ORIGINAL RESEARCH

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Can the Manchester Triage Scale Better Predict Mortality and Outcomes When Combined with Different Frailty Tests in Geriatric Population?

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Abstract

Objective: In our study, we aimed to determine the effect of identifying patients at high risk of frailty by questioning their frailty status during triage in patients aged 65 years and older on the prediction of outcomes.

Materials and Methods: Patients were classified as frail or non-frail according to their scores on frailty tests. According to the Manchester triage system, T2-T3 patients were classified as high priority and T4-T5 patients as low priority. According to the length of stay in the emergency department, patients were divided into two groups as under and over 4 h. The endpoints of the patients were hospitalization, treatments, and mortality. Patients grouped according to triage priorities and frailty risks with the program of research to integrate services for the maintenance of autonomy (PRISMA-7), identifying the seniors at risk, and FRESH tests were statistically analyzed according to separate outcomes, and the relationship between them was investigated.

Results: The study was conducted with 331 elderly patients aged between 65 and 99 years with a median age of 75 years. The PRISMA-7 test predicts admission, mortality, emergency department length of stay (EDLOS) in low priority patients ($p<0.05$), treatment and mortality are mostly affected by triage scores, but admission and EDLOS can be predicted by frailty tools.

Conclusion: The integration of frailty questioning into triage systems will prevent elderly patients presenting with atypical findings and non-specific complaints from being incorrectly classified as low triage priority.

Keywords: Triage, geriatric medicine, frailty

Introduction

The presence of non-urgent cases, comprising approximately 30% of emergency service admissions, obliges emergency care providers to differentiate between urgent and nonurgent applications, which are complex, costly, and time-consuming [1]. Triage plays an important role in rapidly assessing patients who require further evaluation and treatment. Older patients constitute 12%-24% of emergency service admissions [2]. These patients have more comorbidities than the young; they also have higher rates of hospitalization and mortality [3]. The elderly are inappropriately triaged more commonly, which leads to longer waiting times, delayed access to treatment, and more frequent adverse outcomes [4]. In recent years, the science of emergency medicine has increasingly focused on creating efficient systems to determine the priority and urgency of older patients [5]. Triage systems classify individuals according to the urgency of the care they need and optimize resource use in the emergency room. Five-step triage systems widely used around the world, such as the Manchester triage system (MTS) and the Canadian triage and acuity scale (CTAS), were originally designed to screen heterogeneously dispersed patients as a homogeneous population, regardless of age and gender. However, the validity of triage systems applied to older patients in the emergency

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department (ED) has been investigated in only some studies [6-8]. Frailty is a geriatric syndrome characterized by increased susceptibility to adverse events (e.g., injury, hospitalization, and death); its assessment is based on a disability accumulation index or phenotype [9]. A scale integrated with triage systems that enables rapid screening of frailty in the ED could be useful for predicting patient outcomes. This study aimed to evaluate the effect of asking questions about frailty during triage on the prediction of outcomes [mortality, hospitalization in wards and intensive care units (ICUs), and advanced medical intervention] in patients aged 65 or older.

Materials and Methods

This study sought to examine the impact on various outcomes of the frailty status and triage level of patients aged 65 years or older who presented to the ED. The study was conducted in accordance with the principles of Good Clinical Practice and the Declaration of Helsinki and was approved by the İstanbul Medeniyet University, Göztepe Training and Research Hospital Clinical Research Ethics Committee (approval number: 2021/0364, date: 30.06.2021).

Patients and the Setting

Patients aged 65 years or older who presented to the ED of a tertiary hospital between September 1 and October 31, 2021 were included in the study after providing informed consent. Referrals from other healthcare facilities, patients who could not express themselves, and those who required immediate medical treatment were excluded. The patient's demographic information (including age and gender), chronic disease history, and multiple drug use status were recorded at the time of admission. Patients with two or more chronic diseases were considered to have multimorbidities. The frailty tools were assessed with healthcare givers or relatives of the patients where applicable. The program of research to integrate services for the maintenance of autonomy (PRISMA-7), identifying the seniors at risk (ISAR), and FRESH frailty scales were used to assess frailty [10-12].

