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Pressure Ulcer in Intensive Care, Still?

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ABSTRACT

Objectives: The aim of this study was to determine the prevalence of pressure ulcers, alongside pressure ulcer risks, sites, stages and risk factors in patients treated in tertiary intensive care units. **Material and Methods:** This study had a retrospective-descriptive design. The population of this study consisted of N=424 patients followed up in the tertiary intensive care unit of a state hospital between May 1 2022-May 1 2023. An informational form and Braden Scale for Predicting Pressure Ulcer Risk were used as data collection tools. Data collection was performed retrospectively via electronic health records. Means±standard deviation, numbers, percentages, and Kruskal-Wallis, Mann-Whitney U and Spearman's rho tests were used to analyze the data. **Results:** In this patient population, the total prevalence of pressure ulcers was 35.4% (n=150), the prevalence of hospital-acquired pressure ulcers was 12.9% (n=55), and the prevalence of existing pressure ulcers was 22.4% (n=95). All in all, 49.3% of patients had stage II pressure ulcers. The most common site of pressure ulcers was the sacrococcygeal region (65.3%). The mean Braden Scale for Predicting Pressure Ulcer Risk score was 10.56±1.6. **Conclusion:** The patients in this study were considered at risk for pressure ulcers. The results of this study highlight the importance of pressure ulcer risk identification, assessment, and strategies for intensive care patients. Today, the majority of patients still have pressure ulcer. Therefore, this study is important in terms of including up-to-date data.

Keywords: Pressure ulcers, Intensive Care Units, Prevalence.

Yoğun Bakımda Basınç Ülseri, Hala?

ÖZ

Amaç: Bu çalışma üçüncü basamak yoğun bakım ünitesinde tedavi gören hastaların basınç yarası gelişme durumları, basınç yarası risk düzeyi, basınç yarası gelişen bölgeleri, basınç yarası evreleri ve ilişkili olabileceği düşünülen risk faktörlerini belirlemek amacıyla yapılmıştır. **Materyal ve Metot:** Bu çalışma, retrospektif-tanımlayıcı olarak yapılmıştır. Çalışmanın evrenini "01.05.2022-01.05.2023" tarihleri arasında bir devlet hastanesinin üçüncü basamak yoğun bakım ünitesinde takip edilen N=424 hasta oluşturmuştur. Veri toplama aracı olarak; veri toplama formu ve Braden Basınç Ülseri Risk Değerlendirme Ölçeği kullanılmıştır. Veri toplama işlemi elektronik sağlık kayıtları üzerinden retrospektif olarak gerçekleştirilmiştir. Verilerin analizinde ortalama standart sapma, sayı, yüzde, Kruskal-Wallis, Mann-Whitney U ve Spearman's rho testleri kullanılmıştır. **Bulgular:** Bu hasta popülasyonunun basınç yarası prevalansı %35.4 (n=150), hastaların hastanede tedavi görürken basınç yarası gelişme prevalansı %12.9 (n=55), servise yatış öncesi basınç yarası gelişme prevalansı %22.4 (n=95) olarak hesaplanmıştır. Hastaların %49.3'ünde evre II basınç yarası geliştiği ve en çok %65.3 ile sakrokoksigeal bölgede basınç yarası olduğu görülmüştür. Bu çalışmaya dahil edilen hastaların Braden Basınç Ülseri Risk Değerlendirme Ölçeği puan ortalamaları 10.56 ±1.6'dır. **Sonuç:** Bu çalışmadaki hastaların basınç ülseri açısından risk altında olduğu kabul edildi. Bu çalışmanın sonuçları, yoğun bakım hastaları için basınç ülseri riskinin tanımlanması, değerlendirilmesi ve stratejilerinin önemini vurgulamaktadır. Günümüzde hastaların büyük çoğunluğunda hâlâ basınç ülseri bulunmaktadır. Bu nedenle bu çalışma güncel verileri içermesi açısından önemlidir.

Anahtar Kelimeler: Basınç yaraları, Yoğun Bakım Üniteleri, Prevalans.

