Friction injuries in hostalized ederly: a cross-sectional study

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ABSTRACT

Objective: to identify the prevalence and factors associated with friction injury in elderly patients admitted to an intensive care unit. **Method**: cross-sectional study, with a sample of 133 elderly people admitted to a teaching hospital, between July 2017 and July 2018. Data collection included consulting medical records for sociodemographic and clinical surveys, physical examination of the skin to assess Skin tears. The data were analyzed using the Stata® version 12 software. **Result:** a prevalence of friction injuries was found in 10.5% of the elderly, with a significant association with the body mass index (p = 0.003). **Conclusion**: It is believed that the results of the present study may contribute to sensitize the nurse and his team, regarding the realization of effective prevention and care actions for friction injuries, with the aim of improving the quality of care provided to the elderly.

Descriptors: Geriatric Nursing; Old man; Skin aging; University Hospitals; Intensive Care Units.

INTRODUCTION

Skin Tears are classified as traumatic injuries[1], caused by sharp objects, friction or brute force, resulting in partial or total separation of the skin layers, dermis and epidermis[2-3]. In Brazil, the term was adapted to Portuguese, through the Skin Tear Classification System, in which the authors agreed that the expression friction injury can be used appropriately in clinical practice [4].

In the elderly population, the friction injury can occur due to the physiological changes of the skin resulting from the aging process[5-6]. For example, less production of collagen and elastin, loss of adipose tissue with reduced elasticity, decreased activity of sweat glands and reduced blood flow[6-7].

The body topography for a greater occurrence of this type of injury comprises the upper limbs, with emphasis on the arms and hands, which comprise 80% of the friction injuries[8]. However, they can occur in the buttocks and dorsal region[8], in which they can be easily confused with pressure injuries.

Among the various risk factors for developing friction injuries, the literature highlights: advanced age[6,9], impaired mobility and dependence[4,5,10], long-term use of corticosteroids[9,11], inadequate nutritional intake[4], cognitive impairment[11-12], bruises[9-10], history of falls and polypharmacy[5,11].

The prevalence of friction injuries is not yet well established and has great variability, according to the classification criteria adopted. International studies indicate values between 6.2% to 22%[13-14]. In Brazil, in 2012, a cross-sectional epidemiological study with 157 hospitalized adults found a prevalence of 3.3%[15]. In the hospital context, a recent survey found that 28.7% of hospitalized elderly people had skin tears[16].

Although this type of injury causes pain, it contributes to a higher risk of associated infections, with a negative impact on quality of life and increased health costs[5-7,16], studies that contemplate the prevalence and factors associated with friction in the general population are scarce[6], which justifies the development of studies that expand knowledge about the prevalence and its determinants, especially in the elderly population in a critical situation.

Given the above, the objective of this study was to analyze the prevalence and factors associated with friction injury in elderly patients admitted to an intensive care unit of a university hospital.

METHOD

Cross-sectional study, with a quantitative approach, conducted in the intensive care unit of a teaching hospital in the Campos Gerais region, from July 2017 to July 2018. The institution is public and the intensive care unit has 20 beds.

The criteria used to select the sample were: a) being 60 years old or older, considered in Brazilian legislation, an elderly person; b) being admitted to the intensive care unit during the data collection period; c) accepting to participate in the study, by signing the Free and Informed Consent Form, by the

patient or responsible family member. It is important to mention that the length of hospital stay was not distinguished as part of the patient participation inclusion criteria.

The sample size calculation was determined using the Epi.Info® 7.1.4 software, considering the total number of monthly hospitalizations in the last year (n = 263), with a precision of 5%, a confidence interval of 95% and an effect of drawing 1, for a prevalence of 22% of elderly people with friction injuries following the maximum prevalence of an international study developed with elderly people in hospital care[15]. The calculated total resulted in a sample of 133 individuals.

Data collection included the consultation of medical records and the application of a questionnaire for to produce sociodemographic and health data, physical nursing examination that comprised integumentary evaluation and the evaluation of friction injury, which was classified according to the Skin Tears Classification System (STAR), developed by Payne and Martin (1993)[1], validated for Brazil by Strazzieri-Pulido, Santos and Carville (2015)[4].

