

# Risk assessment for pressure injury and associated factors in hospitalized elderly

**RESUMO** | Objetivo: avaliar o risco para lesão por pressão e fatores associados em idosos internados. Métodos: pesquisa transversal, com 202 idosos internados em enfermarias, entre setembro 2017 a janeiro de 2018. Aplicou-se questionário sociodemográfico e clínico, Mini exame de estado mental e escala de Braden. Analisou-se os dados pelo teste qui-quadrado. Resultados: do total de 202 idosos, 27,7% (n=56) foram classificados como risco baixo, 14,4% (n=29) moderado e 17,3% (n=35) alto risco para desenvolver lesão por pressão. Verificou-se associação entre a escala de Braden e faixa etária ( $p<0,001$ ), multimorbidade ( $p=0,024$ ), tempo de hospitalização ( $p<0,001$ ), dispositivos médicos ( $p<0,001$ ), tipo de dieta ( $p<0,001$ ), mobilidade ( $p<0,001$ ), turgor ( $p<0,001$ ) e textura da pele ( $p=0,024$ ). Conclusão: Destaca-se a importância de avaliar e monitorar o risco do idoso em desenvolver lesões considerando as alterações tegumentares oriundas do envelhecimento e os fatores associados descritos  
**Descritores:** Enfermagem Geriátrica; Idoso; Ferimentos e Lesões; Hospitalização; Envelhecimento da Pele.

**ABSTRACT** | Objective: to assess the risk for pressure injury and associated factors in hospitalized elderly. Methods: cross-sectional study, conducted with 202 elderly patients hospitalized in wards, between September 2017 and January 2018. A sociodemographic and clinical questionnaire, Mini Mental State Examination and Braden Scale were applied. Data were analyzed using the chi-square test. Results: of the total of 202 elderly, 27.7% (n=56) were classified as low risk, 14.4% (n=29) moderate and 17.3% (n=35) as high risk for developing pressure injuries. Braden scale was associated to age ( $p<0.001$ ), multimorbidity ( $p=0.024$ ), length of hospital stay ( $p<0.001$ ), medical devices ( $p<0.001$ ), type of diet ( $p<0.001$ ), mobility ( $p<0.001$ ), turgor ( $p<0.001$ ) and texture of skin ( $p=0.024$ ). Conclusion: The importance of evaluating and monitoring the risk of the elderly to develop lesions is highlighted, considering the tegumentary changes arising from aging and the associated factors described.  
**Descriptors:** Geriatric Nursing; Aged; Wounds and Injuries; Hospitalization; Skin Aging.

**RESUMEN** | Objetivo: evaluar el riesgo de lesión por presión y factores asociados en ancianos hospitalizados. Métodos: investigación transversal, realizada con 202 ancianos hospitalizado, (septiembre - enero 2018). Se aplicó un cuestionario sociodemográfico y clínico, Mini Examen del Estado Mental y Escala de Braden. Los datos se analizaron mediante la prueba de chi-cuadrado. Resultados: del ancianos 27,7% (n=56) se clasificaron como de bajo riesgo, 14,4% (n=29) moderado y 17,3% (n=35) alto riesgo para desarrollar lesión por presión. Hubo asociación entre la escala de Braden y grupo de edad ( $p<0,001$ ), multimorbilidad ( $p=0,024$ ), tiempo de estancia hospitalaria ( $p<0,001$ ), dispositivos médicos ( $p<0,001$ ), tipo de dieta ( $p<0,001$ ), movilidad ( $p<0,001$ ) y turgencia ( $p<0,001$ ) y textura de la piel ( $p=0,024$ ). Conclusión: Se destaca la importancia de evaluar y monitorear el riesgo de que los ancianos desarrollen lesiones, considerando los cambios tegumentarios derivados del envejecimiento y los factores asociados descritos.  
**Descritores:** Enfermería Geriátrica; Anciano; Heridas y lesiones; Hospitalización; Envejecimiento de la piel.

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## INTRODUCTION

The aging process causes important physiological changes in the integumentary system, which can favor skin lesions. Added to this, the presence of chronic diseases, mobility restriction, use of medications and medical devices, among other conditions commonly identified in hospitalized elderly. (1-3)

Among the skin lesions, pressure injury (PI) stands out, which can be defined as localized damage to the skin and/or underlying tissues that causes cell death.(4) Associated with the quality of nursing care, it has a multifactorial origin that includes factors such as: pressure, friction, shear, humidity, mobility, level of consciousness, associated comorbidities and age. (5-6)

It is a prevalent condition in different health care scenarios, especially in the hospital context, affecting the elderly, who are exposed to risk factors. (1,3,6-7) Authors point out a wide variability in the prevalence of PI in hospitalized individuals, with rates ranging from 8% to 40%. (1,7-8)

PI contributes to increasing the time and cost of hospitalization, as well as morbidity and mortality. (7) In addition to causing discomfort and pain, this type of injury negatively impacts the quality of life of the elderly and their families.

