacotherapy was obtained on medical prescription.

Data were stored in SPSS Statistics 23 software and analyzed in Stata 11 software.

The results were described by the mean and standard deviation for continuous variables and absolute and relative frequencies for categorical variables. The association of PI incidence with demographic and clinical variables was made using Student's t-test to compare the quantitative variables; for the nominal qualitative variables, the Pearson's chi-square test was used, adopting $p \leq 0.05$ and 95% confidence interval. The absolute incidence coefficient was determined by the number of individuals affected by PI in relation to the total number of participants exposed during the investigation period.

The research complies with the provisions of resolution 466/12 and was approved by the Committee for Ethics in Research with Human Beings of the Multidisciplinary Health Institute - Anísio Teixeira Campus - of the Federal University of Bahia (CEP-IMS-CAT-UFBA) under CAAE 64654117.0.0000.5556.

RESULTS

The incidence of PI was 47% (39). Considering the allocation sector, 23.08% (nine) of the participants were in the SR; 20.51% (eight) in ICU I; and 56.41% (22) in ICU II. The mean length of stay in the study was 6.8 days (± 5.5), with a minimum of three and a maximum of 31 days.

Table 1 represents the grouping of the variables related to the sociodemographic characteristics of the participants. The mean age found was 47.6 years (± 19.8), ranging from 19 to 87 years.

Table 1. Sociodemographic characteristics of users of critical units of a regional hospital. Vitória da Conquista, Bahia, Brazil, 2017.

Variable	Category	n (%)
Age (years)	18 to 34	27 (32.53%)
	35 to 60	30 (36.14%)
	> 60	26 (31.33%)
Gender	Female	26 (31.33%)
	Male	57 (68.67%)
Color	White/Yellow	22 (26.51%)
	Black/Brown	61 (73.49%)
Schooling	Illiterate/incomplete elementary/can read and write	43 (51.81%)
	Elementary complete/high school incomplete	29 (34.94%)
	High school complete/college complete, incomplete or more	11 (13.25%)
		Total: 83 (100%)

The study group consisted of 56.63% (47) of previously healthy individuals, 31.33% (26) of hypertensive patients, 2.40% (two) of diabetics and 9.64% (eight) of others affections. Regarding the main medical diagnosis, 34.94% (29) of the participants were polytraumatic, followed by those with neurological diseases 28,92% (24). There were also neoplasias (10.84%), cardiovascular diseases (4.82%), digestive diseases (3.61%), respiratory diseases (2.41%) and other diseases 14.46% (including external causes).

In the analysis of factors associated with the clinical condition (Table 2), the variables on vasoactive drug use and continuous sedoanalgesia were associated with the outcome, a statistically significant result. Dietary use, systematic change of decubitus, use of alternating pressure mattress and BMI showed no association with PI.

The risk score of the participants performed through the Braden scale revealed that 20.48% (17) of them presented a low risk for the development of PI; 10.85% (nine), moderate risk; 38.55% (32), high risk; and 30.12% (25), severe risk.

No participant considered low risk developed PI, and it was not possible to establish a statistical difference of this variable with the outcome. Regarding the variable protection of bony prominences, no participant was exposed, and it was not possible to establish a relation with the outcome.

Table 3 shows the distribution of PI according to the anatomical location.

The 39 participants who developed PI had a total of 50 lesions. The number of injuries per participant ranged from one to three, with a mean of 1.28 per person. The mean time to onset of the lesion was 5.87 days, with a minimum of three and a maximum of 13 days.

Regarding staging, 68% (34) of the diagnosed lesions presented in stage 1; 30% (15), in stage 2; and 2% (one) were classified as non-stable. Of the 39 individuals who developed PI, 2.56% (one) died, with a statistically significant association.

DISCUSSION

The incidence of PI in this investigation was higher than that observed in other studies[3,15,16]. The results point to the association between the use of vasoactive drugs and PI. The justification for such finding lies in the severity of the critical participant, who as a result of hemodynamic instability, may require the use of these drugs as a priority measure to maintain life. Such

Table 2. Characteristics related to the clinical condition of users of critical units of a regional hospital. Vitória da Conquista, Bahia, Brazil, 2017.

Characteristics related to the clinical condition	Presence of PI n (%)	Absence of PI n (%)	Total	p*
Vasoactive drugs				
Yes	22 (68.75%)	10 (31.25%)	32 (100%)	0.002
No	17 (33.33%)	34 (66.67%)	51 (100%)	
Use of continuous sedative / analgesic				
Yes	33 (62.26%)	20 (37.74%)	53 (100%)	0.000
No	6 (20%)	24 (80%)	30 (100%)	
Dietary use				
Yes	17 (48.57%)	18 (51.43%)	35 (100%)	0.805
No	22 (45.83%)	26 (54.17%)	48 (100%)	
Systematic change of decubitus				
Yes	4 (44.44%)	5 (55.56%)	9 (100%)	0.871
No	35 (47.30%)	39 (52.70%)	74 (100%)	
Protection of bony prominences				
Yes	0	0	0	–
No	39 (47%)	44 (53%)	83 (100%)	
Use of mattress with alternating pressure				
Yes	8 (36.36%)	14 (63.64%)	22 (100%)	0.244
No	31 (50.82%)	30 (49.18%)	61 (100%)	
Previous Comorbidities				
Yes	16 (44.44%)	20 (55.56%)	36 (100%)	0.684
No	23 (48.94%)	24 (51.06%)	47 (100%)	
BMI **				
Eutrophy	20 (45.5%)	24 (54.5%)	44 (100%)	0.766
Low weight/overweight/obesity	19 (48.72%)	20 (51.28%)	39 (100%)	

* Pearson's chi-square test (p <0.05); ** Values according to the Brazilian Guidelines for Obesity (ABESO, 2016)14; BMI = Body mass index; PI = Pressure injury.

