

Original Research Article

Pressure ulcer organs and related factors in patients hospitalized in intensive care units

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ABSTRACT

Background: Pressure injuries are considered to be of important hospitalization side-effects, whereas it is projected that in the US 2.5 million patients get pressure injury treatments per year. These injuries cause a significant health burden for the patients and a seriously significant financial burden on the health-care systems around the world. The aim of this study was to investigate the prevalence of pressure ulcers and related factors.

Methods: This was a descriptive analytical study that has been done on 200 patients hospitalized on ICU. Necessary information was collected by a checklist and then analyzed by using SPSS v 22.

Results: 200 patients were selected to participate in this study which 82 of them were women. Mean age of the participants was 54.9 and mean BMI was 25±3.6. In this study, 47 pressure injury cases were reported. The most common place for pressure injuries were sacrum and foot heel. This study recognized the followings as a predicting factor for pressure injuries: higher age, higher BMI, female gender, longer hospitalization period, DM, smoking and alcohol consumption, prior infection, history of chemotherapy, history of radiotherapy, low level of position change program and using an organ facilitator like a ventilator.

Conclusions: With most of the mentioned risk factors for pressure injuries being underlying factors, it is advised that health-care strategist consider increasing education of the people and with healthier lifestyles it is possible to see less of burdens like this on the health-care system.

Keywords: Ardabil, ICU, Pressure ulcer, Prevalence

INTRODUCTION

Bed sores or pressure sores are areas of damage to the skin and underlying tissues that are usually caused by continuous pressure on the skin and are seen in areas of the skin that are placed on a bony bed or between this bed for a long time. bone and an external pressure source are stressed. The surface skin of the body is less vulnerable to such injuries than the underlying tissue, and for this reason, the external appearance of these types of wounds may be misleading in relation to their severity.¹ These injuries are usually caused by the immobility of the patient. although these types of injuries have also been observed in inappropriate casts or generally inappropriate use of medical tools on the skin. These injuries can range

from a simple erythema on the skin to deep subcutaneous ulcers that extend to the bone. According to a study conducted in the United States in 2006, about 2.5 million people receive treatment for pressure injuries in the United States alone every year.^{2,3} Creating pressure injuries is a complex process that starts with applying pressure to the surface tissue. Although these external pressures are rarely enough to cause these damages, and these pressures in interaction with the tissues of the host's body eventually cause these damages. Of course, the mechanical characteristics of these pressures (magnitude and duration of pressure induction) should also be taken into account in interaction with the tolerance of the host, which is determined by characteristics such as tissue morphology and the power and capacity to repair that

tissue.⁴ Pressure greater than 70 mmHg for more than 2 hours can cause irreversible tissue damage. Naturally, more pressure will shorten the time to cause damage, or a longer time will increase the amount of damage.^{5,6} Patients with skin and soft tissue injuries suffer from pressure and pain and loss of control over their lives. Wound care interferes with normal activities of daily living, and patients often feel stigmatized. This leads to lifestyle changes that lead to social isolation, depression, and reduced health-related quality of life.⁷ Considering the severe burden of this disease in hospitalized patients, especially patients hospitalized in the intensive care unit (ICU), the aim of this study was to determine the prevalence of pressure ulcers and its related factors in patients hospitalized in intensive care units.

METHODS

This descriptive cross-sectional study was conducted on 200 patients over 18 years of age who were admitted to the intensive care unit (ICU) of Imam Reza (AS) and Imam Khomeini (RA) hospitals in Ardabil city from August 2021 to August 2022 with the diagnosis of pressure ulcers. being done Pregnant patients were excluded from the study in order to increase one-handedness and reduce confounding characteristics in patients. A checklist including demographic characteristics and possible factors affecting pressure ulcers was completed for all hospitalized patients and the data in the software. SPSS 22 were analyzed.

RESULTS

The mean (SD) age of the subjects was 54.9 (14.4) years. 82 patients (41%) were female. The average body mass index of the studied patients was 25 ± 3.6 kg/m². In terms of occupation, 75 people (37.5%) were retired. The most common cause of hospitalization of the participants for hospitalization in ICU was respiratory failure with 72 people (36%) (Figure 1).

