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Pressure Ulcers in Palliative Care Unit Patients

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ABSTRACT

Objective: Pressure ulcers are associated with prolonged lengths of stay, increased costs, and lower discharge rates in palliative care units. This study aimed to reveal pressure ulcers' risk factors, incidence, and prevalence in a palliative care unit.

Materials and Methods: The data of 252 inpatients in a secondary-level palliative care unit were examined retrospectively. Patients were divided into groups according to pressure ulcer status, and data was comparatively analyzed. Pressure ulcer prevalence and incidence in the palliative care unit were calculated.

Results: There were 137 (54.4%) males and 115 (45.6%) females. The mean age was 67.4 ± 16.7. Most of them were oncology patients (30.6%) and cerebrovascular patients (30.6%). Pressure ulcers' prevalence and incidence were 40.1% and 4.7%, respectively. The Braden score was a median of 13 (5-23). In patients with pressure ulcers, the Braden score and discharge home rate were significantly lower; admission from another intensive care unit, the length of stay, and the treatment costs were significantly higher.

Conclusion: Pressure ulcers negatively affect the patient's length of stay in the palliative care unit, the discharge rate to home, and the financial burden on the healthcare system. Pressure ulcer risk analysis and a standardized care plan to prevent and treat pressure ulcers should be performed for cost-effective palliative care.

Keywords: Palliative care, pressure ulcer, healthcare cost, prevalence, incidence

INTRODUCTION

With a prolonged life expectancy, increased prevalence of chronic diseases and cancer consequently increased the need for rehabilitation and palliative care. The World Health Organization defines “palliative care” as the relief of pain and other health problems in patients and families facing problems arising from a life-threatening illness (1). Palliative care does not aim to find curative treatment for diseases but to provide the management and control of symptoms and improve the comfort and life quality for the patient and his family in the last period of life (2).

A pressure ulcer is one of the most challenging problems to manage and control in palliative care units. They are lesions that occur on the skin or subcutaneous tissues due to pressure or friction and are often seen on bony prominences but can develop anywhere on the body (3, 4). Factors such as advanced age, immobilization, decreased sensorimotor sensation, a deterioration of nutritional status, and a decreased walking ability are essential in developing pressure ulcers. In addition, the development of pressure ulcers may indicate circulatory failure that occurs in the last period of life and gradually deepens (5, 6). In this respect, all palliative care unit patients are candidates for pressure ulcer development.

Pressure ulcers are associated with prolonged hospital stays, increased costs, and lower discharge rates. So pressure ulcer frequency and risk factors, a well-known issue in intensive care units, should also be examined in palliative care units.

This study aimed to reveal the factors affecting pressure ulcer development, a critical problem in the palliative care unit, and pressure ulcer incidence and prevalence in the palliative care unit.

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MATERIALS AND METHODS

The study's ethical approval was obtained by the local ethics committee of Haseki Training and Research Hospital (Approval number: 71-2022).

The data of 252 patients who received inpatient treatment in a secondary-level state palliative care unit between January 2016 and January 2022 were analyzed retrospectively.

The Braden scale was used in the risk assessment of patients for pressure ulcers (7). In the analysis, patients' admission Braden scores were considered. European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP), and Pan Pacific Pressure Injury Alliance (PPPIA) guidelines were used for staging pressure ulcers (3). Pressure ulcers of the patients were evaluated daily and staged. Patients with no pressure ulcers hole the palliative care period was included in group-1. Complete recovery of the existing pressure ulcer, or getting

Table 1. Demographic data of the patients

		Min-max	Median	Mean±SD
Age (Year)		18.0 - 97.0	69.5	67.4 ± 16.7
			N	**%**
Sex	Male		137	54.4
	Female		115	45.6
Comorbidity	Diabetes mellitus		34	13.5
	Hypertension		44	17.5
	Heart disease		29	11.5
	Pulmonary disease		14	5.6
	Renal failure		1	0.4
Admission to palliative care from	House		123	48.8
	Other hospital		63	25.0
	Intensive care unit		66	26.2
Diagnosis	Oncology		77	30.6
	Cerebrovascular disease		77	30.6
	Alzheimer/dementia		22	8.7
	Hypoxic brain		19	7.5
	Traumatic brain injury		17	6.7
	Senility		16	6.3
	Parkinson		8	3.2
	Other		16	6.3
Cancer type	Colon		11	14.3
	Gastric		11	14.3
	Breast		8	10.4
	Lung		8	10.4
	Brain		8	10.4
	Pancreas		6	7.8
	Bladder		4	5.2
	Endometrium		3	3.9
	Rectum		3	3.9
	Renal		2	2.6
	Ovary		2	2.6
	Cholangiocarcinoma		2	2.6
	Cervix		2	2.6
	Hepatocellular		1	1.3
	Larynx		1	1.3
	Nasopharynx		1	1.3
	Esophagus		1	1.3
	Prostate		1	1.3
	Gallbladder		1	1.3
	Salivary gland		1	1.3

