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ORIGINAL RESEARCH

Impact of inter-visit duration on mortality in older adults who use emergency department frequently

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Abstract

The incidence of older adults presenting to the emergency department (ED) is increasing, and assessing their potential mortality risk for those returning frequently to the ED remains important. This study aims to evaluate the effects of frequent ED visits and the interval between these visits on the mortality of older adults.We retrospectively assessed the data of patients aged 65 years and above who frequently visited an academic ED in Turkey in 2021 and divided them into two groups: ED-frequent users (FUs) (4–7 visits) and ED-highly frequent users (HFUs) (>7 visits), following which we compared their characteristics, inter-visit duration, and 6-month mortality. The results indicated that out of the 2947 ED visits, 516 older adults were identified who visited the ED at least four times, averaging 5.7 visits per patient. HFUs constituted approximately 12% (n = 61)of the cohort. Further analysis revealed a significant increase in mortality associated with shorter inter-visit duration between ED visits ($p < 0.001$). Specifically, visiting the ED at intervals shorter than 74 days was associated with a fourfold increase in mortality risk (odds ratio (OR): 3.84; 95% confidence interval (CI): 2.64–5.57; $p < 0.001$), which escalated to sixfold in patients with a history of recent hospitalization (OR: 5.87; 95% CI: 3.81–9.07; $p < 0.001$).The data indicated that most older adults with frequent ED visits had multiple comorbidities, and those who did not survive were significantly older. This study highlights the important need to acknowledge the increased mortality risk among older adults with frequent ED visits, with recent hospitalization and short inter-visit duration being contributing factors.

Keywords

Older adults; Elderly; Frequent user; Visit; Emergency department; Mortality

1. Introduction

Frequent emergency department (ED) visits pose a significant challenge within healthcare systems. Globally, EDs represent the most readily accessible healthcare service, offering round-the-clock care without the need for an appointment. While this accessibility is crucial for managing medical emergencies that require immediate attention, this may also lead to the misuse of ED. Thus, the issue of frequent ED visits has become an interesting topic of research [1–5].

The definition of ED frequent users (FUs) varies, ranging from individuals who visit between 2 and ≥12 times annually [6]. Nonetheless, the most widely accepted criterion identifies FUs as patients who visit the ED at least four times within a year [2, 7, 8]. It is estimated that 9% of ED patients can be categorized as FU, accounting for 28% of all ED visits [3]. A significant factor behind the increase in ED visits could be the lack of adequate primary care [6, 9, 10]. Frequent presentations to the ED impose additional demands on its services and extend waiting durations for other patients. Furthermore, these frequent visits can lead to treatment delays, reduced patient satisfaction and potential negative impacts on patient outcomes.

Older adults are more likely to frequently have ED visits, and the prevalence of ED visits among this demographic is attributed to the 24/7 availability of healthcare services, as well as factors such as advanced age, physiological changes associated with aging, the presence of multiple comorbidities, and the use of numerous medications [11–13]. The global population aged over 65, which constituted 10% in 2022, is projected to increase to 16% by 2050 [14] and is expected to result in increased mortality rates due to shortcomings in healthcare provision, alongside a surge in ED visits. Elderly FUs often seek ED services primarily due to the exacerbation of their chronic conditions [15]. Therefore, the notion of ED misuse should not be prematurely attributed to visits by older patients. Instead, revisits to the ED by elderly individuals warrant thorough evaluations for better understanding.

The present literature currently lacks comprehensive investigations on the correlation between the frequency of ED visits, particularly the duration between visits (inter-visit duration), and mortality among older adults who are frequent ED users.

Thus, we designed this study to assess the characteristics of elderly frequent ED users and to determine the impact of inter-visit duration on their potential risk of mortality.

2. Materials and methods

2.1 Study design and setting

This was a retrospective, single-center, cross-sectional observational study conducted at the ED of a tertiary university hospital in Turkey, which receives approximately 90,000 presentations annually. The data of patients aged ≥65 years who presented to the ED between 01 January 2021, and 31 December 2021, were retrieved.

In this study, variables such as age, sex, comorbidities, frequency of ED visits, inter-visit duration, total duration from the first to the last visit, number of hospital admissions, and 6-month mortality outcomes were meticulously documented on study forms. Data were sourced from the hospital's electronic patient record system and ED archival records. Mortality status was verified through the national database, accessible via the hospital's electronic system, by identifying any recorded deaths. The term "length of admission" (LOA) refers to the interval between two consecutive ED visits. The total LOA (tLOA) denotes the period from a patient's first to last visit to the ED within the study period. Calculations were performed to determine the tLOA, as well as the minimum, maximum, and median LOA intervals. Additionally, to assess visit frequency, the ratio of the number of visits to the tLOA was determined for each patient.