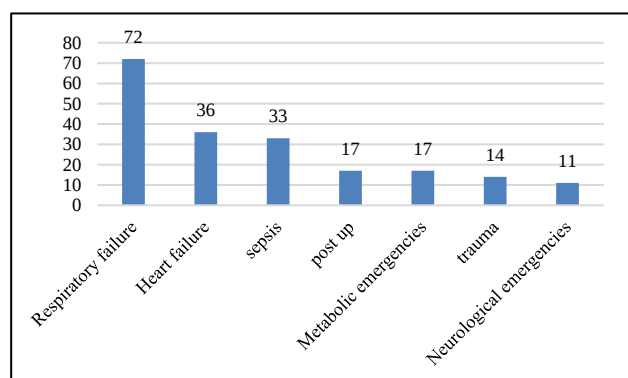


Figure 1: Etiology of patients admitted to ICU.

The average hospitalization days of the patients was 3.58 ± 1.71 days. The prevalence of pressure ulcers among patients hospitalized in the intensive care unit was 23.5%, which was 17.8% among men and 31.7% among women.

The most common region was the sacrum, which was present in 15 (31.9%) patients (Figure 2).

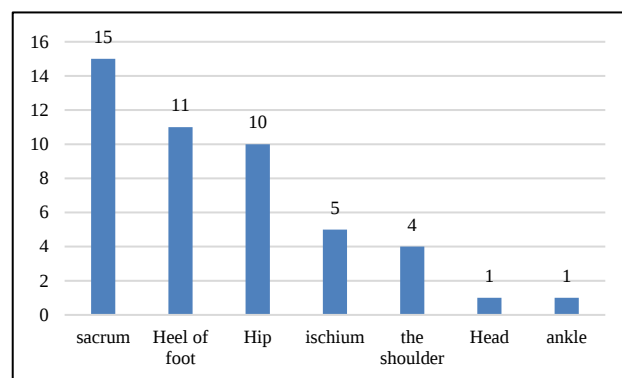


Figure 2: Frequency distribution of pressure ulcers in the studied patients.

The most common severity of pressure ulcer involvement in patients was stage 2 with 40.4%. The age of people in the group of patients with ulcers was 61.7 ± 12.9 on average and in patients without ulcers it was 12.3 ± 52.8 . Body mass index in patients with ulcers was 26.5 ± 4 and in patients without ulcers it was 24.6 ± 3.4 and the difference between the two groups was significant. In the group of patients with ulcers, 44.7% were male and 55.3% were female, and in patients without ulcer, 63.4% were male and 36.6% were female, and the difference was significant. The duration of hospitalization among patients with ulcers had an average of 9.2 ± 16.2 days and in patients without ulcers it was 5.7 ± 10.6 days, and the difference was significant. Among the 47 patients with ulcers, 28 (59.6%) and 59 (38.6%) patients without ulcers had diabetes, and the difference between the two groups was significant. In terms of blood pressure, there was no significant difference between the two groups. The amount of smoking in patients with ulcers was significantly higher than in patients without ulcers in this study (68.1% versus 38.6%). In relation to alcohol consumption, there was also a significant difference between the subjects studied (46.8% versus 26.1% and $p=0.012$). The rate of infection in patients with wounds was 66% and without wounds was 41.8% and the difference between the two groups was significant. The prevalence of cognitive disorders was 38.3% in the pressure ulcer group and 20.3% in the control group, and the difference was statistically significant. 34% of patients with pressure ulcers and 19.6% without ulcers had urinary incontinence and the difference was significant.

There was no significant difference between the two groups in the prevalence of spinal cord injury, the prevalence of coronary artery disease, the history of stroke, and the prevalence of chronic kidney disease. 19 patients (40.4%) with ulcers and 22.9% of patients without ulcers had previous history of chemotherapy. 13 people (27.7%) with wounds and 12.4% of people without wounds had a history of radiotherapy and the

difference was significant. 17 people (36.2%) of the patients with ulcers and 87 people (56.9%) of the patients without ulcers had the program to change the position and the difference was significant. Patients with ulcers in this study experienced more ventilator use than patients without ulcers (48.9% versus 30.1%) and the difference was significant. In the study population, 33 people from the pressure ulcer group (70.2%) and 77 people from the control group (50.3%) were taking anticoagulant drugs and the difference was significant. Therefore, the use of anticoagulant drugs can be considered as a risk factor in the prevalence of pressure ulcers. In the pressure ulcer group, 72.3% and in the control group, 44.4% used narcotics and sleeping pills, and the difference was significant.