One month after inclusion in the study, the patients' records were retrospectively reviewed, and the following outcomes were recorded: duration of ED stay, blood transfusion, hemodialysis, angiography, surgical intervention in the ED or ward, discharge, hospitalization in a service or an ICU, and in-hospital mortality. After the triage was completed, frailty tests were administered by resident physicians who were not involved in the study. A one-on-one, question-and-answer method was used. If necessary, the answers were confirmed with the patients' relatives. Because the FRESH and ISAR tests were not validated in Turkish, they were translated into Turkish by two independent translators, and a consensus was reached on the Turkish text. This was then translated back into English by two additional translators to ensure its equivalence with the original version. The Turkish version was found to be adequate and was used in the evaluation. The PRISMA-7 frailty scale has been validated for use in the Turkish language [13].

Frailty Tests

The PRISMA-7 test is a survey consisting of seven questions, with answers of "yes" or "no." The questionnaire assesses factors such as patient age and gender, presence of health problems that restrict activities or require home care, need for support while walking, and need for regular assistance. Each affirmative answer is assigned one point, and a score of three or more points signifies increased frailty [11].

The ISAR test comprises six binary questions. This study examines functional dependency, recent hospitalization, difficulties with memory and vision, and the use of multiple medications. Each affirmative answer is given a score of one point, and a score of two or more points indicates increased frailty. The ISAR tool has been validated in EDs [12].

The FRESH test comprises four binary questions that can be answered either "yes" or "no." The questions evaluate the presence of fatigue after simple physical exertion, recent episodes of weakness, recent falls or fear of falling, and the need for assistance with daily activities. Each affirmative answer is assigned one point, and a score of two or more points indicates increased frailty. The FRESH tool was developed in the ED [10].

Each frailty assessment took approximately 1 minute to complete.

Based on the results of the assessments, the patients were classified into two groups: frail and non-frail. In accordance with the MTS, the participants in the T2-T3 category were deemed to be of high priority, whereas those in the T4-T5 category were considered low priority [14]. The patients were further divided into two groups based on emergency department length of stay (EDLOS), with those who stayed for less than 4 h being placed in one group and those who stayed for more than 4 h being placed in another group. The participants were then grouped according to their hospitalization and discharge status, such as discharge to a service or an ICU. Those who underwent advanced treatment procedures, such as surgical intervention, blood transfusion, hemodialysis, and angiography, were divided into two groups, with one group consisting of those who received such procedures and the other group consisting of those who did not. Finally, the patients were classified as deceased or alive based on their survival status at the end of their hospital stay. Separate analyses were performed on participants grouped according to triage priorities and frailty risks, and the relationship between these factors and outcomes was investigated.

Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences software (version 21, IBM Corp., Armonk, NY). Descriptive statistical methods were employed to evaluate the data, including mean, standard deviation, median, frequency, percentage, minimum, and maximum. The triage, frailty, and multimorbidity status of the patients were compared using cross-tables based on the outcomes of service/ICU hospitalization, advanced treatment, EDLOS of 4 h or more, and mortality. Pearson's chi-square test or Fisher's exact test was used to determine the differences between the groups. The ability of the frailty scales to predict ward/ICU admission, advanced treatment, EDLOS of 4 h or more, and mortality was analyzed using receiver operating characteristic (ROC) curve analysis. Sensitivity, specificity, and areas under the curve were calculated based on the threshold values. The results were considered statistically significant if the p-value was less than 0.05.

Results

The study was conducted with 331 older patients whose ages ranged between 65 and 99 years; the median age was 75. Of the 331 participants, 62.2% (n=206) were women. The distribution of patients among the age groups 65-74, 75-84, and 85 years or older were 46.83%, 30.82%, and 22.35%, respectively.