2.2 Selection of participant and study protocol

Among the patients aged ≥18 years who visited the ED in 1 year, those aged ≥65 years accounted for 17.5% of all ED visits and 17.2% of the total patient population. From this group, individuals who visited the ED at least four times were selected for inclusion in the study. The flow chart with inclusion and exclusion criteria is shown in Fig. 1.

The included patients were then divided into two groups based on the frequency of their ED visits within one year: FUs (4–7 visits) and highly frequent users (HFUs) (>7 visits). This classification was based on cutoff values commonly used in previous research [2, 7, 8].

After determining the total number of ED visits made by each patient, we calculated their elapsed time between consecutive presentations. For patients who visited the ED at least four times, their median, minimum, maximum and total elapsed time between their first and last visits were computed. To analyze visit frequency more precisely within the study period, the ratio of the number of visits to tLOA for each patient was determined. Moreover, we recorded the number of hospital admissions for these patients and explored the association between hospitalization frequency and mortality rates.

2.3 Statistical analysis

Continuous data are presented as median values along with the 25th and 75th percentiles, while categorical data are expressed in terms of frequency and percentage. The Mann-Whitney U test was utilized to analyze continuous data, while Pearson's Chi-square test or Fisher's Exact test was used to assess the association between two categorical variables. These analyses were conducted using SPSS statistical software version 23 (IBM SPSS Statistics for Windows, IBM Corp., Armonk, NY, USA). For the analysis of receiver operating characteristics (ROC) curves, the pROC package version 1.17.0.1 in RStudio was used. Metrics including sensitivity, specificity, positive likelihood ratio, negative likelihood ratio, positive predictive value, and negative predictive value were computed. The area under the curve (AUC) values were assessed and compared using the bootstrap method. Univariate logistic regression analysis was performed using the identified cutoff values, applicable only for AUC values greater than 0.60. A p-value of less than 0.05 was considered statistically significant.

3. Results

This study comprised 516 patients aged ≥65 years who visited the ED at least four times in 2021. These individuals represented 19% of the total patients >65 years attending the ED. On average, each patient was recorded to have made 5.7 ED visits during the study period, totaling 2947 visits. Among these, 73.5% (n = 2166) of the visits were attributed to 455 FUs who visited the ED between four to seven times, while 11.8% of the patients who visited at least four times were classified as HFUs, having visited the ED more than seven times.

The median age of the patients was 74 years (interquartile range (IQR): 69–80, range: 65–98), with 54.7% (n = 282) being male. A total of 98.6% of the patients (n = 509) had at least one comorbidity, the most common of which was hypertension (n = 400, 77.5%). Additionally, 11.82% (n = 61) were classified as HFUs, having visited more than seven times. In the assessment of 6-month mortality, with a median age of 77 years (IQR: 71–82) compared to 73 years (IQR: 68–79) for survivors ($p < 0.001$). Conditions such as chronic heart failure, atrial fibrillation, Alzheimer's disease, malignancy, and liver disease were significantly more prevalent among non-survivors. There was no difference in the number of visits between survivors and non-survivors, and it was similar between FUs and HFUs. However, the frequency of visits per day (calculated as the number of visits divided by tLOA) was higher in those who died, with a median IQR of 0.03 (0.02–0.05) for survivors and 0.04 (0.03–0.08) for non-survivors ($Z = -6.40$, $p < 0.001$). Additionally, the median, maximum, and tLOA for each patient were significantly shorter among deceased patients ($p = 0.005$, $p < 0.001$ and $p < 0.001$, respectively). Details of patient and visit characteristics, along with mortality comparisons, are presented in Table 1.