Table 1: Comparison of significant characteristics of patients in two study groups with ulcer and without ulcer.

Variables	Patients with ulcers (n=47)	Patients without ulcers (n=153)	P value
Diabetes	28 (59.6%)	59 (38.6%)	0.017
Smoking	32 (68.1%)	59 (38.6%)	0.001
Alcohol consumption	22 (46.8%)	40 (26.1%)	0.012
History of infection	31 (66%)	64 (41.8%)	0.006
Cognitive disorders	18 (38.3%)	31 (20.3%)	0.012
Urinary incontinence	16 (34%)	30 (19.6%)	0.040
Chemotherapy (yes)	19 (40.4%)	35 (22.9%)	0.029
Radiotherapy (yes)	13 (27.7%)	19 (12.4%)	0.023
Position change program (yes)	34 (72.3%)	134 (87.6%)	0.020
Use of ventilator (yes)	23 (48.9%)	46 (30.1%)	0.027
Taking anticoagulant drugs	33 (70.2%)	77 (50.3%)	0.019
Taking narcotics and sleeping pills	34 (72.3%)	68 (44.4%)	0.001

Based on the result of the regression analysis, the final analysis (adjusted) showed that each year of increasing age is associated with a 9% increase in the risk of pressure ulcers, which was statistically significant. Also, female gender was more at risk of pressure ulcer than male. Each unit increase in body mass index was associated with a 14% significant increase in the risk of pressure ulcers in the study population. Smoking was one of the most powerful risk factors for pressure ulcers with

an increase of about 400%. Among the underlying diseases, diabetes was associated with a 114% increase and a history of cognitive disorders such as dementia and Alzheimer's with a 144% increase in the risk of pressure ulcers, which was statistically significant. There was no significant relationship between the history of vascular disorders, the presence of chronic kidney disease and COPD with the risk of developing pressure ulcers in patients admitted to ICU. Among the determining factors of pressure ulcers according to the univariate model, the most important determining factors of pressure ulcers were improper floor with OR=3.53, smoking with OR=3.4, and use of narcotics and sleeping pills with OR=3.27 (Table 2).

Table 2: Determining significant factors of pressure ulcers based on the odds ratio of the univariate model.

Features	Odds ratio (95% confidence interval)
Age	1.15 (1.78-1.02)
Gender, female	2.15 (4.16-0.11)
Body mass index	1.36 (1.46-1.20)
Diabetes, yes	2.35 (4.58-1.21)
Smoking, yes	3.40 (6.81-1.70)
Alcohol consumption, yes	2.49 (4.89-1.26)
Current infection, yes	2.69 (5.34-1.36)
Change position, yes	0.43 (0.85-0.22)
Cognitive disorders such as Alzheimer's, dementia, yes	2.44 (4.96-1.20)
Urinary incontinence, yes	2.11 (4.36-1.02)
Chronic kidney disease (CKD), yes	1.45 (3.31-0.64)
Ventilation, yes	2.23 (4.35-1.14)
Inappropriate subsurface, yes	3.53(6.99-1.78)
Use of anticoagulants (yes)	(1.15-4.38) 2.32
Taking narcotics and sleeping pills (yes)	(1.60-6.68) 3.27

DISCUSSION

In various studies, different risk factors such as age, sex, duration of hospitalization, underlying disease, type of disease, level of consciousness, paraclinical results have been suggested for the occurrence of pressure ulcers.⁸ The prevalence of pressure ulcers in this study in the special care department of Ardabil city was 23.5%. In the study of Sohrabi and his colleagues about the prevalence of pressure ulcers (PU) in Iran, they reported the overall prevalence to be lower than our study, although the prevalence of PU in the intensive care unit in the cities of region 1 (Tehran, Alborz, Qazvin, Semnan), Mazandaran, Golestan and Qom) more than our study has been reported.⁹ According to the results of the study by Boulanger, the prevalence of pressure ulcers in the world is about 59.2% of the cases of pressure ulcers related to patients hospitalized in ICU, and the prevalence of pressure ulcers in patients hospitalized in ICU was reported as 16.2%, which compared to the prevalence rate