In terms of triage classification, most participants (51.4%) were classified as T3 according to the MTS, with T2, T4, and T5 representing 5.4%, 14.8%, and 28.4% of the patients, respectively. The results of the PRISMA-7 test revealed that 47.7% (n=158) of the participants were frail, whereas 52.6% (n=174) and 57.4% (n=190) were found to be frail according to the ISAR and FRESH tests, respectively.

Of all the patients, 82.8% (n=274) did not undergo any advanced treatments, whereas 7.9% (n=26) underwent surgical intervention. Other advanced treatment procedures performed included blood transfusion (3.6%), hemodialysis (5.1%), and coronary angiography (0.6%). After hospital follow-up, 73.1% (n=242) of the patients were discharged, 7% (n=89) were hospitalized, and 9.4% (n=31) died in hospital.

Chronic diseases were prevalent in 81% (n=269) of the participants, with 53.5% (n=177) having at least two chronic conditions. The most common ones were hypertension (n=217, 65.6%), diabetes mellitus (n=98, 29%), and coronary artery disease (n=79, 23.9%). Other chronic conditions included arrhythmia (n=16, 4.8%), chronic kidney failure (n=31, 9.4%), chronic obstructive pulmonary disease (n=37, 11.2%), cerebrovascular disease (n=24, 7.3%), dementia (n=15, 4.5%), endocrinopathies (n=14, 4.2%), malignancy (n=37, 11%), and cirrhosis (n=1, 0.3%).

Tables 1 and 2 present an evaluation of the MTS and frailty scales in relation to admission and discharge, treatment, and mortality. Furthermore, the results of the ROC analysis of the frailty scales are provided on the basis of the patients' hospitalization/ICU admission, treatment, and mortality status in accordance with the MTS. Table 3 shows the logistic regression analyses between patient characteristics and outcomes.

Discussion

The aim of this study was to examine the impact of determining the frailty status of older patients (aged 65 or above) during the triage process on the early identification of adverse outcomes. This aim was motivated by the recognition that the acutely evolving health issues of older adults are often obscured by atypical symptoms (e.g., altered consciousness and overall debility) and that these patients are more likely to have multiple comorbidities than younger populations, which could result in undertriage [7]. The results indicated a low sensitivity of MTS in this patient population, which led to prolonged waiting times and a higher incidence of adverse outcomes. This highlights the need for a more thorough assessment of older adults during triage to ensure timely and appropriate medical intervention [15]. In a prior investigation of the efficacy of MTS, it was discovered that its sensitivity was inadequate, particularly in the pediatric population. However, recent updates to the scale have alleviated this problem in such a population. Thus, the implementation of similar modifications for the elderly would result in improved outcomes [16]. In 2016, a frailty assessment was integrated into the CTAS following recognition of the scale's tendency toward undertriage in the older population. The frailty status of patients classified as low priority through the triage process was evaluated, and those identified as having a high risk of frailty had their triage priority elevated [17]. In our view, the selection of frailty tools for use in ED triage should prioritize attributes such as efficiency, ease of administration, and avoidance of extensive examinations. This consideration arises from the urgent and time-sensitive nature of the triage process, where swift decisions are crucial and patients must be promptly allocated to appropriate treatment areas. Consequently, the chosen tools should be designed to expedite the triage process without compromising the quality of patient assessment and care. The results of this study were consistent with previous literature that found that patients with higher triage priority had a higher rate of hospitalization, mortality, need for additional therapeutic measures, and extended EDLOS compared with those with lower triage priority [18]. The literature shows that frailty predicts hospitalization, length of hospital stay, functional decline, and adverse outcomes (e.g., mortality) [19].