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INTRODUCTION

Pressure ulcers are localized areas of injury to the skin or subcutaneous soft tissues, most often on bony prominences, occurring as a result of intense and prolonged pressure or shearing (Haesler, 2019). Pressure ulcers can cause pain, poor quality of life, limited mobility, loss of productivity, social isolation, and depression. In addition, the incidence of pressure ulcers is considered as a parameter of nursing care quality that affects mortality-morbidity, patient safety, and care procedures (Hajhosseini et al., 2020; Kiraner et al., 2016). Despite expenditures (labor, money, time) on prevention and treatment, pressure ulcers are still prevalent (Hajhosseini et al., 2020; Song et al., 2020). The frequency of hospital-acquired pressure ulcers is reported to be 12.8% (Li et al., 2020), while this rate can be as high as 18.8% in intensive care units (Osís & Diccini, 2020). Evidence suggests that intensive care patients have a higher risk of pressure ulcers than other patient groups (Fatma & Dikmen, 2017). Conditions common in intensive care patients, such as clinical instability, sedation, mechanical ventilation, multiple treatments, limited physical activity and nutrition, perfusion disorders, comorbidities, and conditions that disrupt body integrity, such as incontinence and diarrhea, make these patients more vulnerable to pressure ulcers (Jomar et al., 2019). A risk assessment is necessary to determine the danger of pressure ulcers and the means of preventing their progression to later stages. The Health Quality Standards Version 6.1 published by the Department of Health Quality, Accreditation and Employee Rights of the General Directorate of Health Services of Türkiye indicates that patients receiving treatment in hospitals should be assessed for risk of pressure ulcers with evidence-based scales, and measures should be taken to prevent pressure ulcers according to the determined risk. The prevalence of pressure ulcers are also recorded and monitored in intensive care units to evaluate and improve the quality of patient care (Sağlık Hizmetleri Genel Müdürlüğü & Sağlıkta Kalite Akreditasyon ve Çalışan Hakları Dairesi Başkanlığı, 2020). Assessing pressure ulcer risk of patients in intensive care units and taking necessary precautions are a sign of effective nursing care (Karaca Sivrikaya & Sarıkaya, 2020).

This study aimed to determine the prevalence of pressure ulcers, pressure ulcer risks, sites, stages and risk factors in patients treated in tertiary intensive care units.

MATERIALS AND METHODS

Study type

This study was retrospective-descriptive in design.

Study group

The population of this study consisted of N=424 patients followed up in the tertiary intensive care unit of a state hospital between May 1, 2022 and May 1, 2023. The study group included n=150 patients who were admitted to the clinic with existing pressure ulcers or had hospital-acquired pressure ulcers, were 18 years of age or older,

and whose data was accessed through electronic health records.

Data collection tools

Data Collection Form: This form consisted of 11 questions prepared by the researchers inquiring about the patient's gender, age, body mass index (BMI), intubation status, chronic diseases, length of hospitalization, mode of admission, site and stage of their pressure ulcers, and whether these ulcers developed before or after admission.

Braden Pressure Ulcer Risk Assessment Scale: This scale was developed by Braden and Bergstrom (1987). It has six dimensions, and it can be used for a wide age range of patients. These dimensions are sensory perception (4 points), skin moisture (4 points), mobility (4 points), physical activity (4 points), nutrition (4 points) and friction (3 points). The score range is 6 to 23; 12 points and below is considered high risk; 13-14 points demonstrates a moderate risk; and 15-16 points constitutes a mild risk (Bergstrom, 1987; Fırat Küçük & Sucudağ, 2017).

Data collection

The electronic health records (N=424) for patients treated in the tertiary intensive care unit between May 1, 2022 and May 1, 2023 were examined retrospectively. Data on gender, age, BMI, intubation status, chronic diseases, length of hospitalization, mode of admission, Braden Scale scores, site and stage of pressure ulcers and whether these ulcers occurred before or after admission was recorded and examined for patients (n=150) who had pressure ulcers.

Statistical analysis

Data was analyzed with using SPSS Version 25. Age, BMI, length of hospitalization, and Braden Scale scores were presented as means±standard deviation. Percentages and frequencies were used to evaluate gender, intubation status, chronic diseases, mode of admission, site and stage of pressure ulcers, whether pressure ulcers occurred before or after admission. A histogram graph of skewness-kurtosis values were used to test the normality of distribution of Braden Scale scores (Akgül, 2005). Since the data were not normally distributed, Kruskal-Wallis, Mann-Whitney U and Spearman's rho tests were used to analyze the data. The findings were evaluated at a 95% confidence interval, and a significance of $p < 0.05$ was considered to be significant.

