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Bedridden Patients at Emergency Department: Can We Treat Them at Home?

Acil Serviste Yatağa Bağımlı Hastalar: Onları Evlerinde Tedavi Edebilir Miyiz?

[1]Erdinç ŞENGÜLDÜR, [1]Kudret SELKİ

[1]Department of Emergency Medicine, School of Medicine, Düzce University, Düzce, Türkiye

Erdinç Şengüldür: https://orcid.org/0000-0002-3978-9534
Kudret Selki: https://orcid.org/0000-0002-3495-4991

ABSTRACT

Objective: To examine in detail the demographic and clinical characteristics of fully bedridden patients in emergency department (ED) and to evaluate the applicability of home care services to this patient group.

Materials and Methods: This was a retrospective, single-center observational study, conducted in the ED of a tertiary university hospital in Düzce, Türkiye. Study was conducted with 1012 patients between 01.07.2021 - 01.07.2024. Inclusion criteria: being fully bedridden for any reason. Exclusion criteria: Being able to walk with or without support and being temporarily bedridden.

Results: The rate of bedriddennes was 0.003%. The most common reason for admission was urinary catheter replacement (24.2%) in patients younger than 65 years and general condition disorder (25.6%) in elderly patients. The most common diagnoses in both groups were need of care, pneumonia and stroke, respectively. Calcium and albumin values within 48 hours and 30 days were found to be statistically significantly lower and BUN values were found to be higher in deceased patients compared to survivors. ($p<0.05$).

Conclusions: Meeting the needs of bedridden patients at home, such as catheter replacement, will reduce ED admissions and ED crowding. Calcium, albumin and uric acid levels should be investigated as mortality markers in bedridden patients.

Keywords: Bedridden, emergency department, dementia, home care services, stroke

ÖZ

Amaç: Acil servise başvuran yatağa bağımlı hastaların demografik ve klinik özelliklerini ayrıntılı olarak incelemek ve evde bakım hizmetlerinin bu hasta grubuna uygulanabilirliğini değerlendirmek.

Materyal ve Metot: Bu çalışma, Düzce, Türkiye'deki üçüncü basamak bir üniversite hastanesinin acil servisinde yürütülen retrospektif, tek merkezli gözlemsel bir çalışmadır. 01.07.2021 - 01.07.2024 tarihleri arasında 1012 hasta ile yürütülmüştür. Dahil edilme kriterleri: herhangi bir nedenle tamamen yatağa bağımlı olmak. Dışlama kriterleri: Destekli veya desteksiz yürüyebilme, geçici olarak yatağa bağımlı olma.

Bulgular: Yatağa bağımlı hastaların oranı %0,003 idi. En sık başvuru nedeni 65 yaş altı hastalarda üriner kateter replasmanı (%24,2), yaşlı hastalarda ise genel durum bozukluğuydu (%25,6). Her iki grupta da en sık tanılar sırasıyla bakım ihtiyacı, pnömoni ve inme oldu. Ölen hastalarda 48 saat ve 30 gün içinde kalsiyum ve albümin değerleri hayatta kalanlara göre istatistiksel olarak anlamlı derecede düşük, BUN değerleri ise yüksekti ($p<0.05$).

Sonuç: Yatağa bağımlı hastaların kateter değişimi gibi ihtiyaçlarının evde karşılanması acil servis başvurularını ve acil servisteki yoğunluğu azaltacaktır. Kalsiyum, albümin ve ürik asit düzeyleri yatağa bağımlı hastalarda mortalite belirteçleri olarak araştırılmalıdır.