The presence of a friction injury was considered as a dependent variable. The independent variables were the sociodemographic, health and lifestyle characteristics, including: sex, age group, marital status, education, skin color, diagnosis according to the International Classification of Diseases and Related Health Problems, length of hospitlization,

chronic diseases, number of chronic diseases, smoking, alcohol consumption, diet, Body Mass Index (BMI), medications, medical devices and mobility.

The physical nursing examination was carried out by the research team composed of scientific initiation scholarship holders from the bachelor's degree in nursing and resident nurses from the multiprofessional program in elderly health and intensive care, who received training.

The data were analyzed using the Stata® version 12 software. (StataCorp LP, College Station, TX, USA). Initially, they were submitted to exploratory and descriptive analysis. Subsequently, confirmatory data analysis was performed, calculating prevalence and prevalence ratios (PR). The Chi-square and Fisher's exact tests were applied, with statistical significance of $p \leq 0.05$ in order to investigate the associations between independent variables and dependent variables.

The project was approved by the Ethics Committee of the State University of Ponta Grossa through CAAE nº 66782217.9.0000.5689. The ethical precepts of voluntary and consented participation of each subject were respected, according to the resolution in force at the time of the research. After informing the interviewee and signing the term, data collection was conducted.

RESULTS

Among the 133 elderly in the sample, there was a predominance of males (57.1%), mean age of 72.9 years (SD ±

0.76), the minimum age of 60 years and the maximum age 101, married (41.3%), with 4 to 8 years of unfinished schooling (48.1%). Regarding skin color, it was found that 82.7% of the elderly were white, the average length of hospitalization was 7.1 days (SD ± 0.76), with a minimum of 1 and a maximum of 83 days (Table 1). Most of the research participants presented chronic diseases (94%), all of them used medication (100%), (71.4%) were nonsmokers and (84.2%) did not drink alcohol. Due to the hospital environment being an intensive care unit, the elderly remained restricted to the bed (97.7%), used some type of medical device (97.7%) and mainly received enteral nutrition (76.7%) (Table 1).

Table 1 - Distribution of sociodemographic, health and lifestyle characteristics in elderly patients admitted to an intensive care unit. Ponta Grossa-PR, Brazil, 2019

Variable	Classification	Total n(%)
Sex	Male	76(57.1)
	Female	57(42.9)
Age group	60 - 70 years	58(43.6)
	71 - 80 years	51(38.4)
	>80 years	24(18.0)
Civil status	Married	55(41.3)
	Widow	46(34.6)
	Single	32(24.1)
Schooling	Illiterate	27(20.3)
	Low(1-4 incomplete years)	18(13.5)
	Medium (4-8 incomplete years)	64(48.1)
	High(≥8 years)	24 (18.1)
Skin color	White	110(82.7)
	Brown	18(13.5)
	Black	5(3.8)
Length of hospitaliztion	1 - 7 days	94(70.7)
	8 – 14 days	20(15.0)
	15 – 21 days	13(9.8)
	> 22 days	6(4.5)
Chronic diseases	Yes	125(94.0)
	No	8(6.0)
Number of chronic diseases	Up to 2	70 (61.4)
	3 – 4	34(30.3)
	5 – 6	9(8.3)
Smoke	Yes	38(28.6)
	No	95(71.4)

Consume alcohol	Yes	21(15.8)
	No	112(84.2)
Diet	Enteral	102(76.7)
	Oral	31(23.3)
BMI	< 22	31(23.4)
	22-27	71(53.3)
	>27	31(23.4)
Medications	Yes	133(100.0)
Medical devices	Yes	130(97.7)
	No	3(2.3)
Mobility	Restricted	130(97.7)
	Assisted	2(1.5)
	Independent	1(0.8)

Source: The authors (2019)

Table 2 shows a predominance of prevalence ratios between sociodemographic, health and lifestyle characteristics for the age group ≥80 years (PR = 1.95; p = 0.234), widower (PR = 4.17; p = 0.133), illiterate (PR = 1.57; p = 0.306), black (PR = 3.60; p = 0.395), other diagnoses (PR = 1.46; p = 0.384), length of stay 1-10 days (PR = 3.46; p = 0.157), smoker (PR = 1.38; p = 0.53), alcoholic (PR = 2.12; p = 0.157) and oral diet (PR = 1.31; p = 0.418). However, the variable BMI> 27 (PR = 5.91; p = 0.003) was the only one shown to be associated with friction injury.