Ethical considerations

Written permission was obtained from the institution where the study was conducted. Approval (2023/151) was obtained from the clinical research ethics committee.

RESULTS

Of the students, 56.1% were nursing students. It was found that 63.3% of these patients had existing pressure ulcers prior to being admitted to the intensive care unit, and the 36.7% of these patients had hospital-acquired pressure ulcers. The prevalence of pressure ulcers in this patient population was 35.4% (n=150 of N=424). While the incidence of hospital-acquired pressure ulcers in the intensive care unit was 12.9%, 22.4% of patients admitted to the clinic had already pressure ulcers.

Table 1. Some demographic characteristics of the patients and their relationship with Braden Scale scores (n=150).

Demographic characteristics	n	%	Braden Scale	Statistics
Gender				
Female	72	48.0	10.47±1.5	U ^b =2699.00, Z=-0.423, p=0.673
Male	78	52.0	10.64±1.7	
Intubation				
Yes	92	61.3	10.51±1.5	U ^b =2580.00, Z=-0.350 p=0.726
No	58	38.7	10.63±1.7	
Body Mass Index				
Underweight	2	1.3	9.50±0.7	X ² =4.592 ^c , df=4 p=0.332
Healthy	60	40.0	10.53±1.7	
Overweight	50	33.4	10.40±1.3	
Obese	35	23.3	10.74±1.7	
Morbidly obese	3	2.0	12.33±2.0	
Chronic diseases				
Yes	132	88.0	10.56±1.6	U ^b =1145.00, Z=-0.256 p=0.798
No	18	12.0	10.50±1.65	
Mode of admission				
From emergency ward	51	34.0	10.35±1.5	U ^b =2243.00, Z=-1.151 p=0.250
Transferred between wards	99	66.0	10.66±1.7	
Diagnosis at admission^a				
Circulatory diseases	36	24.0	10.47±1.5	X ² =6.718 ^c , df=4 p=0.152
Respiratory diseases	64	42.7	10.87±1.8	
Infectious diseases	23	15.3	10.08±1.1	
Other	18	12.0	9.94±0.9	
Renal diseases	9	6.0	11.11±1.8	
When the pressure ulcer occurred				
After admission	55	36.7	10.36±1.2	U ^b =2460.00, Z=-0.613 p=0.540
Before admission	95	63.3	10.67±1.7	
Age	77.77± 13.1 (21-94) years			r=0.064 ^d p=0.435
Length of hospitalization	22.02±19.7 (1-97) days			r=0.092 ^d p=0.263
Braden Scale Mean Score	10.56 ±1.60 (6-16) points			r=- ^d p=1

^aCirculatory: anemia, arrest, hypotension, heart failure, cardiac arrest, subdural hematoma, CVA

Respiratory: COPD, pneumonia, respiratory failure, dyspnea

Infectious: Covid-19, sepsis, Other: Alzheimer's, malnutrition, confusion, pressure ulcer, femur fracture, cancer, coma

Renal: chronic renal failure, acute renal failure,

^bMann-Whitney U, ^cKruskal-Wallis, ^dSpearman's rho

Some demographic characteristics of the patients and the results of Braden Scale score analysis are shown in Table 1. Accordingly, 48.0% of the patients were female, and 61.3% were intubated. Body mass index results suggested that 23.3% of the patients were obese and 88% had chronic diseases. Hospitalization data indicated that 42.7% of patients were hospitalized due to respiratory diseases, and 66.0% of patients were transferred from another ward. The mean age was 77.77± 13.10 years, and mean length of hospitalization

was 22.02±19.7 days. The mean Braden Scale score was 10.56±1.6. There was no significant relationship between gender, intubation, body mass index, chronic diseases, mode of admission, diagnosis at admission, age, length of hospitalization and the Braden Scale scores (Table 1).

Table 2 shows data on the pressure ulcers of patients. Accordingly, 49.3% of patients had stage II pressure ulcers and the most common site of pressure ulcers was the sacrococcygeal region (65.3%).