Table 1. Evaluation of the Manchester triage system and frailty scales based on patients' admission/discharge, treatment, and mortality status

General assessment of the Manchester triage system and frailty scales

		Admission n (%)			Treatment n (%)			Mortality n (%)			EDLOS n (%)		
		Yes	No	p	Yes	No	p	No	Yes	p	<4 h	>4 h	p
MTS	Low	20 (9.1)	199 (90.9)	<0.001	16 (7.3)	203 (92.7)	<0.001	212 (96.8)	7 (3.2)	<0.001	188 (85.8)	31 (14.2)	<0.001
	High	43 (61.6)	69 (38.4)		41 (36.6)	71 (63.4)		87 (77.7)	25 (22.3)		37 (33)	75 (67)	
PRISMA-7	Yes	65 (41.1)	93 (58.9)	<0.001	45 (28.5)	113 (71.5)	<0.001	132 (83.5)	26 (16.5)	<0.001	83 (52.5)	75 (47.5)	<0.001
	No	24 (13.9)	149 (86.1)		12 (6.9)	161 (93.1)		167 (96.5)	6 (3.5)		142 (82.1)	31 (17.9)	
ISAR	Yes	64 (36.8)	110 (63.2)	<0.001	44 (25.3)	130 (74.7)	<0.001	147 (84.5)	27 (15.5)	<0.001	97 (55.7)	77 (44.3)	<0.001
	No	25 (15.9)	132 (84.1)		13 (8.3)	144 (91.7)		152 (96.8)	5 (3.2)		128 (81.5)	29 (18.5)	
FRESH	Yes	66 (34.7)	124 (65.3)	<0.001	46 (24.2)	144 (75.8)	<0.001	163 (85.8)	27 (14.2)	<0.001	111 (58.4)	79 (41.6)	<0.001
	No	23 (16.3)	118 (83.7)		11 (7.8)	130 (92.2)		136 (96.5)	5 (3.5)		114 (80.9)	27 (19.1)	

Low-priority (T4-T5) patients according to the Manchester triage system

		Admission n (%)			Treatment n (%)			Mortality n (%)			EDLOS n (%)		
		Yes	No	p	Yes	No	p	No	Yes	p	<4 h	>4 h	p
PRISMA-7	Yes	14 (16.7)	70 (83.3)	0.002	12 (14.3)	72 (85.7)	0.002	78 (92.9)	6 (7.1)	0.014	64 (76.2)	20 (23.8)	0.001
	No	6 (4.4)	129 (95.6)		4 (3)	131 (97)		134 (99.3)	1 (0.7)		124 (91.9)	11 (8.1)	
ISAR	Yes	14 (13.9)	87 (86.1)	0.025	10 (9.9)	91 (90.1)	0.172	97 (96)	4 (4)	0.706	79 (78.2)	22 (21.8)	0.003
	No	6 (5.1)	112 (94.9)		6 (5.1)	112 (94.9)		115 (97.5)	3 (2.5)		109 (92.4)	9 (7.6)	
FRESH	Yes	14 (12.6)	97 (87.4)	0.07	11 (9.9)	100 (90.1)	0.133	105 (94.6)	6 (5.4)	0.119	91 (82)	20 (18)	0.096
	No	6 (5.6)	102 (94.4)		5 (4.6)	103 (95.4)		107 (99.1)	1 (0.9)		97 (89.8)	11 (10.2)	

High-priority (T2-T3) patients according to the Manchester triage system

		Admission n (%)			Treatment n (%)			Mortality n (%)			EDLOS n (%)		
		Yes	No	p	Yes	No	p	No	Yes	p	<4 h	>4 h	p
PRISMA-7	Yes	51 (68.9)	23 (31.1)	0.026	33 (44.6)	41 (55.4)	0.014	54 (73)	20 (27)	0.095	19 (25.7)	55 (74.3)	0.021
	No	18 (47.4)	20 (52.6)		8 (21.1)	30 (78.9)		33 (86.8)	5 (13.2)		18 (47.4)	20 (52.6)	
ISAR	Yes	50 (68.5)	23 (31.5)	0.04	34 (46.6)	39 (53.4)	0.003	50 (68.5)	23 (31.5)	0.001	18 (24.7)	55 (75.3)	0.01
	No	19 (48.7)	20 (51.3)		7 (17.9)	32 (82.1)		37 (94.9)	2 (5.1)		19 (48.7)	20 (51.3)	
FRESH	Yes	52 (65.8)	27 (34.2)	0.156	35 (44.3)	44 (55.7)	0.009	58 (73.4)	21 (26.6)	0.094	20 (25.3)	59 (74.7)	0.007
	No	17 (51.5)	16 (48.5)		6 (18.2)	27 (81.8)		29 (87.9)	4 (12.1)		17 (51.5)	16 (48.5)	