The comparison of visit characteristics between FUs and HFUs in relation to mortality is presented in Table 2. HFUs had a higher frequency of visits per day (median, IQR: HFUs 0.05, 0.03–0.08; FUs 0.03, 0.02–0.06, $Z = -6.40$, $p < 0.001$). The median hospitalization duration for patients was 1 day (IQR:

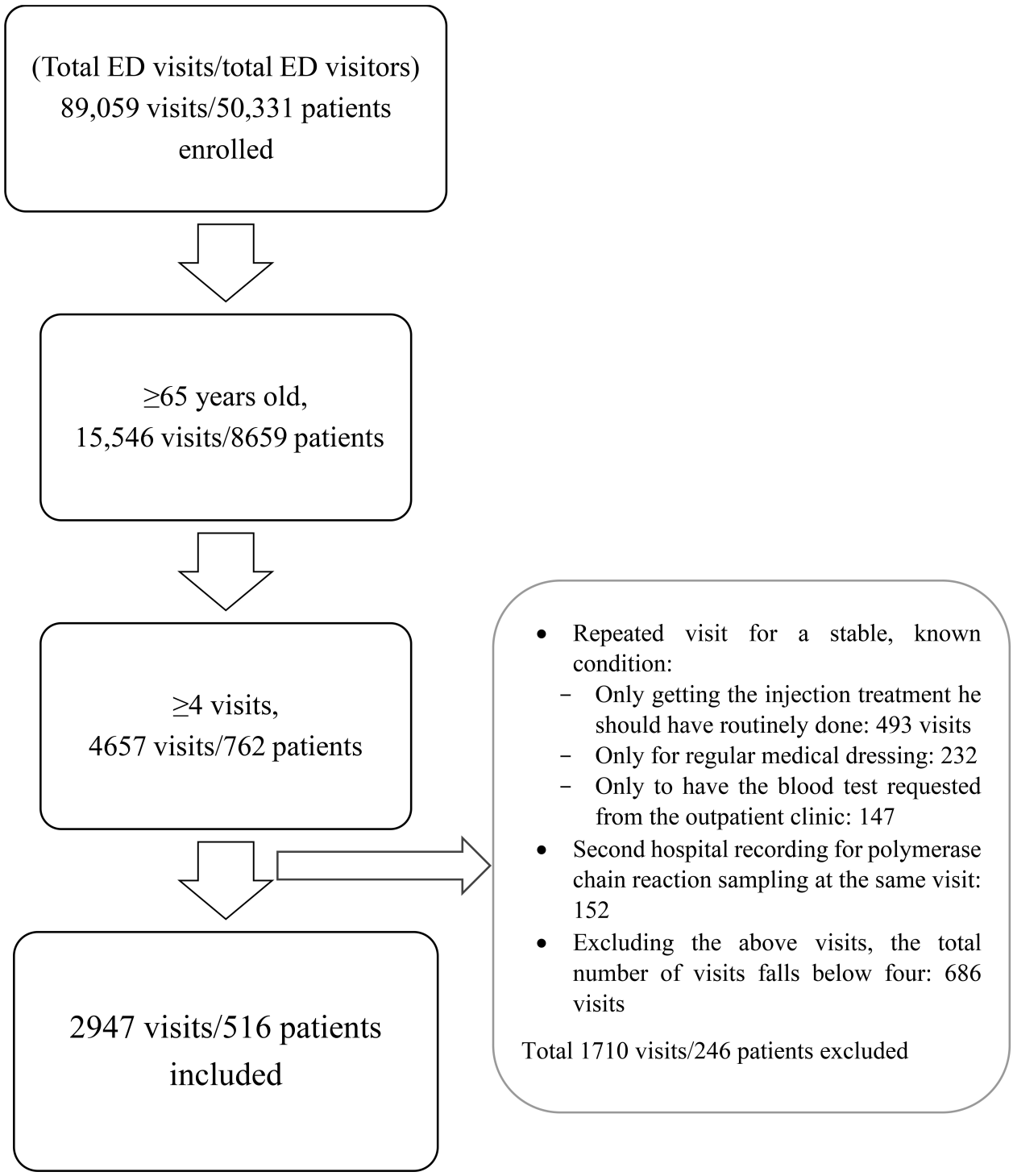

FIGURE 1. Flow diagram of the study. ED: emergency department.

0–2). Mortality rates were significantly higher among patients hospitalized two or more times compared to those who had not been admitted (Fig. 2).

The number of hospitalizations (AUC, 95% CI: 0.73, 0.69–0.78) proved to be a stronger predictor of mortality than other parameters such as median LOA, maximum LOA, tLOA, and the ratio of the number of visits to tLOA ($p < 0.001$). The cutoff values, along with sensitivity, specificity, positive predictive value, negative predictive value and both positive and negative likelihood ratios, are listed in Table 3.