downstage, or decreasing the number of pressure ulcers were accepted as pressure ulcer healing, and these patients formed group-2. Patients whose pressure ulcers did not heal were divided into two groups; the patients with stable pressure ulcers (group-3) and those with worsening pressure ulcers (group-4). Patients with worsening pressure ulcers (group-4) consisted of

Table 2. Pressure ulcer related patients data

		Min-max	Median	Mean ± SD
Braden score		5.0-23.0	13.0	13.0 ± 2.7
Length of stay		1.0-323.0	22.0	39.7 ± 51.6
Cost of hospitalization (dollar)		82.7-100146	3742.1	8656.6 ± 13889.4
			N	%
Pressure ulcer	Present		101	40.1
	None		151	59.9
Patients with pressure ulcer	Healed		20	19.8
	Did not healed		81	80.2
Patients whose pressure ulcers did not healed	Up staging pressure ulcers		8	9.9
	Stable pressure ulcers		61	75.3
	Added new pressure ulcers		12	14.8
Multiple pressure ulcers at admission	Present		49	48.5
	None		52	51.5
Pressure ulcer localization at admission	Sacrum		37	36.6
	Trochanter		2	2.0
	Ischium		4	4.0
	Heel		1	1.0
	Scapula		7	6.9
	Hand		1	1.0
	Multiple localization		49	48.5
Pressure ulcer localization at discharge	Sacrum		34	33.7
	Trochanter		4	4.0
	Ischium		4	4.0
	Heel		3	3.0
	Scapula		6	5.9
	Hand		1	1.0
	Multiple localization		49	48.5
Vacuum assisted closure	Present		18	7.1
	None		234	92.9
Discharge status	To home		88	34.9
	To intensive care unit		69	27.4
	Transferred		75	29.8
	Died		19	7.5
	Nursing home		1	0.4

patients whose pressure ulcers were getting up stage, or a new one was added to the existing pressure ulcer.

Groups;

group-1: patients with no pressure ulcers,

group-2: patients with healing pressure ulcers,

group-3: patients with stable pressure ulcers,

group-4: patients with worsening pressure ulcers,

Daily skincare and standard care plans were applied to all patients with pressure ulcers.

Table 3. Comparative analysis of patients with pressure ulcers and those without

		Pressure ulcer (+)		Pressure ulcer (-)		p
		Mean ± SD	Median	Mean ± SD	Median	
Age (Year)		69.6 ± 17.1	73.0	65.8 ± 16.3	67.0	0.050[a]
Braden score		11.2 ± 1.9	11.0	14.1 ± 2.5	14.0	0.000[a]
Length of stay		51.5 ± 57.8	29.0	31.7 ± 45.5	16.0	0.000[a]
Cost of hospitalization (dollar)		10520 ± 13301	5155	7410 ± 14177	3014	0.000[a]
		N	**%**	**N**	**%**	**p**
Sex	Male	53	52.5	84	55.6	0.622[b]
	Female	48	47.5	67	44.4	
Comorbidity						
Diabetes mellitus		17	16.8	17	11.3	0.204[b]
Hypertension		22	21.8	22	14.6	0.139[b]
Heart disease		10	9.9	19	12.6	0.513[b]
Pulmonary disease		4	4.0	10	6.6	0.366[b]
Renal failure		0	0.0	1	0.7	1.000[b]
Admission to palliative care from						
House		43	42.6	80	53.0	0.000[b]
Other hospital		18	17.8	45	29.8	
Intensive care unit		40	39.6	26	17.2	
Vacuum assisted closure	(-)	83	82.2	151	100.0	0.000[b]
	(+)	18	17.8	0	0.0	
Discharge status						
To home		28	27.7	60	39.7	0.049[b]
To intensive care unit		40	39.6	29	19.2	
Transferred		27	26.7	48	31.8	
Died		5	5.0	14	9.3	
Nursing home		1	1.0	0	0.0	

[a] Mann-Whitney U test / [b] Chi-square test (Fischer test)

Experimed 2023; 13(2): 133-141

The patients' age, gender, from where they were admitted, diagnosis on admission, comorbidities, length of hospitalization, discharge status, Braden scores in admission, oral intake insufficiency, the status of pressure ulcers, the pressure ulcer treatment method and the hospitalization costs of the patients were evaluated comparatively. In the study, prevalence means all patients who had pressure ulcers in admission and added new ones during hospitalization. Incidence means the patients who develop new pressure ulcers during the palliative care period.