Table 3. Distribution of pressure injuries, according to the anatomical location, in critical units of a regional hospital. Vitória da Conquista, Bahia, Brazil, 2017.

Location of injury	Frequency (%)
Calcaneous	22 (44%)
Elbow	1 (2%)
Shoulder blade	1 (2%)
Buttock	2 (4%)
Intergluteal	4 (8%)
Malleolus	4 (8%)
Occipital	2 (4%)
Ear	3 (6%)
Sacrum	11 (22%)
	Total: 50 (100%)

measures interfere since the professionals can postpone actions of maintenance to the integrity of the skin, as, for example, the systematic change of decubitus[17].

The incidences of PI in SR and in ICU were similar; it is important to note that the time spent in SR is lower than in other sectors, considering that it is allocated in the emergency and the users are later sent to other sectors of the hospital. The considerable difference between ICUs I and II is due to the fact that Nursing Care Systematization (NCS) is only implemented in ICU I, which highlights the importance of qualified nursing to identify risk factors, to plan and implement preventive measures effective.

Regarding the sociodemographic characteristics, there was a predominance of males, which represented 68.6% of the sample. The finding is similar to that of a study conducted in the state of São Paulo (Brazil), in which the majority of participants were male[15]. Regarding age, the average found in this study was slightly lower than that of other investigations[15,17]. This difference may be related to the profile of the participants attended, considering that the most frequent medical diagnosis was polytrauma, often associated with young individuals.

Most participants were brown or black. It should be noted that the PI stage 1 can be difficult to identify among individuals with dark skin, and this may be an indication of risk, although there are controversies in the literature about these variables[18,19].

Chronic diseases favor PI development when they affect sensory perception, circulation, oxygenation, and mobility of participants[20]. When analyzing the presence of comorbidities, no statistically significant association was observed.

In this study, it was also verified that the use of continuous sedoanalgesia is associated with PI. These medications may cause decreased sensory perception, decreased mobility and increased friction and shear, these factors predisposing to the appearance of injuries[17,18].

It is known in the literature that nutritional changes can lead to the appearance of tissue changes since they influence metabolic and immunological factors. The use of diet and the BMI classification of participants did not demonstrate a significant statistical association. This result corroborates with findings from other national studies[17,18]. The cohort performed with 77 participants by Borghardt et al. in a university hospital in Vitória (Espírito Santo, Brazil) in 2016, also did not present a statistically significant difference between BMI and the development of PI[17].

Concerning the location of the lesions, the greatest frequency in this investigation was in the calcaneal region, followed by the sacral region, diverging from other studies that point to the sacral region as the most affected[3,9,16-18,21]. The development of the lesions probably results from inadequate actions during the handling of the individuals, as well as from the non-observance of the recommendations of preventive measures according to the classification of PI risk by the Braden scale[3,18].

Staging is an aspect that presents a difference between other studies. Some corroborate with the finding of this investigation in which there is a predominance of stage I lesions[17], such as the prospective cohort conducted in Espírito Santo, where 72% of LPs were classified in stage I. Other studies indicate a higher frequency of stage II lesions[3,15,16,22]. It should be noted that the methodology of the present study did not include the follow-up of PI evolution, and it was not possible to know if the lesions progressed to more advanced categories.

The systematic change of decubitus and the use of a mattress with alternating pressure were verified in a restricted number of participants, noting that only one of the units studied has the pneumatic mattress in all the beds. The protection of bony prominences was not verified in any participant, which interferes with the analysis of the data. The aforementioned variables had no significant association in this study.

Lack of mobility is one of the main risk factors for PI, as it predisposes to tissue damage due to pressure in places of bony prominence[3]. The maintenance of the skin integrity of the clients restricted to the bed is related to the knowledge and the application of care measures, which must be systematically carried out[19].

The use of risk assessment scales for LP development provides systematized planning, which facilitates the diagnosis, treatment, and prevention of these lesions[21]. The mean score of the Braden scale in this study was similar to that of other investigations[7,15,17,21]. Although this variable did not present a statistically significant association with the outcome, it is important to highlight its sensitivity and specificity for users of critical units, allowing the adoption of preventive measures.

The occurrence of an unfavorable outcome (death) was statistically significant in relation to PI (p 0.007). Although this is an absolute value, the frequency is small, this finding reveals the maintenance of skin integrity as a factor that reduces users' suffering and institutional costs, reducing morbidity and mortality rates[3].

As limitation of the study is the use of secondary data sources, considering the documentary nature, and the evaluation interval based on the institutional protocol, which may have contributed to some bias in the research.

CONCLUSION

The incidence of PI was 47%. The findings showed an association between the use of vasoactive drugs, continuous sedoanalgesia, and death with PI, with the majority of participants presenting a high risk for the development of PI according to the Braden scale.

Participants developed a total of 50 lesions, averaging 1.28 per person, especially in the region of calcaneus and sacrum. Of these, 68% were in stage 1 and the others were classified as stage 2 or non-staging.

These data reveal that considering the multifactorial nature of PI emergence, it is essential to share all the agents involved in the care process and to adopt institutional measures focused on the prevention of this adverse event.

CONTRIBUTION OF AUTHORS

Conceptualization, Silva SAM e Pires PS; Metodologia, Silva SAM; Investigation, Silva SAM; Macedo MP; Oliveira LS; Batista JET e Amaral JM; Writing – First version, Silva SAM e Pires PS; Writing – Reviewing & Edition, Silva SAM; Supervisão, Silva SAM.

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