Logistic regression analysis, based on the identified cutoff values, showed the odds ratios (ORs) as follows: 5.87 for the number of hospitalizations ≥1 (OR 95% CI: 3.81–9.07), 3.84 for a maximum LOA <74 days (OR 95% CI: 2.64–5.57), 3.76 for tLOA <180 days (OR 95% CI: 2.56–5.52), and 3.12 (OR 95% CI: 2.16–4.52) for a number of visits to tLOA ratio >0.032 (Table 4). Receiver operating characteristic curves for mortality are shown in Fig. 3.

TABLE 1. Comparison of patient and visit characteristics in terms of mortality.

Characteristics	Total (n = 516)	Mortality		Z/χ^2	p
		Survivors (n = 305)	Non-survivors (n = 211)		
Age, yr	74 (69–80)	73 (68–79)	77 (71–82)	−4.28	<0.001
Gender, male	282 (54.65)	157 (51.48)	125 (59.24)	3.03	0.081
Comorbidity	509 (98.64)	298 (97.70)	211 (100.00)	-	0.045*
Hypertension	400 (77.52)	230 (75.41)	170 (80.57)	1.90	0.168
Heart failure	157 (30.43)	67 (21.97)	90 (42.65)	25.21	<0.001
Diabetes	191 (37.02)	112 (36.72)	79 (37.44)	0.03	0.868
COPD	165 (31.98)	97 (31.80)	68 (32.23)	0.01	0.919
Atrial fibrillation	150 (29.07)	74 (24.26)	76 (36.02)	8.36	0.004
CAD	220 (42.64)	124 (40.66)	96 (45.50)	1.19	0.274
Psychiatric diseases	91 (17.64)	63 (20.66)	28 (13.27)	4.68	0.030
Alzheimer's	63 (12.21)	27 (8.85)	36 (17.06)	7.84	0.005
Musculoskeletal diseases	107 (20.74)	66 (21.64)	41 (19.43)	0.37	0.543
Stroke	94 (18.22)	51 (16.72)	43 (20.38)	1.12	0.290
Renal disease	86 (16.67)	46 (15.08)	40 (18.96)	1.35	0.246
Malignancy	191 (37.02)	86 (28.20)	105 (49.76)	24.88	<0.001
Liver disease	24 (4.65)	5 (1.64)	19 (9.00)	15.26	<0.001
Number of visits	5.00 (4.00–6.00)	5.00 (4.00–6.00)	5.00 (4.00–6.00)	−0.72	0.473
Frequent user (4–7 visits)	455 (88.18)	267 (87.54)	188 (89.10)	0.29	0.590
Highly-frequent user (>7 visits)	61 (11.82)	38 (12.46)	23 (10.90)		
Median LOA, d	21.25 (9–39)	24.00 (9.50–47.75)	19.00 (9.00–31.00)	−2.79	0.005
Min LOA, d	3.00 (1.00–10.00)	3.00 (1.00–11.50)	4.00 (1.00–9.00)	−0.09	0.932
Max LOA, d	86.00 (44.00–136.50)	103.00 (65.50–154.00)	60.00 (30.00–107.00)	−6.95	<0.001
tLOA, d	164.00 (89.00–239.75)	195.00 (110.00–276.00)	126.00 (62.00–186.00)	−6.86	<0.001
Number of visits/tLOA	0.03 (0.02–0.06)	0.03 (0.02–0.05)	0.04 (0.03–0.08)	−6.40	<0.001

*COPD: chronic obstructive pulmonary disease; CAD: coronary artery disease; LOA: The length of admission between two consecutive visits to the emergency department; tLOA: the duration from the first to last visits to the ED during the study period. Continuous data are shown as the median (25th–75th percentile) and analyzed with the Mann-Whitney U test. Categorical data are shown as n (%) and analyzed using the Chi-square test. *: Fisher's Exact test.*

4. Discussion

As lifespan extend in societies with advanced healthcare, the proportion of older adults encountered by medical professionals increases as well. It is reported that around 25% of all ED presentations are by older individuals [16]. Moreover, it is well-documented that patients over the age of 65 frequently visit the ED [17, 18]. These frequent visits contribute not only to the busy nature of the ED but can also negatively impact patient outcomes. Given the time constraints and the often hectic environment of the ED, providing comprehensive evaluations for older adults can be challenging [19, 20]. While there are some studies on the relationship between frequent ED visits and mortality rates, the impact of the inter-visit duration on mortality among older adults who frequently use the ED remains a significant gap in the literature.