Anahtar Kelimeler: Acil servis, demans, evde bakım hizmetleri, inme, yatağa bağımlı

Sorumlu Yazar / Corresponding Author:
Erdinç Şengüldür
Department of Emergency Medicine, School of Medicine, Düzce University, 81620, Düzce, Türkiye
Tel: +90 380 542 14 16 / Extension 6586
E-mail: drerdincsenguldur@hotmail.com

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INTRODUCTION

Fully bedridden patients constitute one of the most vulnerable groups in terms of health services. These patients cannot perform basic life activities on their own and need continuous physical, medical and psychosocial support.[1] Advanced age, neurological disorders, musculoskeletal disorders and chronic organ failure are the most common causes of this condition.[1-4]

The emergency department (ED) has become one of the primary admission points for bedridden patients.[5] ED admissions are made for reasons such as the transition of chronic health problems to the acute phase, presence of infection, fluid-electrolyte imbalances or inability of caregivers to provide care at home.[1,6-9] However, these admissions often increase the burden of emergency departments due to complex care needs.[6,10]

Some bedridden patients admitted to ED are hospitalized without appropriate assessment or undergo unnecessary further investigations despite not requiring intensive care.[6] This can have negative consequences such as hospital infections, complication risks and unnecessary costs.[10] Home care services promise to provide more appropriate care for bedridden patients at a lower cost.[1,11,12] Identifying which patients can be treated at home may allow for more effective use of resources.

The objective of the study is to determine their everyday care requirements, evaluate the suitability of home care services for this patient population, identify deficiencies experienced in this realm, and offer concrete recommendations for enhancing home care services.

MATERIALS AND METHODS

Ethics Committee Approval: Local ethics committee approval was obtained (Date: 19.08.2024, decision no: 2024/167), and the study was carried out in accordance with the Declaration of Helsinki.

Study Setting and Design: This is a retrospective, single-centre observational study. It was conducted in ED of a tertiary university hospital in Düzce, Türkiye, with approximately 100.000 admissions per year. Bedridden patients admitted to the ED between 01.07.2021 and 01.07.2024 were identified through the hospital's electronic database and included in the study.

Demographic information of the patients, method of admission, complaints at admission, comorbid diseases, blood biochemistry test results, hemogram results, ED diagnoses and mortality results were obtained from the hospital computer system and archive records and written on study forms.

Selection of Participants and Study Protocol: Bedridden patients admitted to the ED for any reason within a three-year period were included in the study. Bedridden patients were defined as patients who were fully dependent on bed for any reason and could not walk on their own or with support [7]. Patients who mostly had to stay in bed due to various diseases but could walk with or without support were not included in the study. Patients who were temporarily bedridden for various reasons (e.g. trauma, surgery) were also excluded. Twenty-three patients were excluded from the study because laboratory parameters or comorbid disease information could not be obtained.

Patients included in the study were divided into groups according to age, 48-hour mortality and 30-day mortality. Comparisons were made between the groups in terms of the parameters screened in the study. A descriptive statistical table was created with the reasons for bedridden, complaints at admission and ED diagnoses.

Statistical Analysis: The conformity of continuous data to normal distribution was evaluated by Shapiro -Wilk and Kolmogorov-Smirnov tests. Continuous data were summarised as median, 25th and 75th percentile and categorical data as frequency and percentage. Continuous data were compared between the two groups by Mann-Whitney U test. The relationship between two categorical variables was analysed by Pearson's Chi-square test or Fisher's exact. Statistical software SPSS version 23 (SPSS Inc., Armonk, NY) was used for these analyses. The significance level was determined as $p < 0.05$.

RESULTS

During the three-year period of the study, 346194 patients were admitted to the ED. 1035 of these admissions were made by bedridden patients. The bedridden rate of ED patients in this study was 0.003. 1035 bedridden patient admissions were made by 723 different patients. The necessary data for the study was obtained from 1,012 admissions. The bedridden patient visits were made by 723 different patients. The data required for the study could be obtained in 1012 of the admissions.

The median age of the patients was 76 years (66-84) and 49.6% were female. The female sex ratio was 34.2% in patients younger than 65 years and 53.8% in patients older than 65 years. The most common comorbid disease was hypertension with a rate of 70.9%. Stroke was the second most common comorbid disease with 64.4%. The prevalence of hypertension was statistically significantly higher in the group older than 65 years ($p<0.001$). 25.5% of patients were hospitalized. While 1.4% of patients died within 48 hours, 5.9% died within 30 days. Demographic characteristics, comorbid diseases, laboratory findings, hospitalization information and mortality

results of bedridden patients admitted to ED are given in Table 1.