Table 2. Data on the pressure ulcers of patients (n=150).

Variable	Total (n=150)		Patients with hospital-acquired pressure ulcers (n=55)		Patients with existing pressure ulcers (n=95)	
	n	%	n	%	n	%
Pressure ulcer stage						
Stage I	31	20.7	10	18.2	21	22.1
Stage II	74	49.3	31	56.4	43	45.3
Stage III	30	20.0	13	23.6	17	17.9
Stage IV	15	10.0	1	1.8	14	14.7
Dorsal^a						
No	135	90.0	53	96.4	82	86.3
Yes	15	10.0	2	3.6	13	13.7
Elbows^a						
No	145	96.7	54	98.2	91	95.8
Yes	5	3.3	1	1.8	4	4.2
Sacroccygeal^a						
No	52	34.7	12	21.8	40	42.1
Yes	98	65.3	43	78.2	55	57.9
Femur lateral^a						
No	133	88.7	53	96.4	80	84.2
Yes	17	11.3	2	3.6	15	15.8
Hip^a						
No	134	89.3	51	92.7	83	87.4
Yes	16	10.7	4	7.3	12	12.6
Heel^a						
No	134	89.3	51	92.7	83	87.4
Yes	16	10.7	4	7.3	12	12.6
Side of the foot^a						
No	134	89.3	52	94.5	82	86.3
Yes	16	10.7	3	5.5	13	13.7
End of the shoulder^a						
No	144	96.0	51	92.7	93	97.9
Yes	6	4.0	4	7.3	2	2.1

a: Some patients had pressure ulcers in more than one region.

DISCUSSION

In this study, no significant relationship was found between gender, intubation, body mass index, chronic diseases, mode of admission, diagnosis at admission, age and length of hospitalization and pressure ulcer risk (Table 1). Other studies on intensive care patients also suggest that gender and pressure ulcer incidence are not related (Amini et al., 2022; Farid et al., 2022). However, Avşar and Karadağ (2016) reported that female patients in intensive care had a higher level of risk than male patients (Avşar & Karadağ, 2016). Kopp et al. (2011) also indicated that there was no association between advanced age and risk of pressure ulcers, although they examined patients older than 70 years who underwent surgery for hip fracture (Kopp et al., 2011). In contrast, some studies show that pressure ulcer risk increases with age (Ness et al., 2018; Webster et al., 2015). A study conducted with surgical patients suggested that

low BMI posed a risk for pressure ulcers (Aloweni et al., 2019), while another study reported that patients with high BMI (obese) were at risk for pressure ulcers (Ness et al., 2018). Strazzieri-Pulido et al. (2019) found that intubated patients were 3.5 times more likely to have pressure ulcers, and each day of hospitalization increased the risk of pressure ulcers by 10.9% (Strazzieri-Pulido et al., 2019). In addition, there are studies reporting that variables of having comorbid diseases (Bilik & Çömez, 2017), mode of admission and diagnosis at admission (Ateşgöz et al., 2022) increase the risk of pressure ulcers. It is not clear whether pressure ulcers are preventable in intensive care patients. Patient characteristics and non-modifiable risk factors such as age, gender, weight, and disease severity complicate this issue (Cox, 2017; Edsberg et al., 2014). Jacq et al. (2021) explained that there is no consensus on which risk factors affect risk of pressure ulcers in

patients receiving treatment in critical services such as intensive care units. They attributed this to the heterogeneity of the critical patient population of intensive care units (Jacq et al., 2021). Despite the lack of consensus and the inconclusive results obtained from this study, the identification of risk factors that independently predict pressure ulcers among intensive care patients should be considered important for targeted pressure ulcer prevention interventions.