Manchester triage score low-priority (T4-T5) patients with increased frailty risk and Manchester triage score high-priority (T2-T3) patients with no frailty risk

		Admission n (%)			Treatment n (%)			Mortality n (%)			EDLOS n (%)		
		Yes	No	p	Yes	No	p	No	Yes	p	<4 h	>4 h	p
PRISMA-7	Group 1	14 (16.7)	70 (83.3)	<0.001	12 (14.3)	72 (85.7)	0.35	78 (92.9)	6 (7.1)	0.31	64 (76.2)	20 (23.8)	0.002
	Group 2	18 (47.4)	20 (52.6)		8 (21.1)	30 (78.9)		33 (86.8)	5 (13.2)		18 (47.4)	20 (52.6)	
ISAR	Group 1	14 (13.9)	87 (86.1)	<0.001	10 (9.9)	91 (90.1)	0.247	97 (96)	4 (4)	0.67	79 (78.2)	22 (21.8)	0.001
	Group 2	19 (48.7)	20 (51.3)		7 (17.9)	32 (82.1)		37 (94.9)	2 (5.1)		19 (48.7)	20 (51.3)	
FRESH	Group 1	14 (12.6)	97 (87.4)	<0.001	11 (9.9)	100 (90.1)	0.222	105 (94.6)	6 (5.4)	0.23	91 (82)	20 (18)	<0.001
	Group 2	17 (51.5)	16 (48.5)		6 (18.2)	27 (81.8)		29 (87.9)	4 (12.1)		17 (51.5)	16 (48.5)	

MTS: Manchester triage system, EDLOS: Emergency department length of stay, PRISMA-7: The program of research to integrate services for the maintenance of autonomy, ISAR: Identifying the seniors at risk, FRESH: Short screening instrument for continuum of care for frail elderly people, Group 1: Patients who are frail according to the assessment tool and have low Manchester triage score, Group 2: Patients who have high Manchester triage score and are not frail according to the assessment tool

Table 2. Results of ROC analysis of frailty scales based on patients' hospitalization/intensive care unit admission, advanced treatment, and mortality status according to the Manchester triage scale

Results of the ROC analysis of patients with low priority according to the Manchester triage scale				
Admission	**Area under the curve**	**p**	**Sensitivity (%)**	**Specificity (%)**
PRISMA-7	0.730	0.001	70	64.8
ISAR	0.678	0.009	70	56.3
FRESH	0.678	0.009	70	51.3
Advanced treatment				
PRISMA	0.725	0.061	75	64.5
ISAR	0.646	0.069	62.5	55.2
FRESH	0.646	0.069	68.8	50.7
Mortality				
PRISMA	0.803	0.059	85.7	63.2
ISAR	0.694	0.088	57.1	54.2
FRESH	0.651	0.072	85.7	50.5
Emergency department length of stay				
PRISMA	0.666	0.052	64.5	66
ISAR	0.674	0.046	71	58
FRESH	0.622	0.054	64.5	51.6
Results of the ROC analysis of patients with high priority according to the Manchester triage scale				
Admission	**Area under the curve**	**p**	**Sensitivity (%)**	**Specificity (%)**
PRISMA	0.579	0.056	73.9	46.5
ISAR	0.552	0.058	72.5	46.5
FRESH	0.563	0.057	75.4	37.2
Advanced treatment				
PRISMA	0.603	0.054	80.5	42.3
ISAR	0.618	0.053	82.9	45.1
FRESH	0.632	0.053	85.4	38
Mortality				
PRISMA	0.641	0.059	80	37.9
ISAR	0.693	0.059	92	42.5
FRESH	0.640	0.059	84	33.3
Emergency department length of stay				
PRISMA	0.608	0.059	73.3	48.6
ISAR	0.675	0.056	73.3	51.4
FRESH	0.668	0.058	78.7	45.9