In this study, older adults who presented to the ED at least four times accounted for 6% of all elderly patients and 19% of all elderly presentations. This pattern of older adults frequently using EDs instead of outpatient services indicates that EDs alone may not be adequately meeting their healthcare needs. The reliance on EDs could signal inadequate primary healthcare services, potentially increasing the burden on emergency services [6, 9]. Studies have shown that effective and timely delivery of primary healthcare can significantly reduce the number of ED visits and hospitalizations [21]. However, trying to provide comprehensive care for elderly patients in the ED, who often require complex management and follow-up, is unlikely to meet acceptable healthcare standards. Given the global increase in the aging population, enhancing primary healthcare and establishing dedicated geriatric emergency ser-

TABLE 2. Comparison of patient and visit characteristics between frequent and high-frequent emergency department users.

Characteristics	Total (n = 516)	Frequent user (n = 455)	High frequent user (n = 61)	Z/χ^2	*p*
Age, yr	74 (69–80)	75 (69–80)	71 (67–78.5)	−2.35	0.019
Gender, male	282 (54.65)	246 (54.10)	36 (59.02)	0.53	0.466
Comorbidity	509 (98.64)	448 (98.46)	61 (100.00)	-	1.000*
Hypertension	400 (77.52)	356 (78.24)	44 (72.13)	1.15	0.283
Heart failure	157 (30.43)	139 (30.55)	18 (29.51)	0.03	0.868
Diabetes	191 (37.02)	168 (36.92)	23 (37.70)	0.01	0.905
COPD	165 (31.98)	150 (32.97)	15 (24.59)	1.73	0.188
Atrial fibrillation	150 (29.07)	140 (30.77)	10 (16.39)	5.39	0.020
CAD	220 (42.64)	187 (41.10)	33 (54.10)	3.71	0.054
Psychiatric diseases	91 (17.64)	79 (17.36)	12 (19.67)	0.20	0.657
Alzheimer's	63 (12.21)	59 (12.97)	4 (6.56)	2.06	0.151
Musculoskeletal diseases	107 (20.74)	94 (20.66)	13 (21.31)	0.01	0.906
Stroke	94 (18.22)	88 (19.34)	6 (9.84)	3.26	0.071
Renal disease	86 (16.67)	72 (15.82)	14 (22.95)	1.97	0.161
Malignancy	191 (37.02)	165 (36.26)	26 (42.62)	0.93	0.334
Liver disease	24 (4.65)	21 (4.62)	3 (4.92)	-	0.755*
Median LOA, d	21.25 (9.00–39.00)	24.00 (11.00–42.00)	10.50 (6.50–18.75)	−5.90	<0.001
Min LOA, d	3.00 (1.00–10.00)	4.00 (1.00–11.00)	1.00 (1.00–2.50)	−2.05	<0.001
Max LOA, d	86.00 (44.00–136.50)	89.00 (45.00–143.00)	75.00 (40.50–105.50)	−4.14	<0.001
tLOA, d	164.00 (89.00–239.75)	158.00 (84.00–232.00)	212.00 (147.50–313.00)	−5.02	<0.001
Number of visits/tLOA	0.03 (0.02–0.06)	0.03 (0.02–0.06)	0.05 (0.03–0.08)	−5.07	<0.001
Number of hospitalizations	1.00 (0.00–2.00)	1.00 (0.00–2.00)	1.00 (0.00–3.00)	−2.21	0.027
None	192 (37.21)	172 (37.80)[a]	20 (32.79)[a]	0.68	0.033
1	152 (29.46)	140 (30.77)[a]	12 (19.67)[a]		
≥2	172 (33.33)	143 (31.43)[a]	29 (47.54)[b]		

*COPD: chronic obstructive pulmonary disease; CAD: coronary artery disease; LOA: The length of admission between two consecutive visits to the emergency department; tLOA: the duration from the first to last visits to the ED during the study period. Continuous data are shown as the median (25th–75th percentile) and analyzed with the Mann-Whitney U test. Categorical data are shown as n (%) and analyzed by Chi-square test ([a], [b]: Post-Hoc test (Adj. Bonferroni test). Different letters indicate a significant difference between groups, $p < 0.05$). *: Fisher's Exact test.*

vices could be key strategies for addressing these challenges.

