International Journal of Gerontology 15 (2021) 145–149
https://doi.org/10.6890/IJGE.202104_15(2).0011

International Journal of Gerontology

journal homepage: http://www.sgecm.org.tw/ijge/

Original Article

Can Frailty Tools Predict the Mortality, Readmission, and Hospitalization of Geriatric Emergency Attenders?

Gorkem Alper Solakoglu [a *], Kurtulus Aciksari [a], Nur Aleyna Adak [b]

[a] *Emergency Medicine Department, Istanbul Medeniyet University, Istanbul, Turkey,* [b] *School of Medicine, Istanbul Medeniyet University, Istanbul, Turkey*

ARTICLE INFO

Accepted 23 December 2020

Keywords:
frailty,
emergency department,
patient readmission,
hospital mortality

SUMMARY

Background: The population in Turkey, as well as globally, is aging, and frail patients appear more frequently in emergency departments. Our study aims to identify various frailty tools to stratify risk for patients in terms of inpatient mortality, the prevalence of hospitalization, the length of hospital stay, and 30-day readmission.

Materials and Method: In an emergency department, geriatric patients over the age of 65 were assessed using the PRISMA-7 questionnaire, the Clinical Frailty Scale (CFS), and the Identification of Seniors at Risk (ISAR) tool to predict the possibility of hospitalization, 30-day readmission, and mortality. In addition, demographic and socioeconomic parameters were analyzed.

Results: In total, 137 patients with a mean age of 80.19 ± 8.12 years were assessed. Both the CFS and ISAR tools failed to predict mortality, 30-day readmission, and hospitalization ($p > .05$). The PRISMA-7 tool was not statistically related to mortality ($p = .018$) or hospitalization ($p = .038$) but did predict 30-day readmission ($p = .677$). The average number of hospitalization days of the patients was 9.96 ± 9.78 (1–45 days). There was no statistically significant relation between age, monthly income, distance to hospital, and polypharmacy to mortality, 30-day readmission, hospitalization, and outpatient clinic admission ($p > .05$).

Conclusion: The PRISMA-7 questionnaire, but not the CFS or ISAR, might be used by geriatric emergency attenders to assess risk for hospitalization and mortality. However, the development of more standardized and prospective study protocols is needed to draw further conclusions.

1. Introduction

The term "frailty" refers to a geriatric, multidimensional, and multifactorial syndrome that increases vulnerability by causing loss of energy, health, and physical and cognitive abilities.[1] Frailty has been found to increase the risk of falling due to loss of muscle mass and strength and leads to the physical inadequacy of individuals, hospitalization time, comorbidity, and mortality.[2] Therefore, when considering its prevalence and consequences, frailty can cause grave problems for individuals, their relatives, health services, and society. Based on these reasons and the increasing average age of the population worldwide, understanding and managing the medical and social dimensions of frailty has become more important.

The elderly population in Turkey, as well as globally, is increasing. This means that the elderly population in emergency departments is also increasing, and emergency services constitute a critical interface between this population and hospitals. For patients admitted to the emergency department, an emergency physician usually makes diagnostic and treatment decisions after conducting an initial assessment. However, elderly and frail patients often have multiple health problems and, therefore, require more resources. These patients usually have several comorbidities and often experience adverse outcomes after being discharged from the emergency department.[3] A timely determination of frailty could be beneficial for health professionals to predict intervention outcomes, to prevent poor outcomes, and to manage the health needs of elderly patients in the long term. Therefore, convenient tools are needed to make diagnostic and treatment decisions regarding frail patients to predict possible risks such as mortality, hospitalization, length of stay, and readmission to emergency departments as well as outpatient clinics. Frailty screening tools, which can determine the risk of poor outcomes and the need for further geriatric assessment in elderly patients, can be valuable in emergency departments when they are applied appropriately.[4]

Our study aimed to identify various frailty tools to stratify risk for patients in terms of inpatient mortality, prevalence of hospitalization, hospital length of stay, 30-day readmission, and outpatient clinic admissions.