In this study, the prevalence of pressure ulcers was found to be 35.4% in patients followed up in the intensive care unit, and 12.9% of these occurred after admission to the intensive care unit. Labeau et al. (2021) found that the total and hospital-acquired prevalence of pressure ulcers was 26.6% and 16.2%, respectively (Labeau et al., 2021). Cox et al. (2017) reported in their systematic review that the overall prevalence of pressure ulcers for intensive care patients in the United States was 14.3%, while the prevalence of hospital-acquired pressure ulcers was 5.85% (Cox, 2017). In a European study, it was reported that the prevalence of pressure ulcers in intensive care units varied between 14% and 42% (De Laat et al., 2006). In contrast, a multicenter study conducted in Türkiye found prevalence of pressure ulcers to be 11.43% (Sayan et al., 2020). There is considerable heterogeneity between study results regarding pressure ulcer prevalence, incidence, and rate of hospital-acquired cases (Li et al., 2020). Determining the prevalence of pressure ulcers is important for understanding the current condition of health care and further health care planning (Tubaishat et al., 2018). Prior studies suggest that intensive care patients are at high risk for pressure ulcers due to disease-specific complexities as well as the multitude of advanced technologies used in intensive care units (Cox, 2017). The difference between prevalence values found in this study and those found in other studies (Cox, 2017; Labeau et al., 2021; Sayan et al., 2020) may be due to differences between patient populations and health care conditions of different countries. The results of this study highlight the need to focus on pressure ulcers in critical intensive care patients. Care must be taken to determine the risk of pressure ulcers and provide nursing care to prevent these ulcers according to assessed risk levels.

As a result of this study, it was found that 49.3% of the tertiary intensive care patients had stage II pressure ulcers, and that most had cropped up in the sacrococcygeal region (65.3%). Other studies have shown that the sacrococcygeal region is the most common site for pressure ulcers, and that most of them are stage II (Cox, 2017; Kiraner et al., 2016; Li et al., 2020; Sayan et al., 2020; Strazzieri-Pulido et al., 2019). The results of this study were consistent with the literature, supporting the notion that pressure ulcers are an important and ongoing problem. The fact that most pressure ulcers are identified as stage II may be due to nurses' inability to recognize stage I pressure ulcers. This draws attention to the importance of continuous skin evaluation for pressure ulcers, and learning to

recognize the appearance of stage I pressure ulcers so that their progression can be prevented.

The pressure ulcer risk of intensive care patients was evaluated in this study, using the Braden Scale for Predicting Pressure Ulcer Risk, and results showed that the pressure ulcer risk was high. Early detection of the patients' pressure ulcer risk status via the Braden Scale score is useful in combination with appropriate nursing care practices and preventive measures. It is also worth noting that the progression of the wound stage is slowed, and the development of pressure ulcers are reduced when good judgment is used by nurses (Sayan et al., 2020). Primary responsibility for the care of intensive care patients belong to nurses. In addition, the high prevalence of pressure ulcers in this high-risk patient group, pressure ulcers most commonly being stage II and the sacrococcygeal region being the most common site of pressure ulcers are of concern. Thus, it is recommended to bring attention to pressure ulcer risk through in-service training for nurses.

Limitations of study

This study was conducted in an intensive care unit located in a single center. Research data were collected retrospectively through electronic health records. For this reason, the patients and their data included in this study were considered for limitations.

CONCLUSION

As a result of this study, no significant relationships of gender, intubation, body mass index, chronic diseases, mode of admission, diagnosis at admission, age and length of hospitalization were found with the Braden Scale scores. One-third of the general patient population had pressure ulcers, and most pressure ulcers were stage II. Pressure ulcers were most common in the sacrococcygeal region. The patients in this study were considered at risk for pressure ulcers. The results of this study highlight the importance of pressure ulcer risk identification, assessment, and strategies for intensive care patients. Today, the majority of patients still have pressure ulcer. Therefore, this study is important in terms of including up-to-date data.

According to the results of this study; It is recommended that patients treated in tertiary intensive care units are considered to be at high risk for the development of pressure ulcers, and appropriate precautions should be taken. Furthermore, awareness about the stages of pressure ulcers should be increased, and training should be organized to detect pressure ulcers at stage I level. Moreover, studies to determine the prevalence of pressure ulcers should be continued at regular intervals.

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Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: LNU, HHT; **Material, methods and data collection:** LNU, HHT; **Data analysis and comments:**LNU, HHT; **Writing and corrections:** LNU, HHT

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Ethical Considerations

Written permission was obtained from the institution where the study was conducted. Approval (2023/151) was obtained from the clinical research ethics committee.

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