Statistical Analyses

Mean, standard deviation, median, minimum, maximum, frequency, and ratio values were used for the descriptive statistics of data. The distribution of variables was calculated by the Kolmogorov-Smirnov test. Independent quantitative data were analyzed by the Mann-Whitney U test. The Chi-Square test was used to examine independent qualitative data, and the Fischer test was used when the Chi-square test conditions were not met. SPSS 28.0 program was used in the analysis.

Table 4. Comparative analysis of patients whose pressure ulcers healed and those not

		Pressure ulcer				
		Healed		Not healed		
		Mean ± SD	Median	Mean ± SD	Median	p
Age (Year)		71.7 ± 15.8	74.0	69.1 ± 17.4	72.0	0.571[a]
Braden score		11.3 ± 1.4	11.0	11.2 ± 2.0	11.0	0.812[a]
Length of stay		34.8 ± 39.2	23.5	55.7 ± 61.0	29.0	0.114[a]
Cost of hospitalization (dollar)		9112.1 ± 7396.1	6285.8	10867.0 ± 14405.7	4530.2	0.506[a]
		N	**%**	**N**	**%**	**p**
Sex	Male	11	55.0	42	51.9	0.801[b]
	Female	9	45.0	39	48.1	
Comorbidity						
Diabetes mellitus		4	20.0	13	16.0	0.672[b]
Hypertension		6	30.0	16	19.8	0.320[b]
Heart disease		3	15.0	7	8.6	0.410[b]
Pulmonary disease		1	5.0	3	3.7	1.000[b]
Admission to palliative care from						
House		8	40.0	35	43.2	0.948[b]
An other hospital		4	20.0	14	17.3	
Intensive care unit		8	40.0	32	39.5	
Vacuum assisted closure	(-)	17	85.0	66	81.5	0.713[b]
	(+)	3	15.0	15	18.5	
Discharge status						
To home		4	20.0	24	29.6	0.389[b]
To intensive care unit		11	55.0	29	35.8	
Transferred		5	25.0	22	27.2	
Died		0	0.0	5	6.2	
Nursing home		0	0.0	1	1.2	

[a] Mann-Whitney U test / [b] Chi-square test (Fischer test)

RESULTS

The data of 252 patients who received inpatient treatment in the palliative care unit between January 2016-2022 were analyzed. There were 137 (54.4%) male and 115 (45.6%) female patients. The mean age was 67.4±16.7. The most common comorbid diseases of the patients were hypertension (17.5%) and diabetes mellitus (13.5%). Almost half, 48.8%, of the patients were admitted from home. Mainly oncology (30.6%) patients and cerebrovascular disease (30.6%) patients were admitted (Table 1).

The Braden score of the patients was found to be a median of 13 (5-23). Pressure ulcers prevalence in our palliative care unit was 40.1%. Although daily wound care was performed in 81 (80.2%) patients with pressure ulcers, healing could not be achieved. It was observed that new pressure ulcers were added in 12 of the patients whose pressure ulcers did not heal. Pressure ulcers incidence in our palliative care unit was 4.7%. There was more than one pressure ulcer at admission in 49 (48.5%) patients with pressure ulcers. Vacuum-assisted closure (VAC) was used in the treatment of 18 patients with pressure ulcers. While 34.9% of the patients were discharged home, 29.8% were transferred to a tertiary-level center, and 27.4% were transferred to the intensive care unit. Nineteen (7.5%) patients died in the palliative care unit. The mean length of stay was 39.7 ± 51.6 days, and the mean cost of hospitalization was 8656.6 ± 13889.4 dollars (Table 2).

The Braden score and the rate of discharge to home were significantly lower in patients with pressure ulcers than those without wounds ($p<0.05$). The rate of admission from another intensive care unit, the length of hospital stay, and hospitalization cost was significantly higher in the group with pressure ulcers than in the group without pressure ulcers ($p<0.05$) (Table 3).