Table 2 – Prevalence ratios between sociodemographic, health and lifestyle characteristics, according to the presence of friction injuries in elderly people admitted to an intensive care unit. Ponta Grossa-PR, Brazil, 2019

Variables	No friction injury	Friction injurt	Total n(%)	Prevalence Ratio	CI95%	p-value
	n(%)	n(%)				
Sex						
Male	68(89.5)	8(10.5)	76(100.0)	1		
Female	51(89.5)	6(10.5)	57(100.0)	1	0.36-2.72	1
Age group						
60-69 years	46(92.0)	4(8.0)	50(100.0)	1		
70-79 years	46(90.2)	5(9.8)	51(100.0)	1.22	0.34-4.30	0.512
≥80	27(84.3)	5(15.7)	32(100.0)	1.95	0.56-6.73	0.234
Civil status						
Single	31(96.8)	1(3.12)	32(100.0)	1		
Widow	40(86.9)	6(13.1)	46(100.0)	4.17	0.52-33.02	0.133

Married	48(87.2)	7(12.8)	55(100.0)	4.07	0.52-31.61	0.132
Schooling						
Low/medium/high	96(90.6)	10(9.4)	106(100.0)	1		
Illiterate	23(85.2)	4(14.8)	27(100.0)	1.57	0.53-4.62	0.306
Skin color						
Brown	17(94.4)	1(5.6)	18(100.0)	1		
Black	4(80.0)	1(20.0)	5(100.0)	3.6	0.27-47.92	0.395
Branco	98(89.1)	12(10.9)	110(100.0)	1.96	0.27-14.19	0.424
Diagnosis						
Digestive diseases Circulatory	39(90.7)	4(9.3)	43(100.0)	1		
Others	38(86.4)	6(13.6)	44(100.0)	1.46	0.44-4.83	0.384
Respiratory System Diseases	27(93.1)	2(6.9)	29(100.0)	0.74	0.14-3.78	0.538
Digestive System Diseases	15(88.2)	2(11.8)	17(100.0)	1.26	0.25-6.27	0.551
Length of hospitalization stay						
≥ 11 days	27(96.4)	1(3.6)	28(100.0)	1		
1-10 days	92(87.6)	13(12.4)	105(100.0)	3.46	0.47-25.38	0.157
Chronic diseases						
Yes	112(89.6)	13(10.4)	125(100.0)	1		
No	7(87.5)	19(12.5)	8(100.0)	1.2	0.17-8.06	0.599
Smoke						
No	86(90.5)	9(9.5)	95(100.0)	1		
Yes	33(86.9)	5(13.1)	38(100.0)	1.38	0.49-3.87	0.531
Consume Alcohol						
No	102(91.1)	17(80.9)	112(100.0)	1		
Yes	10(8.9)	4(19,.1)	21(100.0)	2.13	0.76-3.16	0.157
Diet						
Enteral	92(90.2)	10(9.8)	102(100.0)	1		
Oral	27(87.1)	4(12.9)	319(100.0)	1.31	0.44-3.90	0.418
BMI						
22/27	68(95.8)	3(4.2)	71(100.0)	1		
<22	27(90.0)	3(10.0)	30(100.0)	2.36	0.50-11.06	0.245
>27	24(75.0)	8(25.0)	32(100.0)	5.91	1.67-20.84	0.003
Medical devices						

No	2(66.6)	1(33.4)	3(100.0)	1		
Yes	117(90.0)	13(10.0)	130(100.0)	0.3	0.05-1.61	0.285

Source: The autors (2019)

DISCUSSION

It was found that the frequency of elderly people with friction injuries in this study was higher than the results of a cross-sectional study with 157 adult patients, over 18 years of age, from an intensive care unit in São Paulo, in which a prevalence of 3.3% of friction injury was found[15]. On the other hand, authors of an important systematic review found rates between 3.3% and 22% of this condition in the hospital setting[14]. A recent cross-sectional and analytical study, conducted with a sample of 101 hospitalized elderly in an intensive care unit, found a prevalence of friction injuries higher than those identified in the present study (28.7%)[16].

Thus, the differences in the prevalence values can be attributed to the characteristics of the sample, different methodological approaches and inclusion criteria of the participants. Likewise, the classification system used may compromise the comparison with other studies.