Pressure ulcer in the patients of the present study is significantly less with 23.5%.¹⁰

Coyer et al showed in a study that the prevalence of pressure ulcers in the ICU and other departments in Australia is much lower than the results of the present study and other studies in Iran.¹¹ The reason for the high prevalence of pressure ulcers in our study compared to other studies is probably the delay in changing the patient's position, which should be done every two hours according to existing protocols. However, according to our investigation in the ICU where this study was conducted, the position is changed every 8 hours by the nurse's assistant. It is also possible that the non-adjustment of the specialized wind of the wavy mattresses used in the ICU department is also one of the reasons for the increase in the prevalence of pressure ulcers in our study compared to previous studies. In the group of patients with pressure ulcers, the average age was 61.7 years, and in the group of patients without pressure ulcers, it was 52.8 years, which indicates that the age of patients with pressure ulcers is significantly higher than that of patients without PU. Older age has been reported as a risk factor for pressure ulcers in patients in various studies by Boulanger, Amini and Latifa K and colleagues, as in the present study.^{10,12,13} In the group of patients with pressure ulcers, 55.3% and in the group without pressure ulcers, 36.6% were women, which indicates a significant incidence of pressure ulcers among women hospitalized in the intensive care unit. Labeau and her colleagues showed in their study that a higher BMI can play a significant role in the occurrence of pressure ulcers in patients admitted to the intensive care unit.¹⁴

In this study, the average BMI in the group of patients with pressure ulcers was significantly higher than that of patients without pressure ulcers. Therefore, it can be said that BMI is a risk factor for the occurrence of pressure ulcers in ICU patients, which was consistent with the study conducted by Latifa et al.¹³ In the present study, the average body mass index was different in patients with and without ulcers, and based on logistic regression analysis, it was shown that each unit increase in body mass index increased the risk of developing pressure ulcers by 14% in the study population. It was related that this increase was statistically significant. In this study, it was shown that the history of underlying diseases such as diabetes and hypertension was associated with a significant increase in the risk of pressure ulcers in patients, which was consistent with the results of other studies.¹⁵⁻²² Tabarsi and his colleagues also showed, like the present study, that the history of smoking among patients with pressure ulcers was significantly higher than among patients without pressure ulcers, and smoking was associated with an increase in the incidence of pressure ulcers in patients hospitalized in the ICU.²³ Smoking was one of the most powerful risk factors for pressure ulcers with an increase of about 400%. Also, alcohol consumption is considered as one of the important risk factors. The hazard ratio of alcohol consumption for

pressure ulcers was 3.45. As a result of smoking and alcohol consumption, two important risk factors for patients to develop pressure ulcers are considered. Sohrabi and his colleagues showed that the incidence of infection can lead to an increase in the duration of hospitalization of patients in the ICU and is associated with an increase in the incidence of pressure ulcers in patients.¹⁶ In this study, the incidence of infection was higher in patients hospitalized in ICU. Among the shortcomings of the current study was the limited statistical population and the geographical limitation of conducting this study.

CONCLUSION

According to the results of this study; age, female gender, body mass index, smoking and alcohol consumption, having an ongoing infection, inappropriate undersurface, and the use of anti-coagulant and sedative drugs were among the most important risk factors associated with pressure ulcers. Considering the fact that most of the risk factors of this complication are related, it is recommended that health policy makers pay more attention to raising awareness in the society so that by increasing healthy behaviors and healthy lifestyle in the society, the occurrence of such complications will decrease and the financial burden will decrease. Let's be humane and soulful on the treatment staff and healthcare system. Considering the great importance of this issue and the adoption of appropriate treatment and care policies to increase the quality of life of patients and improve their prognosis in the special caregivers department, it is recommended to conduct more extensive studies in this field and also Many other such factors should be evaluated.

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