2. Materials and methods

2.1. Sample collection

Patients over the age of 65 who came to the emergency department of a research and training hospital between March 1, 2019 and

* Corresponding author. Emergency Medicine Department , Istanbul Medeniyet University, Eğitim Mah. Dr. Erkin Cad. Kadıköy/İstanbul 34722.
E-mail address: alper.solakoglu@medeniyet.edu.tr (G. Alper Solakoglu)

May 1, 2019 and were triaged as level 3 or 4 according to the Manchester Triage Scale[5] were enrolled in the study prospectively after providing consent. Patients who were aphasic, had limited communication skills, and/or were unable to participate in the evaluation were excluded from the study. Age, gender, the distance of their residence to the hospital emergency department, monthly income status in U.S. dollars (USD) according to the Turkish Central Bank rate on the day of admission, medications, comorbid diseases, frailty indices, hospitalization status, in-hospital length of stay, in-hospital mortality, 30-day emergency department readmission, and 30-day outpatient clinic presentation were determined as parameters to be analyzed.

The Programme de Recherche sur l'Intégration des Services pour le Maintien de l'Autonomie questionnaire (PRISMA-7), the Identification of Seniors at Risk (ISAR) tool, and the Clinical Frailty Scale (CFS) were used to screen patients after the standard emergency department triage was completed. The frailty screening was conducted at the patient's bedside after the initial treatment and diagnostic approaches were completed by the research assistants. Where patients were deemed unable to comply due to sensory or cognitive impairment, caregivers, family members, or those attending the patient — where available and with the permission of the patient — were invited to assist. The answers of the patients were double-checked by the caregivers where applicable. This study was conducted in accordance with Good Clinical Practice guidelines and the principles of the Declaration of Helsinki. Ethical approval was obtained from the Medeniyet University ethical committee (2018/0469-02.01.2019).

2.2. Frailty tools

Table 1 summarizes the characteristics of the utilized frailty tools.

The PRISMA-7 questionnaire consists of seven yes/no questions directed to patients. The questions are about the patient's age and gender, whether the patient has health problems that affect their activity or that require them to stay at home, whether they require regular assistance, if they receive support while walking, and whether they can count on someone if they need help. Each question that is answered "yes" is given one point, and a total of three or more points indicate an increased risk of frailty. This scale has been validated in the Turkish population.[6]

The ISAR tool consists of six yes/no questions and is designed to be used in the emergency department. Two of the six questions are about functional dependence while the rest focus on recent hospitalization, memory impairments, visual impairments, and polypharmacy. The tool is validated in emergency departments.[7] No Turkish translation of the ISAR tool was available; therefore, for this study, the tool was translated by two translators to the Turkish language and, after agreement on the Turkish version, the text was translated back to English by two different translators. The translation was then assembled into one text and matched with the original. Each question answered "yes" is given one point, and a total of two or more points indicate an increased risk of frailty.

The CFS is a subjective frailty measurement tool based on clinical evaluation. The tool involves a scale that is based on images and descriptions that score individuals from 1 to 9 to grade the severity of their frailty. According to the scoring system, individuals who score from 1 to 3 are not considered to be frail and are considered to be very fit and managing well. A score of 4 indicates an individual who is vulnerable. Individuals who score between 5 and 8 are considered to be, respectively, mildly, moderately, severely, and very severely frail. Individuals who score 9 are considered to be terminally ill. The tool is validated in the Turkish population.[8] In our study, patients scoring 5 or more points were considered frail.

2.3. Statistical analysis

SPSS Statistics Version 25.0 software (IBM, Chicago, IL) was used for all statistical data analysis. The descriptive statistics are presented with average $\pm$ standard deviation (minimum/maximum) values for continuous variables. Frequency values (number of cases) for categorical variables are shown in combination with percentages. The relationship between the two categorical variables was calculated using Spearman's rho correlation coefficient. Binary logistic regression analysis was used to determine the combination of independent variables that describe the categorical dependent variables. Chi-squared test was used to explore the relationship between two categorical variables; however, in the case of a two by two table that violated the assumption that any cell should be five or more, Fisher's exact test was performed. The two group comparisons were analyzed by conducting a nonparametric Mann-Whitney U Test since the normality assumption was violated. A value of $p < .05$ was considered statistically significant when evaluating the results of the analysis.