Frequent ED users are typically older than their non-frequent counterparts [22, 23]. Elderly FUs often seek care due to exacerbations of existing comorbid conditions [15]. Research indicates that mortality rates among FUs escalate with age, revealing that comorbidities and polypharmacy are markedly more prevalent among deceased patients in this group [23–25]. In our analysis, we compared the 6-month mortality rates of 516 patients over 65 years of age who presented to the ED at least four times within a specified timeframe and were categorized as FUs. The findings indicated that mortality was predominantly higher in older individuals, while no significant differences were found in mortality rates between genders. Comorbidities were present in 99% of the study cohort. Notably, every patient who died within 6 months of follow-up had one or more comorbid conditions. These results underscore the urgent need for the expansion of geriatric emergency medicine as a specialized domain within emergency care, aimed at addressing the complex needs of older adults with multiple health conditions.

A study identified patients with more than 18 visits within a year as superusers (SUs) and reported no significant difference in 24-month mortality between SUs and FUs [22]. Similarly, our research found no significant disparity in 6-month mortality between FUs and HFUs. We suggest that the annual visit count alone may not adequately indicate mortality risk. Our hypothesis was that shorter periods between ED visits might correlate with increased mortality. Analyzing the

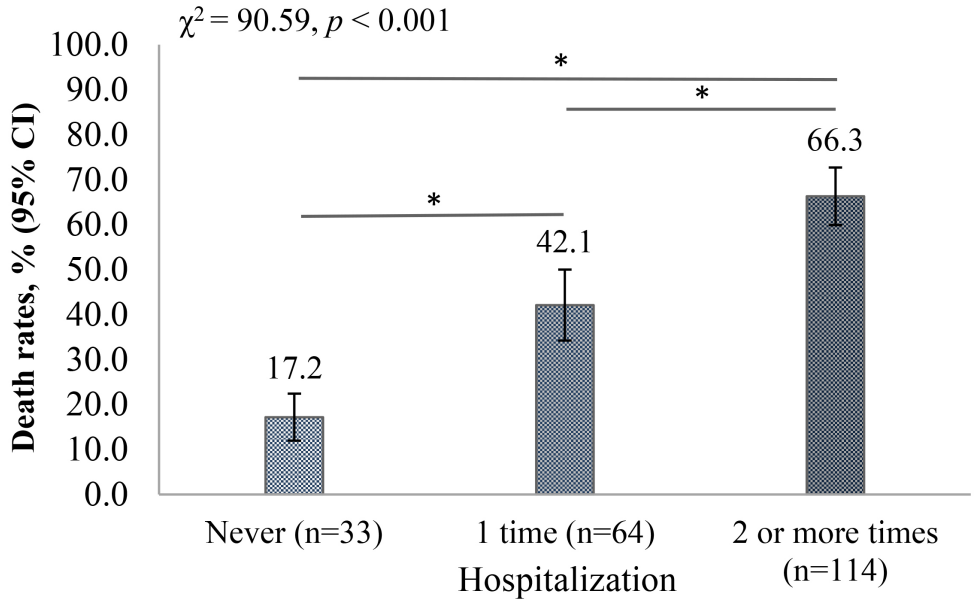

FIGURE 2. Mortality rates by number of hospitalizations. *: $p < 0.05$. CI: confidence interval.

TABLE 3. Receiver operating characteristic (ROC) analysis results and performance measures for 6-month mortality.

Characteristics	AUC, 95% CI	Cutoff	Sensitivity	Specificity	LR+	LR−	PPV	NPV
Number of visits	0.52, 0.47–0.57	5.50	0.35	0.69	1.13	0.94	0.44	0.61
Median LOA	0.57, 0.52–0.62*	33.75	0.78	0.40	1.30	0.55	0.47	0.72
Min LOA	0.50, 0.45–0.55	2.50	0.61	0.48	1.17	0.81	0.45	0.64
Max LOA	0.68, 0.63–0.78*	73.50	0.60	0.72	2.14	0.56	0.60	0.72
tLOA	0.68, 0.63–0.72*	179.50	0.74	0.56	1.68	0.46	0.54	0.76
Number of visits/tLOA	0.67, 0.62–0.71*	0.03	0.69	0.59	1.68	0.53	0.54	0.73
Number of hospitalization	0.73, 0.69–0.78*	0.50	0.84	0.52	1.75	0.31	0.55	0.83

*LR+: Positive likelihood ratio; LR−: Negative likelihood ratio; PPV: Positive predictive value; NPV: Negative predictive value; AUC: area under the curve; CI: confidence interval. *: p < 0.05. LOA: The length of admission between two consecutive visits to the emergency department. tLOA: the duration from the first to last visits to the emergency department during the study period.*

TABLE 4. Univariate logistic regression analysis of cutoff values for 6-month mortality.