ROC: Receiver operating characteristic, PRISMA-7: The program of research to integrate services for the maintenance of autonomy, ISAR: Identifying the seniors at risk, FRESH: Short screening instrument for continuum of care for frail elderly people

However, the extent of the relationship between frailty and triage priority remains uncertain. Further research is expected to shed light on the significance of frailty evaluation during triage and to assist in the clinical decision-making process. The results of O'Caoimh et al.'s [20] study, which evaluated the effectiveness of the PRISMA-7 and ISAR frailty scales in identifying patients at high and low risk of frailty in Ireland, showed that PRISMA-7 was significantly better at making this distinction than ISAR. According to the study, with PRISMA-7, the best sensitivity and specificity values for distinguishing high-risk patients from low-risk ones were found for the recommended threshold value of three points. With ISAR, sensitivity was high for the recommended threshold value of two points, but specificity was weak. With this scale, the threshold value that provides the optimum sensitivity and specificity values is three [20]. Triage is a system that evaluates patients' medical urgency and guides them to receive prompt and suitable medical care [21]. Proper application of frailty scores and directing patients to specific treatment areas can enhance the efficiency of providing appropriate medical

Table 3. Logistic regression analysis of patient characteristics and outcomes

	Admission to the hospital				Advanced treatment				Mortality				Emergency department length of stay			
	B	S.E.	Odds ratio	p	B	S.E.	Odds ratio	p	B	S.E.	Odds ratio	p	B	S.E.	Odds ratio	p
Patient characteristics																
Sex	-0.216	0.383	0.869	0.573	-0.505	0.406	0.598	0.215	-0.042	0.040	0.950	0.292	-0.395	0.367	0.696	0.282
Diabetes mellitus	0.511	0.454	1.096	0.260	0.744	0.473	1.445	0.115	0.020	0.524	1.254	0.970	0.355	0.428	1.381	0.407
Hypertension	0.660	0.602	1.173	0.273	0.071	0.618	0.566	0.908	-0.150	0.644	1.375	0.816	0.301	0.547	1.701	0.582
Ischemic heart disease	0.459	0.453	1.307	0.312	-0.355	0.456	0.526	0.436	-0.068	0.772	1.560	0.930	-0.011	0.424	1.118	0.980
Arrhythmias	0.897	0.707	2.160	0.205	0.771	0.701	1.694	0.272	0.111	0.597	0.305	0.853	-0.645	0.700	0.579	0.357
Chronic kidney disease	1.501	0.602	4.133	0.013	1.574	0.552	3.612	0.004	-1.742	1.279	2.414	0.173	1.682	0.587	5.557	0.004
Chronic obstructive pulmonary disease	0.628	0.506	1.254	0.215	0.154	0.549	0.907	0.779	0.478	0.612	0.775	0.434	0.313	0.497	1.419	0.528
Cerebrovascular disease	0.034	0.646	0.724	0.958	0.448	0.628	1.158	0.476	-0.101	0.705	0.740	0.886	0.540	0.633	1.854	0.394
Dementia	-1.054	0.892	0.279	0.237	-1.646	1.157	0.158	0.155	-0.988	0.853	0.00	0.247	-0.557	0.768	0.590	0.468
Endocrine diseases	-0.506	0.969	0.396	0.602	0.249	0.979	1.146	0.799	-20.925	9325.993	0.000	0.998	-1.118	0.959	0.291	0.244
Malignancy	0.360	0.666	0.933	0.589	0.440	0.657	0.601	0.503	-18.122	9764.797	1.825	0.999	1.250	0.580	4.412	0.031
Frailty tool																
PRISMA-7	0.182	0.164	0.996	0.267	0.199	0.172	0.896	0.246	-21.076	40192.970	1.309	1.000	-0.167	0.147	0.700	0.257
ISAR	-0.174	0.200	0.766	0.384	-0.141	0.203	0.912	0.485	0.225	0.258	1.417	0.383	0.262	0.194	1.313	0.176
FRESH	0.283	0.203	1.540	0.163	0.384	0.218	1.315	0.079	0.381	0.261	0.741	0.145	0.171	0.186	1.737	0.357