3. Results

Table 2 provides the main features of the patients along with the primary outcomes of the study with comparisons of frailty scores. Table 3 shows the Spearman's rho correlation coefficient values between frailty scores indicating a statistical association with each other. Logistic regression analysis was performed to evaluate whether the frailty scores (PRISMA-7, ISAR, and CFS) predicted mortality, hospitalization, readmission, and outpatient clinic admissions; the results are provided in Table 4.

To assess whether the frailty tools predicted 30-day emergency readmission, mortality, hospitalization, and 30-day outpatient admissions, the chi-squared test was performed for each test separately. The PRISMA-7 tool was statistically related to mortality ($p = .018$) and hospitalization ($p = .038$). The ISAR tool failed to predict mortality, 30-day emergency readmission, hospitalization, and 30-day

Table 1
Main characteristics of utilized frailty tools

Prisma-7	ISAR	CSF
• Self-report screening questionnaire	• Screening tool for use in the emergency department aged over 65	• Based on clinical judgment
• Used in various public and clinical settings	• Identify those with severe disability at the time they visit the ED	• Grade the severity of frailty
• Suitable for both self and caregiver report	• Identify developing adverse outcomes in the six months following the visit to ED	• Provides predictive information about death or the need for an institution.
• Might overestimate frailty.		• Needs expertise

outpatient admission (p = .127, .182, .058, and .599, respectively). The CFS also failed to predict mortality, 30-day emergency readmission, hospitalization, and 30-day outpatient admission (p = .770, .538, .770, and .680, respectively). Of the 59 planned admissions, seven of the patients refused hospitalization or were admitted for a day procedure only and excluded from the analyses. The average number of days of hospitalization for the 52 patients was 9.96 ± 9.78 (1–45 days), and the average length of stay of patients identified as frail according to the PRISMA-7, ISAR, and CFS tools was 4.81 ± 8.9, 4.9 ± 8.6, and 4.15 ± 7.7 days, respectively.

There was no statistically significant difference in terms of age, monthly income, distance to hospital, and polypharmacy between mortality, 30-day readmission, hospitalization, and outpatient readmission (p > .05). Having comorbid diseases did not result in a statistically significant difference in relation to the variables of hospitalization and mortality within one month (p > .05).

Heart failure and chronic kidney failure was observed to be statistically significant in the evaluation with all tests (p < 0.05), and diabetes mellitus and hypertension were highly correlated with the ISAR test (p < 0.01).

Table 3
Spearman rho correlation coefficient values between Frailty Scores (*n* = 137).

	PRISMA-7		ISAR		CFS	
	Rho	*p*	*Rho*	*p*	*Rho*	*p*
PRISMA-7	-	-	0.44	< .001	0.70	< .001
ISAR	-	-	-	-	0.48	< .001
CFS	-	-	-	-	-	-

Table 2
Primary characteristics of patients and main outcomes of the study.