Variables	Ex n (%)	Wald	*p*	Odds ratio	95% CI, Lower-Upper
Max LOA					
<74 days	126/211 (59.72)	50.205	<0.001	3.84	2.64–5.57
≥74 days (Ref.)	85/305 (27.87)	-	-	-	-
tLOA					
<180 days	157/290 (54.14)	45.893	<0.001	3.76	2.56–5.52
≥180 days (Ref.)	54/226 (23.89)	-	-	-	-
Number of visits/tLOA					
≤0.032 (Ref.)	66/245 (26.94)	-	-	-	-
>0.032	145/271 (53.51)	36.419	<0.001	3.12	2.16–4.52
Number of hospitalization					
Never (Ref.)	33/192 (17.19)	-	-	-	-
≥1	178/324 (54.94)	63.900	<0.001	5.87	3.81–9.07

Ref.: Reference group; LOA: The length of admission between two consecutive visits to the emergency department; tLOA: the duration from the first to last visits to the emergency department during the study period; CI: confidence interval.

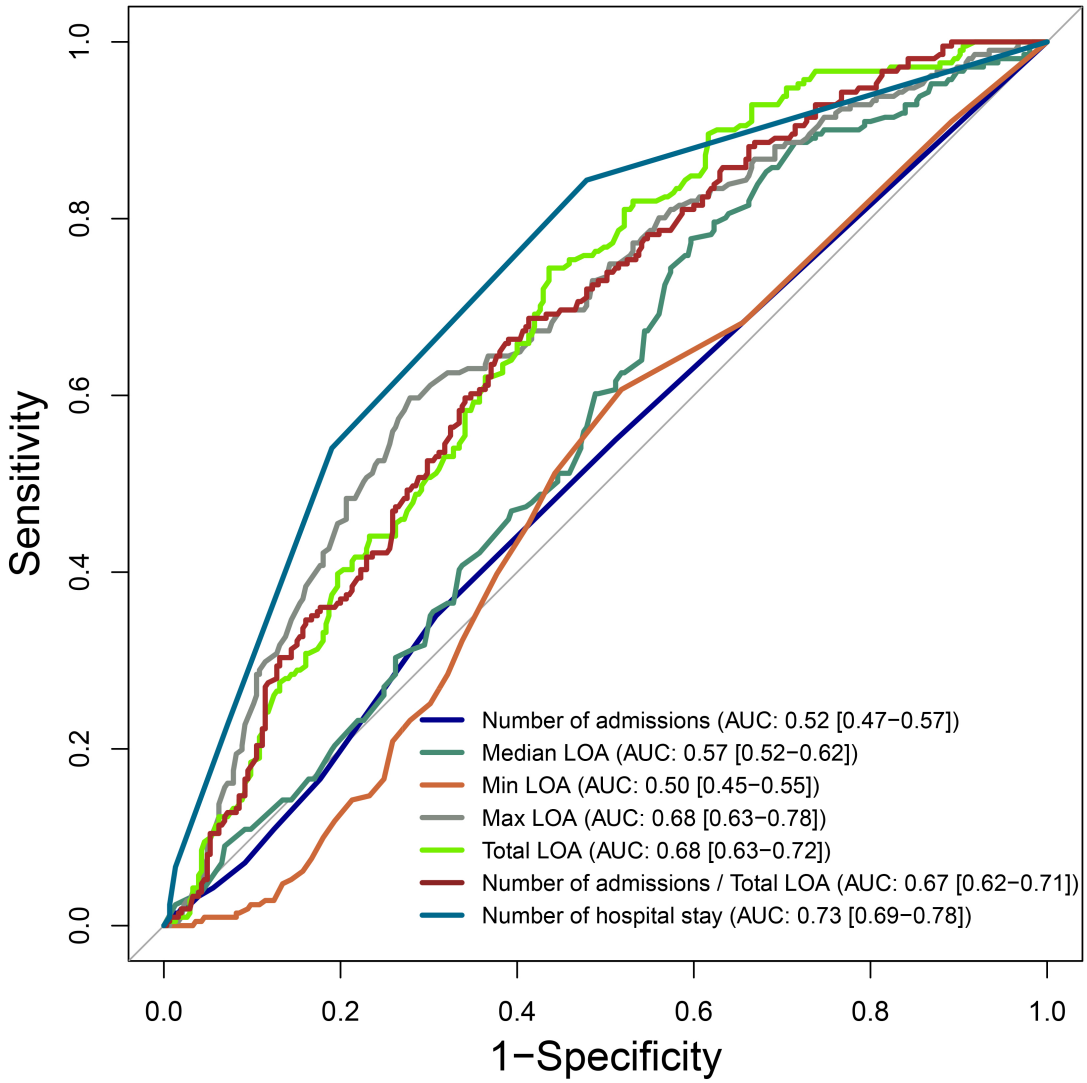

FIGURE 3. Receiver operating characteristic (ROC) curves for mortality. LOA: Length of admission between two consecutive visits to the emergency department. Total LOA: the duration from the first to last visits of the patients to the emergency department during the study period; AUC: area under the curve.

visitation patterns of all patients, we observed the following impact of inter-visit duration on 6-month mortality: the median inter-visit duration was 19 days for non-survivors compared to 24 days for survivors. The maximum interval was 60 days for non-survivors and 103 days for survivors, with visit frequencies of 0.04 for deceased patients and 0.03 for survivors. These findings indicate that reduced inter-visit duration and a higher frequency of visits among elderly patients who presented to the ED at least four times in one year significantly correlate with higher mortality rates. There is a common misconception among emergency physicians that visits by FUs are generally non-essential. Furthermore, while ED physicians often consider a patient's recent hospitalization history, they might overlook records indicating a high frequency of previous visits. Therefore, it is crucial for ED physicians to not only take into account the recent visits of elderly patients who frequently present but also to assess the frequency and intervals of these visits as indicators of mortality risk.

The median, minimum and maximum durations between visits were notably shorter in patients who died among the HFUs compared to FUs. Shorter intervals between presentations were significantly linked to higher mortality rates in the HFU group, and a greater frequency of visits was also strongly associated with increased mortality. The logistic regression analysis conducted in our study revealed that mortality rates were approximately four times higher in patients who visited the ED at least four times within a year and had the maximum interval between two consecutive presentations of less than 74 days. Furthermore, the study found that the mortality rate tripled in patients whose frequency of presentation (number of visits/total length of stay) exceeded 0.032. Additionally, patients with at least one hospitalization faced an almost six-fold higher risk of mortality.