B: Coefficient estimates, S.E.: Standard errors, PRISMA-7: The program of research to integrate services for the maintenance of autonomy, ISAR: Identifying the seniors at risk, FRESH: Short screening instrument for continuum of care for frail elderly people

services tailored to their urgent medical conditions. The outcome of whether a patient is hospitalized in the ICU or a ward can be used as a measure of successful triage. In our study, the PRISMA-7 frailty scale was found to be more successful than the ISAR and FRESH frailty scales in terms of predicting hospitalization, need for further treatment, mortality, and EDLOS.

There are several functional scales that measure frailty, but they are not widely used in clinical practice in the ED [22]. A recent study identified frailty as a strong predictor of severe adverse outcomes within the first 30 days after discharge from the emergency room. However, this study used a 44-item scale, which is not suitable for rapid screening in the ED [23].

Mowbray et al. [17] conducted a study in Canada involving 2,153 patients, which evaluated the association between frailty and triage priority status in terms of adverse outcomes, such as hospitalization, length of hospital stay, and repeat ED visits. In the study, CTAS was used for measuring triage priority, while a software program based on a frailty scale developed by Brousseau et al. [24] was used for frailty. An examination was performed to establish the correlation between frailty and hospitalization, length of stay, and repeated visits to the ED. The results indicated that only hospitalization was predictable through triage status. Moreover, the authors found that patients who were assigned a low triage priority but possessed a high risk of frailty experienced a higher rate of hospitalization and prolonged lengths of stay after discharge [17].

In the Netherlands, Blomaard et al. [25] investigated the relationship between triage urgency, as assessed by MTS, and adverse outcomes in 2,608 patients. In addition to MTS, this study used the acutely presenting older patient (APOP) geriatric rating scale. The results showed that the risk of 30-day mortality increased with higher triage urgency and higher APOP risk. Furthermore, patients with low triage urgency but high APOP risk were found to have a significantly higher mortality rate than those with low APOP risk.

In accordance with the existing literature, our study found that high triage urgency according to the MTS and high risk of frailty according to the PRISMA-7, ISAR, and FRESH frailty scales were independently associated with increased hospitalization, need for advanced treatment, mortality, and EDLOS. The results showed that patients with a high risk of frailty according to PRISMA-7, particularly those classified as low urgency according to the MTS, were more likely to experience the negative outcomes evaluated in the study. However, this association was not significant when using the FRESH frailty scale. These findings suggest that incorporating PRISMA-7 into the triage process and identifying patients at high risk of frailty could lead to more efficient allocation of resources and improved patient outcomes.

Study Limitations

Despite being a pioneering effort, our study presents several limitations concerning integrating frailty assessment into a triage system and achieving universal validity. These limitations include the single-center design of our study, limited sample size, and brief follow-up. These factors may impact the generalizability and sustainability of our findings and call for further research with larger and more diverse patient populations.

Conclusion

Our study highlights the significance of considering frailty in low-priority patients classified under MTS. The inclusion of frailty assessment in the triage process could avoid the misclassification of older patients as low priority. By taking frailty into account, the negative outcomes associated with delays in treatment can be reduced.

Ethics

Ethics Committee Approval: The study was conducted in accordance with the principles of Good Clinical Practice and the Declaration of Helsinki and was approved by the İstanbul Medeniyet University, Göztepe Training and Research Hospital Clinical Research Ethics Committee (approval number: 2021/0364, date: 30.06.2021).

Informed Consent: Required informed consent was provided.

Authorship Contributions

Surgical and Medical Practices: O.C.B., Concept: O.C.B., K.A., G.A.S., Design: O.C.B., K.A., G.A.S., Data Collection or Processing: O.C.B., Analysis or Interpretation: O.C.B., G.A.S., Literature Search: O.C.B., K.A., G.A.S., Writing: K.A., G.A.S.

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