	Prisma-7			ISAR			CSF		
	Yes n (%)	No n (%)	p	Yes n (%)	No n (%)	p	Yes n (%)	No n (%)	p
Age (year ± SD) 80.19 ± 8.12	82.73 ± 7.70	75.90 ± 6.96	< .001*	80.90 ± 8.23	76.83 ± 6,74	.03*	81.71 ± 8.15	77.63 ± 7.46	.004*
Female/male, n (%)	52 (60.5)/	42 (82.4)/	.008*	79 (69.9)/	15 (62.5)/	.48	59 (68.6)/	35 (68.6)/	1.00
94 (68.6)/43 (31.4)	34 (39.5)	9 (17.6)		34 (30.1)	9 (37.5)		27 (31.4)	16 (31.4)	
Education status, n (%)			.48			.40			.73
Illiterate 33 (26.83)	17 (19.8)	16 (31.4)		30 (26.5)	3 (12.5)		19 (22.1)	14 (27.4)	
Primary education 65 (52.85)	42 (48.8)	23 (45.1)		53 (46.9)	12 (50.0)		40 (46.5)	25 (49.0)	
High school 13 (10.57)	8 (9.3)	5 (9.8)		10 (8.8)	3 (12.5)		8 (9.3)	5 (9.8)	
University 12 (9.76)	8 (9.3)	4 (7.8)		8 (7.0)	4 (16.7)		8 (9.3)	4 (7.8)	
Monthly income, USD ± SD	1842 ± 1096	2083 ± 1145	.36	1899 ± 1162	1908 ± 780	.50	1750 ± 1052	2196 ± 1166	.06
(min-max; n = 74)	(500–6000)	(800–5000)		(500–6000)	(1000–3500)		(500–6000)	(800–5000)	
414 ± 240 (108.9–1307)									
Distance from hospital, km ± SD	6.75 ± 7.96	5.43 ± 5.49	.36	6.83 ± 7.60	3.54 ± 3.33	.03*	6.46 ± 7.08	5.96 ± 7.32	.46
(min-max; n = 116)	(0.30–40)	(0.30–25)		(0.30–40)	(0.30–10)		(0.40–30)	(0.30–40)	
6.26 ± 7.15 (0.30–40)									
Medication count, n ± SD (min-max)	4.89 ± 2.40	4.18 ± 2.35	.10	5.05 ± 2.25	2.63 ± 2.02	< .001*	5.06 ± 2.38	3.90 ± 2.26	.005*
4.63 ± 2.39 (0–12)	(0–12)	(0–9)		(0–12)	(0–6)		(0–12)	(0–9)	
Admission to hospital, n (%)			.03*			.48			.004*
By ambulance 54 (39.4)	28 (32.5)	26 (51.0)		43 (38.0)	11 (45.8)		26 (30.2)	28 (54.9)	
By own 83 (60.6)	58 (67.4)	25 (49.0)		70 (61.9)	13 (54.2)		60 (69.8)	23 (45.1)	
30-day outpatient admission, n (%)	28 (32.5)	5 (9.8)	.682	24 (21.2)	9 (37.5)	.599	23 (26.7)	10 (19.6)	.680
33 (24.1)									
30-day emergency readmission, n (%)	28 (32.5)	5 (9.8)	.677	21 (18.6)	12 (50.0)	.182	31 (36.0)	2 (3.9)	.538
33 (24.1)									
In hospital mortality, n (%) 14 (10.2)	13 (15.1)	1 (2.0)	.018*	12 (10.6)	2 (8.3)	.127	13 (15.1)	1 (2.0)	.770
Hospitalization, n (%) 59 (43.1)	50 (58.1)	9 (17.7)	.038*	50 (44.2)	9 (37.5)	.058	50 (58.1)	9 (17.6)	.770
Comorbidities, n (%)									
Osteoporosis 1 (0.7)	0 (0)	1 (2.0)	--	0 (0)	1 (4.2)	--	0 (0)	1 (2.0)	--
Cerebrovascular disease 7 (5.1)	6 (6.9)	1 (2.0)	--	7 (6.2)	0 (0)	--	7 (8.1)	0 (0)	--
Coronary artery disease 28 (20.4)	16 (18.6)	12 (23.5)	.45	23 (20.3)	5 (20.8)	.001*	18 (20.9)	10 (19.6)	.13
Heart failure 32 (23.4)	24 (27.9)	8 (15.7)	.005*	29 (25.7)	3 (12.5)	< .001*	23 (26.7)	9 (17.6)	.013*
Dementia 9 (6.6)	9 (10.4)	0 (0)	--	9 (8.0)	0 (0)	--	8 (9.3)	1 (2.0)	--
COPD 13 (9.5)	11 (12.8)	2 (3.9)	.013*	10 (8.8)	3 (12.5)	.052	10 (11.6)	3 (5.9)	.052
CKD 13 (9.5)	11 (12.8)	2 (3.9)	.013*	11 (9.7)	2 (8.3)	.013*	12 (14.0)	1 (2.0)	.002*
Hypertension 83 (60.6)	46 (53.5)	37 (72.5)	.323	70 (61.9)	13 (54.2)	< .001*	51 (59.3)	32 (62.7)	.037*
Cancer 14 (10.2)	12 (13.9)	2 (3.9)	.008*	12 (10.6)	2 (8.3)	.008*	9 (10.5)	5 (9.8)	.285
Diabetes mellitus 38 (27.7)	19 (22.1)	19 (37.2)	1.00	33 (29.2)	5 (20.8)	< .001*	20 (23.3)	18 (35.3)	.746

CVD: cerebrovascular disease, CAD: coronary artery disease, COPD: chronic obstructive pulmonary disease, CKD: chronic renal disease.