Stroke was the most common cause of bedriddennes in all age groups (61.3%), under the age of 65 (60.7%) and 65 years and older (61.4%). In patients under 65 years of age, malignancies (10.5%) were the second most common cause of bedriddennes, while dementia (19.4%) was the second most common in patients over 65 years. The most common reason for ED admission was urinary catheter replacement in patients under 65 years of age (24.2%), while general condition disorder was the most common reason in patients over 65 years (25.6%). The most common ED diagnoses in bedridden patients were needed for care, pneumonia and stroke in all three groups, respectively. The causes of bedridden patients presenting to the ED, complaints at ED admission and ED diagnoses are given in Table 2.

Table 1. Characteristics of bedridden patients and comparisons by age group.

Parameter	All Patients (n=1012)	Patients <65 Years Old (n=219)	Patients ≥65 Years Old (n=793)	p
Gender (Female)	502 (49.6)	75 (34.2)	427 (53.8)	**0.001****
Hypertension	718 (70.9)	98 (44.7)	620 (78.2)	**0.001****
Diabetes Mellitus	367 (36.3)	70 (32.0)	367 (37.5)	0.135**
Cardiac Disorder	434 (42.9)	45 (20.5)	389 (49.1)	**0.001****
Asthma/COPD	145 (14.3)	20 (9.1)	125 (15.8)	**0.013*****
Renal Failure	73 (7.2)	7 (3.2)	66 (8.3)	**0.009*****
Stroke	652 (64.4)	138 (63.0)	652 (64.8)	0.622**
Cancer	131 (12.9)	30 (13.7)	101 (12.7)	0.707***
Demans	246 (24.3)	7 (3.2)	239 (30.1)	**0.001*****
Hemoglbin (g/dL)	11.56 (10.14-13.03)	11.80 (10.41-13.58)	11.37 (9.99-12.80)	**0.002***
Leukocyte (10^3/uL)	9.27 (6.68 – 12.41)	8.72 (6.40-11.35)	9.00 (6.75-12.43)	0.149*
Sodium (mEq/L)	137 (134-141)	137 (135-140)	137 (133-141)	0.780*
Potassium (mEq/L)	4.32 (3.87-4.75)	4.33 (3.96-4.57)	4.32 (3.83-4.77)	**0.039***
Calcium (mEq/L)	9.00 (8.50-9.50)	9.20 (8.90-9.61)	9.00 (8.50-9.44)	**0.001***
Cloride (mEq/L)	101.70 (97.10-105.80)	102.90 (98.00-105.20)	101.30 (97.05-105.90)	0.700*
Albumine (g/dL)	3.64 (3.15-4.02)	4.03 (3.45-4.28)	3.54 (3.06-3.89)	**0.001***
Bun (mg/dL)	23.97 (16.57-36.14)	17.99 (13.22-28.48)	25.76 (17.86-40.19)	**0.001***
Creatinin (mg/dL)	0.95 (0.72-1.34)	0.89 (0.63-1.15)	0.97 (0.73-1.41)	**0.001***
Hospitalization (Yes)	259 (25.5)	50 (22.8)	209 (26.4)	0.290***
48-Hour Mortality (Yes)	14 (1.4)	5 (2.3)	9 (1.1)	0.198***
30-Day Mortality (Yes)	60 (5.9)	11 (5.0)	49 (6.2)	0.521***

Continuous data are given as median (25-75) and categorical data as n (%). In comparisons made with continuous data, Mann Whitney U test was applied due to non-compliance with normal distribution. Chi-Square or Fisher Exact tests were applied for comparisons made with categorical data. Bold p values <0.05 indicate statistical significance. *: Mann Whitney U test; **: Chi-Square test; ***: Fisher Exact tests.

Table 2. Causes of bedriddenness, reasons for admission to the ED and the diagnoses in the ED of the patients evaluated in the study.