This study had some limitations. First, it is retrospective, and although the data exhibited low variability, suggesting that a prospective design might not have been strictly necessary, this approach limits the ability to establish causality. Second, being conducted in a single center restricts our ability to account for patients' interactions with other EDs or primary healthcare services, which could influence the frequency of

ED visits. Third, it does not include potentially influential factors such as socioeconomic status, living conditions and family support, which might impact health outcomes and ED utilization patterns. Fourth, the exclusion of non-frequent ED users may limit the generalizability of our findings. Fifth, while the study suggests that shorter intervals between ED visits correlate with higher mortality among FUs, this association should be interpreted with caution. Mortality rates among ED FUs are likely influenced by the nature and severity of their medical conditions. Furthermore, patients with severe conditions requiring hospitalization at each ED visit might inherently experience longer intervals between visits, indicating a need for further investigation into the relationship between visit frequency, inter-visit duration and mortality. This necessitates a multivariate logistic regression analysis to adjust for potential confounders not accounted for in this study. Lastly, the analysis was based on data from a single year, which may not fully capture the longitudinal patterns of ED use and associated outcomes.

5. Conclusions

Our findings underscore the critical association between frequent ED visits by older adults and a higher mortality risk. Specifically, a short inter-visit duration (<74 days) was associated with approximately a fourfold increase in mortality risk. Additionally, for older adults with frequent ED usage, a history of recent hospitalization further escalated the mortality rate, increasing it six-fold. Given the demographic trend towards an aging population, the establishment of geriatric EDs tailored to meet the complex health needs of seniors, coupled with the enhancement of older adults' health through comprehensive national policies, is essential.

AVAILABILITY OF DATA AND MATERIALS

The data presented in this study are available on reasonable request from the corresponding author.

AUTHOR CONTRIBUTIONS

MCD and KS—Concept, Materials, Data Collection and Processing. MCD, KS and EŞ—Supervision, Analysis and Interpretation, Writing. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was initiated in the emergency department of a university hospital following the Duzce University Non-Invasive Health Research Ethics Committee approval with decision number 2022/96, Date: 03 June 2022. Informed consent was waived owing to the retrospective nature of the study. The study was conducted in compliance with the principles of the Declaration of Helsinki.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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