Table 4
Logistic regression analysis of the variables.

	Mortality			Hospitalization			30-day outpatient readmission			30-day ER readmission		
	ISAR	CSF	Prisma-7	ISAR	CSF	Prisma-7	ISAR	CSF	Prisma-7	ISAR	CSF	Prisma-7
B	-1.21	18.63	2.55	-.83	.88	-1.12	.30	.97	-.24	1.14	-.59	.04
SE	767	.76	1.19	.57	.54	.54	.53	.49	.50	.68	.70	.70
OR	.00	3.34	.08	.43	2.41	.33	1.36	.38	.78	3.14	.56	1.04
P	.99	.11	.03	.15	.10	.04	.38	.03	.85	.09	.40	.96
	X^2 = 12.169, df = 3, N = 137, p < .01			X^2 = 8.962, df = 3, N = 137, p = .030			X^2 = 2.234, df = 3, N = 137, p = .525			X^2 = 3.19, df = 3, N = 137, p = .36		

4. Discussion

Clinicians who deal with geriatric patients should be concerned about identifying high-risk patients as much as possible to initiate accurate and appropriate diagnostic and treatment approaches.[9] The utilization of frailty tools on post-triaged, high-risk patients can serve as a risk stratification tool for predicting mortality and other adverse outcomes. The frailty screening tool must be capable of being practically applied under the time pressures of the emergency department. Moreover, it should be objective and based on the patient's condition in their general daily life, not at the moment of admission, since elderly patients usually come to the emergency department with atypical presentations and may be more unwell at the time of admission than they would be at baseline.[10] Furthermore, the right tool should help practitioners recognize frailty early and prevent adverse outcomes by predicting mortality, morbidity, and revisits to the emergency department by providing an accurate risk determination and helping emergency staff to decide on the hospitalization needs of the patient. Based on the answers given by patients, PRISMA-7 is a practical and non-time-consuming tool. This tool has been validated in the Turkish community-dwelling geriatric population[6] as well as within the emergency department.[10] However, studies on mortality and other adverse outcomes are limited in the current literature. Both ISAR and PRISMA-7 were developed for risk stratification in emergency services;[11,12] however, the current literature lacks reliable data for identifying seniors at risk for adverse outcomes in the emergency department using the ISAR score. The CFS is convenient, but this judgement-based scale requires the clinician to be experienced with its use, which might limit its reliability. As Spearman's correlation suggests a strong association between CSF and PRISMA-7, caregivers might utilize PRISMA-7 test to assess frailty rather than relying on the clinical judgment required by CSF, which was designed to be used by physicians. More studies are needed to clarify the associations between these scores.

It was observed that the correlation between patient characteristics and frailty tests depended on the scoring systems of the frailty tools used. For instance, it was observed that the ISAR score was significantly higher in polypharmacy patients as one of the questions asked if the patient was "using more than three medications." The PRISMA-7 tool gives one point if the patient is male, and accordingly, frailty was found to be related to gender. In our study, admission to the emergency department by ambulance was more statistically correlated to the CSF test, which is used to score clinical fitness; patients with higher scores tend to be more disabled and bedridden, requiring ambulance utilization.

In our study, using various frailty instruments, hospitalization, death, and 30-day readmission to the emergency department were evaluated. The proportion of patients who were considered to be frail ranged between 70% and 82%, which corresponded to the findings of a previous study based on observation in an emergency department.[9]

Geriatric patients utilize more resources and stay in emergency departments longer than younger, healthier patients, which contributes to overcrowding. Therefore, to avoid this phenomenon, approaches to predicting whether the hospitalization of geriatric patients is necessary have been developed, which also avoids admission delays. In a study conducted in the U.S., general weakness, which is often encountered in frail patients,[13] was found to be related to hospitalization.[14] Advanced age is associated with physical frailty as well as with cognitive decline,[15] and patients with cognitive disabilities are more often hospitalized from emergency departments than those without cognitive disabilities.[14] Clinicians must avoid unnecessarily hospitalizing frail patients as much as possible,[16] and detecting frailty in elderly patients in the emergency department can help physicians to manage hospitalization and discharge risk analyses. According to our study, the PRISMA-7 score is related to the hospitalization of frail patients from emergency departments and might be used for this purpose. The CFS seems to be an accurate tool for predicting in-hospital mortality, but in many studies, patient selection criteria differs from our sample, which makes it hard to draw further conclusions. Within the literature, Baghsaw[17] utilized the CFS on critically ill patients, while Clark[18] focused on low socioeconomic status and Mackenzie[19] on diabetic patients. In our study, we were not able to find any relation between the ISAR score and mortality, which is in line with the literature.[7] In our sample, the PRISMA-7 tool predicted mortality, while the CFS and ISAR tools failed to do so. Lack of ability to demonstrate in-hospital mortality might be related to sampling differences of patients and/or our inexperience utilizing the CFS tool and/or the broad range of CFS scores related to frailty.