	The causes of being bedridden, n (%)		
	All Patients (n=1012)	**Patients <65 Years Old** (n=219)	**Patients ≥65 Years Old** (n=793)
Stroke	620 (61.3)	133 (60.7)	487 (61.4)
Demans	160 (15.8)	6 (2.7)	154 (19.4)
Cancer	85 (8.4)	23 (10.5)	62 (7.8)
Skeletal Disorders	78 (7.7)	13 (5.9)	65 (8.2)
Congenital Disorders	14 (1.4)	12 (5.5)	2 (0.3)
	Reasons for Admission to the Emergency Department, n (%)		
	All Patients (n=1012)	**Patients <65 Years Old** (n=219)	**Patients ≥65 Years Old** (n=793)
General Condition Disorder	230 (22.7)	29 (13.2)	201 (25.3)
Urinary Catheter Replacement	157 (15.5)	53 (24.2)	104 (13.1)
Dyspnea	148 (14.6)	21 (9.6)	127 (16.0)
Vomiting	55 (5.4)	18 (8.2)	37 (4.7)
Fever	45 (4.4)	11 (5.0)	34 (4.3)
	Diagnoses in the Emergency Department, n (%)		
	All Patients (n=1012)	**Patients <65 Years Old** (n=219)	**Patients ≥65 Years Old** (n=793)
Care Requirement	286 (28.3)	90 (41.1)	196 (24.7)
Pneumonia	153 (15.1)	31 (14.2)	122 (15.4)
Stroke	109 (10.8)	19 (8.7)	90 (11.3)
Skin Disorders	66 (6.5)	19 (8.7)	47 (5.9)
Constipation	36 (3.6)	3 (1.4)	33 (4.2)

PEG: Percutan enterogastric catheter. Data is shown as n (%).

There was no statistically significant difference in age between deceased patients within 48 hours and those who survived (75.50 [66.00-84.00] vs 80.50 [63.00-92.00]) (p>0.05). Within 30 days, there was no statistically significant difference in age between deceased patients and survivors (75.00 [66.00-83.00] vs 78.00 [69.00-87.00]) (p>0.05). Deceased patients within 48 hours had statistically lower calcium and albumin values and higher BUN values than survivors (p<0.05). The same situation was also present in the comparison between 30-day mortality groups. The comparison of the parameters screened in the study between 48-hour and 30-day mortality groups is given in Table 3.

Table 3. Comparison of the parameters screened in the study between 48-hour and 30-day mortality groups.

Parameter	**Death in 48 Hours: No** (n=998)	**Death in 48 Hours: Yes** (n=14)	p	**Death in 30 Days: No** (n=952)	**Death in 30 Days: Yes** (n=60)	p
Age (Years)	75.5 (66.0-84.0)	80.50 (63-92)	0.343*	75.0 (66.0-83.0)	78.0 (69.0-87.0)	0.081*
Gender (Female)	494 (49.5)	8 (57.1)	0.570**	471 (49.5)	31 (51.7)	0.742**
Hypertension	713 (71.4)	5 (35.7)	**0.006****	680 (71.4)	38 (63.3)	0.180**
Diabetes Mellitus	363 (36.4)	4 (28.6)	0.547***	351 (36.9)	16 (26.7)	0.111***
Cardiac Disorder	430 (43.1)	4 (28.6)	0.276***	405 (42.5)	29 (48.3)	0.379***
Asthma/COPD	145(14.5)	0 (0)	-	139 (14.6)	6 (10.0)	0.324***
Renal Failure	72 (7.2)	1 (7.1)	0.732***	69 (7.2)	4 (6.7)	0.561***
Stroke	646 (64.7)	6 (42.9)	0.081***	616 (64.7)	36 (60.0)	0.460***
Cancer	129 (12.9)	2 (14.3)	0.559***	120 (12.6)	11 (18.3)	0.200***
Demans	240 (24.0)	6(42.9)	0.098***	225 (23.6)	21 (35.0)	**0.047*****
Hemoglbin (g/dL)	11.44 (10.13-12.90)	11.56 (9.17-13.16)	0.915*	11.46 (10.15-12.89)	11.21 (9.37-13.18)	0.574*
Leukocyte (10^3/uL)	8.90 (6.60-12.27)	9.57 (7.85-14.69)	0.313*	8.87 (6.65-11.97)	10.56 (5.96-15.75)	0.062*
Sodium (mEq/L)	137 (133-140)	140 (137-144)	0.105*	137 (133-140)	136 (130-141)	0.615*
Potassium (mEq/L)	4.28 (3.87-4.69)	3.95 (3.57-4.52)	0.155*	4.29 (3.86-4.70)	4.20 (3.77-4.63)	0.310*
Calcium (mEq/L)	9.00 (8.60-9.50)	8.70 (8.00-9.10)	0.018*	9.07 (8.60-9.50)	8.75 (8.07-9.20)	**0.001***
Cloride (mEq/L)	101 (97-105)	106 (97-112)	0.089*	101 (97-105)	100 (94-107)	0.458*
Albumine (g/dL)	3.60 (3.11-4.00)	2.81 (2.41-3.32)	**0.001***	3.36 (3.16-4.01)	3.00 (2.52-3.59)	**0.001***
Bun (mg/dL)	23.76 (16.48-36.12)	38.67 (26.36-81.02)	**0.032***	23.52(16.19-35.70)	32.23 (22.25-48.12)	**0.001***
Creatinin (mg/dL)	0.93 (0.68-1.34)	1.02 (0.71-2.05)	0.329*	0.93 (0.68-1.34)	0.99 (0.67-1.56)	0.538*