In the comparative analysis of patients whose pressure ulcers healed and those who did not, no significant difference was found in terms of where they were admitted from, Braden scores, rate of vacuum assisted closure (VAC) use, the rate of discharge home, the length of hospital stay, and hospitalization cost ($p>0.05$) (Table 4).

In the comparative analysis of patients whose pressure ulcers worsened and whose were stable, it was observed that the rate of VAC use and the cost of hospitalization were significantly higher in patients with worsening pressure ulcers ($p<0.05$) (Table 5).

DISCUSSION

The increasing elderly population, chronic diseases, and cancer have increased the need for palliative care. Palliative care aims to feel the patients and their relatives well in the last period of life, and it has been fully integrated into healthcare systems in developed countries. In modern healthcare systems, every patient has the right to palliative care (8).

With aging, there are changes such as thinning of the subcutaneous tissue, loss of collagen and elastic fibers, decrease in vascularity, and disruption of the skin's barrier function. Additional factors such as a deterioration in nutritional status, cachexia, and immunosuppression due to cytokines such as tumor necrosis factor (TNF) α, as in cancer patients, or accompanied by immobilization and loss of sensorimotor sensation, as in cerebrovascular disease, further increases pressure ulcer development risk. In addition, it should be remembered that in the last period of life, inevitable pressure ulcers may be encountered due to the inadequacy of homeostatic mechanisms. For all these reasons, palliative care patients are candidates for pressure ulcer development (9).

Pressure ulcers prevalence in palliative care is between 17% to 47% in the literature (10). In Galvin's study, pressure ulcers prevalence in the palliative care unit was 38.1%, and the incidence was 12% (11). Hendrichova et al. reported the pressure ulcers prevalence as 22.9% and the incidence as 6.7% in cancer patients in the palliative care unit (10). When we look at the data from Turkiye, Gencer et al. found the general prevalence of pressure ulcers in a university hospital was 2.49% and the incidence 1.9% (12). Studies conducted in the intensive care unit show that the rate of pressure ulcers varies between 15-29% (13). In their study, Zengin and Tasci found that the pressure ulcer frequency in the palliative care unit is as high as 36.1% (1). In our study, pressure ulcers prevalence was 40.1%, and the incidence was 4.7%. This result shows that if correct risk analysis is performed and protection is taken, the incidence of pressure ulcers could decrease even if the prevalence is very high.

In our study, the mean age, gender distribution, diagnoses in admission, and comorbid diseases of the patients were compatible with the literature.

Since the frequency of pressure ulcers varies from each other in the general population, clinical units, intensive care units, and palliative care units, all patients should be well questioned about where they are admitted from and their previous care history. The risk of pressure ulcers is higher in patients with a history of organ dysfunction that requires intensive care follow-up. Our study observed that admission from the intensive care unit was significantly higher in patients with pressure ulcers.

The Norton, Braden, and Waterlow scales are commonly used scales for pressure ulcer risk assessment of patients (14). Pressure ulcer risk analysis is performed by evaluating sensory perception, activity, mobility, humidity, nutrition, and friction/shearing with the Braden scale, and patients receive a score between 6 and 23. The risk of pressure ulcers increases as the Braden scale total score decreases (7). Our study's median Braden score was 13 (5-23). This low score shows the high risk of pressure ulcers in palliative care patients. Additionally, the Braden score was significantly lower in patients with pressure ulcers than those without wounds. This result indicates we can safely use the Braden scale in palliative care unit patients.

Experimed 2023; 13(2): 133-141

The rate of discharge to home in a palliative care unit is accepted as one of the indicators of success (1). Yuruyen et al. found the discharge rate to home in the tertiary level palliative care unit to be 52%. In the same study, the transfer rate to intensive care was 15.3%, and mortality in the palliative care unit was 33.4% (15). Starks et al. in their study, which used data from two different hospitals' palliative care units, found the discharge rate to home to be 13.4% and 15.3%, respectively. In the same study, the rate of discharge to a skilled nursing facility was 15.3% and 33.0%, and the rate of discharge to a hospice was 22.1% and 3.3%. Starks et al. found 37.3% and 39.5% mortality rates in the palliative care unit in their study (16). In our study, 34.9% of the patients were discharged home, while 29.8% were transferred to a tertiary level center and 27.4% to the intensive care unit. The mortality rate was found to be 7.5%. Our study observed that the discharge rate to home was significantly