Readmission to the emergency department within 30 days is an important parameter used to determine the quality of the health system;[20] therefore, we marked our cut-off value for readmission to the emergency department as one month. Readmission to the emergency department is usually due to infection, recurrence of the same disease, or premature departure from the emergency department before treatment is completed.[21] Also, patients over the age of 75 who are discharged directly from the emergency department are at high risk of readmission within a month of their first visit.[22] In the literature, there are contradictions and heterogeneity in the choice of outcome in the emergency department regarding the prediction of readmission for various frailty scores. In various studies, the readmission cut-off was determined to be 1, 3, 9, or 12 months, making it difficult to draw conclusions.[17,18,23,24] In a previous study, readmission to the hospital within 28 days was found to be related to the CFS score.[18] However, in another study, despite a limited number of patients, neither the ISAR nor the CFS tool were able to determine readmission to the emergency department within 30 days.[4] In our study, the ISAR, CFS, and PRISMA-7 tools were unable to predict 30-day readmission to both emergency and outpatient clinics. More standardized and prospective research on utilizing frailty scores in emergency geriatric patients should be implemented as current knowledge does not support the usage of the these tools to determine 30-day readmission to emergency departments.

In our study, the most frequently utilized outpatient clinics were cardiology, neurology, and internal medicine, and the most common diseases were heart failure, hypertension, and diabetes. Our study found that diabetes is correlated with frailty, which is in line with the literature,[25–27] underlining the need to screen this patient group for frailty in emergency departments to refer them to appropriate outpatient health care.

Our study has some limitations. One is that the 30-day readmission criterion was considered only to be readmission to our emergency department and readmission to other emergency departments of different hospitals might have been missed. Also, the patients were hospitalized with a variety of medical complaints, and we did not investigate the relation between the cause of hospitalization, mortality, 30-day emergency, or 30 day outpatient readmission. The comparatively small sample size of patients in this prospective cohort may prevent us from defining stronger associations.

5. Conclusion

To the best of our knowledge, this is the first study investigating

the use of various frailty tools in an emergency department in Turkey to determine mortality and other adverse outcomes. We determined the PRISMA-7 score might be used to stratify risk for geriatric patients in emergency departments in terms of mortality and prediction of hospitalization. However, more standardized and prospective study protocols are needed to draw further conclusions.

Data availability

Access to data is restricted. For ethical concerns and privacy of the volunteers, the access to data is on request.

Ethical approval

All the procedures performed in studies involving human participants were in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Institutional Review Board of Istanbul Medeniyet University (IRB Number 2018/0469) approved the IRB statement of this study.

Consent

All participants signed the appropriate informed consent forms.

Disclosure

None.

Acknowledgments

None.

Conflicts of interest

None.