Continuous data are given as median (25-75) and categorical data as n (%). In comparisons made with continuous data, Mann Whitney U test was applied due to non-compliance with normal distribution. Chi-Square or Fisher Exact tests were applied for comparisons made with categorical data. P<0.05 indicates statistical significance. *: Mann Whitney U test; **: Chi-Square test; ***: Fisher Exact tests.

DISCUSSION AND CONCLUSION

The characteristics that differentiate bedridden patients from other patients in their age group are that they cannot perform self-care and most of their basic vital activities without assistance. [1,2] When previous studies were examined in terms of the reasons for hospital admission of bedridden patients, it was observed that care-related problems such as urinary catheter replacement, feeding catheter problems and bed sores were the main reasons for hospital admission.[6,8,13,14] Urinary catheter replacement, which is a practice related to the general care of bedridden patients, was also among the main reasons for admission in this study and was the most common reason for admission in patients younger than 65 years of age. The most common diagnosis of ED in the study was the need for care in all age groups. The diagnosis of need for care includes conditions that can be intervened by home care services in the patient's home, such as the need for catheter care or replacement, the need for wound dressing, and nutritional disorders. The data indicates that 24.7% of bedridden admissions for individuals aged 65 and over, as well as 41.1% of bedridden admissions for those under 65, presented with issues that could have been addressed by home care services. Bringing these manageable complaints to the hospital can result in unnecessary examinations and hospital stays, ultimately raising healthcare costs associated with each complaint.[6,10] Improving the availability and accessibility of home healthcare services will reduce the financial and labor burden of bedridden patients on the healthcare system.

The bedridden population generally consists of elderly patients. In studies in the literature, the mean age of bedridden patients is seen in the range of 75-80 years.[2,6,9,15-17] In our study, the median age was 76 years, which supports existing literature. In patients over 65 years of age, stroke and dementia come to the forefront when the reasons for bedriddennes are investigated.[3,4,6] Dementia and stroke are diseases whose frequency increases in advanced ages.[13,14,18] Congenital disorders, traumas and central nervous system infections are the most common causes of bedriddennes below the age of 65.[19] In this study, stroke was found to be the most common cause of bedriddennes in all age groups. The causes of bedriddennes according to age groups in this study were found to be compatible with the data in the literature.

In some studies with bedridden patients, the proportion of male patients was higher [2,6,15] while in others the proportion of female patients was higher.[6,17] Stroke and dementia are among the leading causes of bedriddenness and both are diseases whose frequency increases in older ages.[13,18] The higher life expectancy in women compared to men indirectly increases the likelihood of encountering these diseases.[13] In our study, the higher proportion of female gender in bedridden patients over 65 years of age may be explained by the fact that life expectancy is higher than that of male gender and women are more likely to encounter age-related diseases because they live longer. In the study, musculoskeletal system disorders came to the forefront among the causes of bedriddenness in patients under 65 years of age. The majority of these disorders are caused by traumas. It has been shown in previous studies that men are more exposed to traffic accidents,[20,21] and the high rate of working in dangerous jobs increases the risk of exposure to central nervous system injuries that may result in bedriddenness for the male population.[22] These mechanisms may explain the higher male-sex ratio in patients under 65 years of age in this study.