The Braden scale stands out as a measure of prevention and risk assessment. Validated worldwide and adapted for Brazil, often used regardless of the care setting.(9) In care practice, there is a need for careful evaluation of the integumentary system by nurses, with actions for prevention, assessment and monitoring of PI. The present study aimed to assess the risk for PI and associated factors in hospitalized elderly.

## METHODS

Cross-sectional research, developed in the inpatient sectors of surgical,



Among the skin lesions, pressure injury (PI) stands out, which can be defined as localized damage to the skin and/or underlying tissues that causes cell death. Associated with the quality of nursing care, it has a multifactorial origin that includes factors such as: pressure, friction, shear, humidity, mobility, level of consciousness, associated comorbidities and age



medical, infectious diseases and neurology clinics of a teaching hospital in the city of Paraná, from September 2017 to January 2018.

A non-probabilistic convenience sampling was adopted with 202 hospitalized elderly people, who met the following inclusion criteria: a) being 60 years old or older; b) be hospitalized for at least 24 hours in the institution, during the period of data collection; c) have the cognitive ability to answer the study questions, assessed through the Mini Mental State Examination (MMSE). (10) Elderly people without cognitive conditions to answer the research questions, at the interview stage, the caregiver/family member was invited to participate, for which the following inclusion criteria were listed: a) being a caregiver/family member, aged 18 years or over ; b) living with the elderly person for at least three months.

Data collection was carried out through the application of the MMSE, assessment of skin lesions through inspection, a sociodemographic and clinical questionnaire built specifically for the study, and risk assessment using the Braden scale. (10-11) Nurses residing in elderly health, were trained by a nurse specialist in stomatotherapy, with clinical experience in the area, through 45 hours of theoretical-practical updating.

Braden has six domains: sensory perception, moisture, activity, mobility, nutrition and friction and shear. The sum of the domain scores determines the patient's degree of risk for developing PI. The score ranges from 6 to 23 points, and the lower the score, the higher the risk, with no risk score equal to or greater than 19 points, low risk between 15 and 18 points, moderate risk between 13 and 14 points, high risk equal or less than 12 points. (9,11)

Data were tabulated in Microsoft Excel 2013® software and analyzed using absolute and relative frequency

and the chi-square test. The dependent variable was considered the risks verified by the Braden scale and as independent variables sociodemographic characteristics, lifestyle, clinics, use of health services and skin assessment.

It was approved by the Ethics Committee for Research with Human Beings of a Higher Education Institution as per opinion nº 2.012.327 and Certificate of Presentation for Ethical Appreciation nº 66782217.9.0000.5689. The ethical precepts of voluntary and consenting participation of each subject were respected, according to the resolution in force at the time of the research.

## RESULTS

A total of 202 elderly people participated in the study, with a predominance of assessment without risk for the development of PI (40.6%), however, more than half presented some risk (59.4%). Most were male (52%), aged between 60 and 70 years (64.9%), white (77.1%), married (53%), with low education (63.4%). Of the participants, 73.4% declared they were non-smokers and 84.7% did not drink alcohol, with a eutrophic Body Mass Index (BMI) (40.1%) (Table 1).

It was found that 83.2% had a chronic disease, 54% had no multimorbidity, 45.5% remained hospitalized for 1 to 3 days, 78.2% used medical devices, 85.1% were orally fed, 59.9% had active mobility and 40.1% had passive or assisted mobility (Table 2).

Upon inspection of the skin, normal turgor (51%), hot temperature (63.9%) thin thickness (78.7%), dry texture (52%), sensitivity (92.6%) and pruritus (24.3%). (Table 3).

The risk for developing PI was significantly associated with age ( $p < 0.001$ ), multimorbidity ( $p = 0.024$ ), length of stay ( $p < 0.001$ ), medical devices ( $p < 0.001$ ), type of diet ( $p < 0.001$ ), mobility ( $p < 0.001$ ), turgor ( $p < 0.001$ ) and

**Table 1. Sociodemographic and lifestyle characteristics of elderly people admitted to a teaching hospital, according to the risk of the Braden scale (n=202). Paraná, Brazil, 2018.**