Table 5. Comparative analysis of patients whose pressure ulcers worsened and those stable

		Pressure ulcer				p
		Worsened		Stable		
		Mean ± SD	Median	Mean ± SD	Median	
Age (Year)		67.1 ± 17.3	70.0	69.8 ± 17.5	72.0	0.595[a]
Braden score		10.7 ± 1.5		11.4 ± 2.1		0.153[a]
Length of stay		62.8 ± 55.1		53.3 ± 63.0		0.369[a]
Cost of hospitalization(dollar)		11638.0 ± 7927.9		10614.3 ± 16016.7		0.033[a]
		N	**%**	**N**	**%**	**p**
Sex	Male	10	50.0	32	52.5	0.849[b]
	Female	10	50.0	29	47.5	
Comorbidity						
Diabetes mellitus		3	15.0	10	16.3	0.224[b]
Hypertension		3	15.0	13	21.3	0.538[b]
Heart disease		2	10.0	5	8.2	1.000[b]
Pulmonary disease		0	0.0	3	3.7	0.571[b]
Admission to palliative care from						
House		5	25.0	30	49.2	0.158[b]
An other hospital		5	25.0	9	14.8	
Intensive care unit		10	50.0	22	36.1	
Vacuum assisted closure	(-)	13	65.0	53	86.9	0.029[b]
	(+)	7	35.0	8	13.1	
Discharge status						
To home		3	15.0	21	34.4	0.099[b]
To intensive care unit		13	65.0	16	26.2	
Transferred		3	15.0	19	31.1	
Died		1	5.0	4	6.6	
Nursing home		0	0.0	1	1.6	

[a] Mann-Whitney U test / [b] Chi-square test (Fischer test)

lower in patients with pressure ulcers than in those without. This result shows that the development of pressure ulcers directly affects the success of palliative care.

Although the rate of discharge to home was consistent with the literature in our study, transfer rates to a tertiary-level center and intensive care unit were found to be high since our unit is located in a secondary-level hospital. The 7.5% mortality rate for the palliative care unit seems relatively low. The mortality rate was low because the discharge status of the patients transferred to a tertiary-level center and intensive care unit was unknown and was not evaluated in this study.

Unfortunately, the capacity of palliative care units, which has yet to be fully integrated into healthcare systems in many countries, to afford the supply-demand balance is also limited. Therefore, how long it takes to discharge home successfully is extremely important for both patient and their relatives, and the burden on the healthcare system. Factors such as a limitation of movement, feeding tube, permanent tracheostomy, hypertension, infection, and pressure ulcers affect the duration of stay in the palliative care unit (1). Our study observed that the length of stay in the palliative care unit was longer in patients with pressure ulcers than in patients without ulcers.

Cost analyses are essential to understand the burden of palliative care units on the healthcare system and to produce appropriate solutions. Pressure ulcers increase the length of hospital stay and treatment costs and the burden on the healthcare system. Our study observed that the financial burden of patients with pressure ulcers on the healthcare system was significantly higher.

Comparative analyses of patients whose pressure ulcers healed and those who did not, revealed that no real success can be achieved even if the best care services and treatment options are offered after pressure ulcers develop in the palliative care unit. The length of stay in the palliative care unit of the patients whose wounds healed was as long as those who did not. Similarly, the discharge rate to home was found to be low, and the costs increased. This result shows the importance of pressure ulcer risk analysis and prevention of pressure ulcers before they develop.

Comparative analyses of patients with worsening pressure ulcers and patients with stable pressure ulcers showed no significant difference in the rate of discharge to home and length of hospital stay between the two groups and that the use of VAC and costs were higher in patients with worsening pressure ulcers. This result shows that despite the expensive treatment such as VAC, real success has yet to be achieved, and the costs have increased (Table 5).

The most important limitations of our study were that it is retrospective and with a limited number of patients. In addition, since our palliative care unit is in a secondary level health care institution, the final status of the patients transferred to a tertiary-level center could not be evaluated.

In conclusion, pressure ulcers negatively affect the patient's length of stay in the palliative care unit, the rate of discharge to home, and the financial burden on the healthcare system. In order to obtain cost-effective and successful results in palliative care units, a pressure ulcer risk analysis and a standardized care plan to prevent and treat pressure ulcers should be performed.

Ethics Committee Approval: The study's ethical approval was obtained by the local ethics committee of Haseki Training and Research Hospital (Approval number: 71-2022).

Conflict of Interest: The author declare that there is no conflict of interest.

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