Research has shown that diseases such as coronary artery disease, hypertension, and dementia are more prevalent among bedridden patients aged 65 and older. This trend can be attributed to the higher occurrence of these conditions in the general population as people age.[13] However, there was no statistically significant difference in the incidence of stroke as a comorbid condition between patients younger than 65 and those older than 65. This finding is likely due to the fact that the study focused specifically on bedridden patients rather than the general population.

Previous studies have shown that advanced age is a parameter that increases the mortality rate in ED patients.[13,23] In a study conducted with patients hospitalized in the ward, it was found that advanced age increased the mortality rate in bedridden patients.[8] In the literature review, no study was found with bedridden patients admitted to the ED. In this study, the 48-hour and 30-day mortality rates of bedridden patients admitted to the ED did not show a statistically significant difference between the groups under and over 65 years of age. The fact that bedridden patients in both age groups are frequently admitted to the ED for reasons such as care needs, catheter replacements, wound dressings and that these reasons for admission are not life-threatening may be one of the reasons why there is no difference in mortality between the groups. Again, the same explanation can be put forward as a reason for reaching different results within studies conducted with patients hospitalized in the ward. The fact that hospitalization rates were similar between age groups in the study may be explained by the fact that the complaints and diagnoses were mostly care-related conditions.

Bedridden patients may also be admitted to hospitals with potentially fatal complications. Urinary tract infections, bedsores, delirium and pneumonia have

been shown to be common complications in bedridden patients, and a study reported that the presence of three of these complications increased mortality 8 -fold.[9] In this study, pneumonia was found to be the 2nd most common diagnosis in bedridden patients admitted to the ED in all age groups. Urinary tract infection and stroke were the other common ED diagnoses that may be fatal. In one of the previous studies, 3-month mortality of bedridden patients hospitalized in the ward was 14% [16]. In another study conducted with patients admitted to a physical therapy and rehabilitation center, the 1-year mortality rate was 15.24%. The fact that the mortality durations evaluated in this study were not similar to the durations in the literature and that the study was conducted with ED patients prevented comparison. However, the fact that both 48-hour and 30-day mortality rates are quite low indicates that ED admissions are usually made because of the need for care, not because of urgent pathologies.

Various studies have shown that hypocalcemia and hypoalbuminemia are associated with increased mortality in critically ill patients.[24,25] Elevated blood urea nitrogen (BUN) levels are also associated with increased mortality, especially in patients with sepsis.[26] In this study of bedridden patients admitted to the ED, albumin and calcium were significantly lower, and BUN was higher in the mortality groups. The results of the study showed that calcium, albumin and BUN values may be useful when evaluating the mortality of bedridden patients admitted to the ED and when making hospitalization-discharge decisions.

The first limitation of the study is that it was retrospective. The second limitation is that the study was conducted in a single center. The third limitation is that the study was limited to the evaluation of ED admissions and did not include an evaluation of home care services.

In conclusion, meeting the needs of bedridden patients at home, such as catheter replacement, feeding catheter care and wound dressing, will reduce ED admissions and ED crowding. Calcium, albumin and uric acid levels should be investigated as mortality markers in bedridden patients. Home care services should be improved in terms of quality and quantity.

Ethics Committee Approval: This study was initiated in the emergency department of Düzce University Non-Invasive Health Research Ethics Committee's approval (Date: 19.08.2024, decision no: 2024/167). The study was carried out in accordance with the Declaration of Helsinki.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – EŞ, KS; Supervision – EŞ, KS; Materials – EŞ, KS; Data Collection and Processing – EŞ, KS; Analysis and Interpretation – EŞ, KS; Writing – EŞ, KS.

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