Variables	Braden Scale Risk				Total n (%)	p value
	Without n(%)	Low n(%)	Moderated n(%)	High n(%)		
Braden Scale Risk	82(40,6)	56(27,7)	29(14,4)	35(17,3)	202(100)	
<b>Gender</b>						0,643
Female	39(40,2)	29(29,9)	11(11,3)	18(18,6)	97(48,0)	
Male	43(41,0)	27(25,7)	18(17,1)	17(16,2)	105(52,0)	
<b>Age group</b>						0,001
60–70	67(51,1)	34(26,0)	16(12,2)	14(10,7)	131(64,9)	
≥71-79	11(20,8)	16(30,1)	9(17,0)	17(32,1)	53(26,2)	
≥80 e +	4(22,2)	6(33,4)	4(22,2)	4(22,2)	18(8,9)	
<b>Skin color</b>						0,963
White	63(40,7)	43(27,7)	23(14,8)	26(16,8)	155(77,1)	
Others	18(39,1)	13(28,3)	6(13)	9(19,6)	46(22,9)	
<b>Marital status</b>						0,617
Married	49(46,7)	26(24,8)	15(14,3)	15(14,3)	105(52)	
Widow	23(33,4)	21(30,4)	10(14,5)	15(21,7)	69(34,1)	
Others	10(35,7)	9(32,1)	4(14,3)	5(17,9)	28(13,9)	
<b>Education*</b>						0,517
High	11(50,0)	6(27,3)	1(4,5)	4(18,2)	22(10,9)	
Medium	11(40,8)	7(25,9)	5(18,5)	4(14,8)	27(13,4)	
Low	54(42,2)	35(27,3)	20(15,7)	19(14,8)	128(63,4)	
Illiterate	6(24,0)	8(32,0)	3(12,0)	8(32,0)	25(12,4)	
<b>Smoking</b>						0,644
No	64(43,2)	39(26,4)	20(13,5)	25(16,9)	148(73,3)	
Yes	18(33,3)	17(31,5)	9(16,7)	10(18,5)	54(26,7)	
<b>Alcohol</b>						0,773
No	71(41,5)	45(26,3)	25(14,6)	30(17,6)	171(84,7)	
Yes	11(35,5)	11(35,5)	4(12,9)	5(16,1)	31(15,3)	
<b>BMI</b>						0,070
22/27	37(45,7)	26(32,1)	11(13,6)	7(8,6)	81(40,1)	
<22	14(27,5)	14(27,5)	10(19,5)	13(25,5)	51(25,2)	
>27	31(44,3)	16(22,9)	8(11,4)	15(21,4)	70(34,7)	

\* Education: Illiterate; Low from one to four years of incomplete education; Medium of four to eight years of incomplete studies; High equal to or greater than eight years of study.  
Source: the authors (2020).

skin texture ( $p = 0.024$ ) (Tables 1, 2 and 3).

## DISCUSSION

The results showed a high percentage of elderly people with some risk of developing PI. In a cross-sectional study carried out in Tunisia with 473 hospitalized patients aged up to 85 ye-

**Table 2. Clinical characteristics and use of health services by elderly people admitted to a teaching hospital, according to the risk of the Braden scale (n=202). Paraná, Brazil, 2018.**

Variables	Braden Scale Risk				Total n (%)	p value
	Without n(%)	Low n(%)	Moderated n(%)	High n(%)		
<b>Chronic disease</b>						0,279
No	16(47,1)	12(35,3)	3(8,8)	3(8,8)	34(16,8)	
Yes	66(39,3)	44(26,2)	26(15,5)	32(19,0)	168(83,2)	
<b>Multimorbidity</b>						0,024
No	47(43,1)	37(34,0)	11(10,1)	14(12,8)	109(54,0)	
Yes	35(37,6)	19(20,4)	18(29,4)	21(22,6)	93(46,0)	
<b>Length of stay</b>						<0,001
1 to 3 days	47(51,1)	25(27,2)	12(13,0)	8(8,7)	92(45,5)	
4 to 7 days	23(39,7)	17(29,3)	9(15,5)	9(15,5)	58(28,7)	
8 to 15 days	11(32,3)	12(35,3)	4(11,8)	7(20,6)	34(16,8)	
+ than 15 days	1(5,6)	2(11,1)	4(22,2)	11(61,1)	18(8,9)	
<b>Dispositive</b>						<0,001
No	28(63,6)	13(29,5)	2(4,6)	1(2,3)	44(21,8)	
Yes	54(34,2)	43(27,2)	27(17,1)	34(21,5)	158(78,2)	
<b>Diet</b>						<0,001
Via Oral	81(47,1)	52(30,2)	23(13,4)	16(9,3)	172(85,1)	
Via cateter (NEC)*	1(3,3)	4(13,3)	6(20,0)	19(63,3)	30(14,9)	
<b>Mobility</b>						<0,001
With	79(65,3)	37(30,6)	3(2,4)	2(1,7)	121(59,9)	
Without	3(3,7)	19(23,5)	26(32,1)	33(40,7)	81(40,1)	

\* NEC: nasoenteral catheter. Source: the authors (2020).