Authors point out that in clinical practice, friction injuries are relevant and prevalent, especially among elderly patients and individuals with chronic or critical diseases[3]. In a prospective cohort study carried out with 368 Japanese patients, it was found that 3.8% of the respondents had friction injuries[17] and in a study with 144 elderly, hospitalized patients from Singapore, a higher prevalence rate was found in 6.2% of the evaluated[14].

It should be noted that the friction injury can favor important complications such as secondary infections, especially in elderly patients undergoing hospitalization, with a consequent impact on quality of life and increased health costs. It stands out, the relevance of health professionals to identify risk factors, in order to better implement preventive and care measures.

As for sociodemographic factors, it was observed that the prevalence of friction injuries in both men and women was equal. Other studies, with elderly people from different scenarios, found that this type of injury occurs more frequently in females[14,18], as women compared to men have reduced skin thickness and greater collagen reduction when compared to men[5].

Concerning the distribution of the lesion by age group, young elderly people stood out, however, the older elderly had a higher prevalence ratio for this condition without a significant association. However, authors show that advanced age is a risk factor most often associated with friction injury[3]. Senescence is understood as a collaborative factor for the development of friction injuries as it causes physiological changes in the skin[9-10], greater dependence for the performance of basic activities of daily living and immobilization [3]. Physiological and pathological skin changes such as loss of elastin and

collagen, decreased adipose tissue, skin elasticity and subcutaneous tissue retraction, predisposes to xerosis, leading to skin fragility[6].

In this study, no association was identified between friction injury and low education. Despite this, the educational level is understood as a preventive factor for various health-disease situations, as it provides the individual with better access to information and services, financial resources and improved self-care[2]. Low education levels or illiteracy can increase the risk of the elderly of falls, shear and ineffective understanding of information and instructions, favoring friction injuries[19]. In this context, public investments for formal education are necessary, such as strengthening and qualifying access to health-promoting content, in the search for overcoming structural barriers experienced and greater social equity.

Authors highlight the white race as a factor for the development of friction injuries[17,20]. In the documentary study with 102 elderly people from two long-term institutions[20], a significant association of the white race with friction injury was identified (p = 0.003). Despite this, this relationship was not identified in this investigation.

The aging process favors the appearance of comorbidities and contributes to the hospitalization event. Regarding this variable, there was no significant association between length of hospital stay and friction injury. However, the length of hospital stay contributes to a greater chance of developing the friction injury[6] and represents an important negative factor for mobility[1] and nutritional status[10], as well as favoring the condition of friction and shear[7].

Regarding smoking, no significant association was observed with friction injury. Although authors point out the possible changes in the skin due to the use of nicotine, such as: a) production of an enzyme that destroys fibroblasts causing the connective tissue to lose elasticity; b) reducing the lipid layer of the skin, making it dry and opaque; c) blood vessels with reduced caliber, impairing oxygenation and cellular nutrition[6]. It is understood that these alterations contribute significantly to the fragility of the elderly's skin leading to the occurrence of breaks and consequent frictional injury.

Skin integrity in the elderly is influenced by a number of factors related to care practices and health status, with emphasis on nutritional condition[12]. Aging determines changes in body composition and is associated with increased fat mass and changes in its distribution pattern[9-10].

In this study, a significant association was found between Coporal Mass Index (> 27) and friction injury. The literature reports that the body mass index tends to increase the prevalence of xerosis, and when associated with impaired nutrition, it increases the risk of friction injury[3]. Despite the absence of other studies to compare this finding, authors point out that obese and malnourished patients may be at risk for friction injuries[19].

The limitations of this study are related to

the collection of some information in medical records, which are not always complete. In addition, the scarcity of Brazilian studies to support comparisons with the findings presented emphasizes the need for the development of new studies, especially epidemiological ones in order to support the practice of preventing friction injuries through more robust scientific evidence.

The number of subjects in this group was small, even though a sample calculation was carried out, which requires a precautionary assessment of the data in this context, especially the associations. However, this fact does not reduce the importance of the present study which is considered a starting point to rethink the need to foster new studies involving a greater number of subjects and different hospital institutions, in order to enhance knowledge about this theme.

CONCLUSION

The present study made it possible to identify the low prevalence of friction injuries and associated factors in the elderly hospitalized in an intensive care unit, with an emphasis on the association of body mass index.

It is believed that the findings can support the nurse and nursing team regarding the performance of effective actions for the prevention and care of friction injuries, with the aim of improving the quality of care provided to the elderly.

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