**Table 3. Skin characteristics in elderly patients admitted to a teaching hospital, according to the risk of the Braden scale (n=202). Paraná, Brazil, 2018.**

Variables	Braden Scale Risk				Total n (%)	p value
	Without n(%)	Low n(%)	Moderated n(%)	High n(%)		
<b>Turgor</b>						<0,001
Normal	56(54,4)	23(22,3)	13(12,6)	11(10,7)	103(51,0)	
Decreased	26(26,3)	33(33,4)	16(16,1)	24(24,2)	99(49,0)	
<b>Temperature</b>						0,175
Cold	24(32,9)	20(27,4)	15(20,5)	14(19,2)	73(36,1)	
Warm	58(45,0)	36(27,9)	14(10,8)	21(16,3)	129(63,9)	
<b>Thickness</b>						0,114
Thin	58(36,5)	46(28,9)	26(16,4)	29(18,2)	159(78,7)	
Thick	24(55,8)	10(23,2)	3(7,0)	6(14,0)	43(21,3)	
<b>Texture</b>						0,024

ars, there was a higher occurrence of individuals without risk or at low risk (89.9%) for developing PI. (12)

Patients with some degree of risk are more likely to develop PI, especially the elderly, due to the integumentary aging process. (12-13) The results identified in this study can be attributed to the sociodemographic and clinical characteristics of the sample, composed of elderly people admitted to clinics.

As for the factors associated with the risk of developing PI, there was a relationship with age group. In the quantitative research with 229 Finnish patients admitted to wards, elderly people aged 80 years or more had lower scores on the Braden scale compared to younger people (p<0.001). (14) Advanced age is identified as a significant factor for the development of PI due to the impact of aging on the skin barrier. (6-7, 13)

It found a significant association between risk for developing PI and multimorbidity. Authors point to the presence of chronic diseases as a predisposing factor related to the risk of PI. (7) The presence of one or more chronic diseases is related to vascular changes that can compromise healing, nutritional support and skin defense. (7)

The length of stay and the use of medical devices were associated with the risk of developing PI. A similar result was pointed out in the cross-sectional study with 832 adult hospitalized patients, in which it was found that the length of stay was associated with a higher risk (p<0.001). (15) A longer hospital stay increases the chances of the action of extrinsic factors that favor skin rupture, in addition to the probability of greater clinical severity. (16-17)

The use of medical devices is inherent to the hospitalization process, subjecting the elderly to the occurrence of traumas with damage to skin integrity as a result of their manipulation and their prolonged use. (18-19) Thus, professionals should assess the possibility

Soft	50(51,6)	23(23,7)	11(11,3)	13(13,4)	97(48,0)
Dry	32(30,5)	33(31,4)	18(17,1)	22(21,0)	105(52,0)
<b>Pruritus</b>					<b>0,963</b>
No	63(41,2)	41(26,8)	22(14,4)	27(17,6)	153(75,7)
Yes	19(38,8)	15(30,6)	7(14,3)	8(16,3)	49(24,3)

Source: the authors (2020).

of rotating the location of the device and changes in fixation, observing aspects related to humidity and dirt.

The type of diet was associated with the risk for PI, with emphasis on the elderly with enteral catheter feeding. Authors emphasize that nutritional deficits increase the risk for PI (5, 13), as malnutrition directly interferes in the healing process, predisposing the patient to infections. (7, 20)

Supplementation can improve nutritional intake, reducing the risks for PL, as shown by a clinical trial with 42 adult patients hospitalized in clinical and intensive care units who received food supplementation. (21) In the present study, however, despite the individuals receiving a NEC diet, they were at higher risk, suggesting the need to adjust their nutritional intake.

Mobility is a variable that can be considered independent for the appearance of PI. (22) In a cohort study with 6,552 Portuguese adults hospitalized, it was found that individuals with impaired mobility and who needed help were more likely to have PL. (22) Im-mobility is a risk enhancer, as it restricts the patient to bed, which favors pressure, friction and shear, in addition to impairing self-care. (17)

As for the characteristics of the skin (turgor and texture), there is a scarcity of epidemiological studies to carry out comparisons with the findings presented. The literature points out that in senescence, the skin turgor is altered, due to the reduction of sweat glands and the volume of intracellular water, a condition that can favor the weakening of the skin, predisposing to erosion and

rupture. (18)

The limitations of the study were the scarcity of literature that addressed the theme in hospitalized elderly. The sample was representative of the local community, so that it does not allow generalizing the results to other territories. As this is a cross-sectional study, it is not possible to determine the cause and effect relationships.

## CONCLUSION

Most of the elderly hospitalized in the nursing sector presented some risk for PI. Elderly individuals at higher risk were older, multimorbid, hospitalized for more than 7 days, using medical devices and nasoenteral diet, with restricted mobility to bed, dry skin and reduced turgor.

The importance of evaluating and monitoring the risk of the elderly to develop PL is highlighted through physical examination and validated scales, considering the integumentary changes arising from senescence, as well as the associated factors described, to ensure better health care with the elderly.

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