References

1. Rockwood K, Song X, MacKnight C, et al. A global clinical measure of fitness and frailty in elderly people. *CMAJ*. 2005;173(5):489–495.
2. Hsieh TJ, Chang HY, Wu IC, et al. Independent association between subjective cognitive decline and frailty in the elderly. *PLoS One*. 2018;13(8): e0201351.
3. Salvi F, Morichi V, Grilli A, et al. The elderly in the emergency department: a critical review of problems and solutions. *Intern Emerg Med*. 2007;2(4): 292–301.
4. Jørgensen R, Brabrand M. Screening of the frail patient in the emergency department: A systematic review. *Eur J Intern Med*. 2017;45:71–73.
5. Zachariasse JM, Seiger N, Rood PPM, et al. Validity of the Manchester Triage System in emergency care: A prospective observational study. *PLoS One*. 2017;12(2):e0170811.
6. Yaman H, Ünal Z. The validation of the PRISMA-7 questionnaire in community-dwelling elderly people living in Antalya, Turkey. *Electron Physician*. 2018;10(9):7266–7272.
7. Edmans J, Bradshaw L, Gladman JRF, et al. The Identification of Seniors at Risk (ISAR) score to predict clinical outcomes and health service costs in older people discharged from UK acute medical units. *Age Ageing*. 2013; 42(6):747–753.
8. Özsürekci C, Balcı C, Kızılarslanoğlu MC, et al. An important problem in an aging country: identifying the frailty via 9 Point Clinical Frailty Scale. *Acta Clin Belg*. 2020;75(3):200–204.
9. Beauchet O, Fung S, Launay CP, et al. Screening for older inpatients at risk for long length of stay: which clinical tool to use? *BMC Geriatr.* 2019; 19(1):156.
10. O'Caoimh R, Costello M, Small C, et al. Comparison of frailty screening instruments in the emergency department. *Int J Environ Res Public Health*. 2019;16(19):3626.
11. Yao JL, Fang J, Lou QQ, et al. A systematic review of the identification of seniors at risk (ISAR) tool for the prediction of adverse outcome in elderly patients seen in the emergency department. *Int J Clin Exp Med*. 2015; 8(4):4778–4786.
12. Moons P, De Ridder K, Geyskens K, et al. Screening for risk of readmission of patients aged 65 years and above after discharge from the emergency department: predictive value of four instruments: *Eur J Emerg Med*. 2007;14(6):315–323.
13. Sousa-Santos AR, Afonso C, Moreira P, et al. Weakness: The most frequent criterion among pre-frail and frail older Portuguese. *Arch Gerontol Geriatr.* 2018;74:162–168.
14. LaMantia MA, Platts-Mills TF, Biese K, et al. Predicting hospital admission and returns to the emergency department for elderly patients. *Acad Emerg Med*. 2010;17(3):252–259.
15. Vella Azzopardi R, Beyer I, Vermeiren S, et al. Increasing use of cognitive measures in the operational definition of frailty—A systematic review. *Ageing Res Rev.* 2018;43:10–16.
16. Theou O, Campbell S, Malone ML, et al. Older adults in the emergency department with frailty. *Clin Geriatr Med*. 2018;34(3):369–386.
17. Bagshaw SM, Stelfox HT, McDermid RC, et al. Association between frailty and short- and long-term outcomes among critically ill patients: a multicentre prospective cohort study. *CMAJ*. 2014;186(2):E95–E102.
18. Clark S, Shaw C, Padayachee A, et al. Frailty and hospital outcomes within a low socioeconomic population. *QJM*. 2019;112(12):907–913.
19. MacKenzie HT, Tugwell B, Rockwood K, et al. Frailty and diabetes in older hospitalized adults: The case for routine frailty assessment. *Can J Diabetes*. 2020;44(3):241–245.e1.
20. Friebel R, Hauck K, Aylin P, et al. National trends in emergency readmission rates: a longitudinal analysis of administrative data for England between 2006 and 2016. *BMJ Open*. 2018;8(3):e020325.
21. Mahmoudi S, Taghipour HR, Javadzadeh HR, et al. Hospital readmission through the emergency department. *Trauma Mon*. 2016;21(2):e35139.
22. Ellis G, Marshall T, Ritchie C. Comprehensive geriatric assessment in the emergency department. *Clin Interv Aging*. 2014;9:2033–2043.
23. Juma S, Taabazuing MM, Montero-Odasso M. Clinical frailty scale in an acute medicine unit: A simple tool that predicts length of stay. *Can Geriatr J*. 2016;19(2):34–39.
24. Salvi F, Morichi V, Grilli A, et al. Screening for frailty in elderly emergency department patients by using the Identification of Seniors at Risk (ISAR). *J Nutr Health Aging*. 2012;16(4):313–318.
25. Denfeld QE, Winters-Stone K, Mudd JO, et al. The prevalence of frailty in heart failure: A systematic review and meta-analysis. *Int J Cardiol*. 2017; 236:283–289.
26. Vetrano DL, Palmer KM, Galluzzo L, et al. Hypertension and frailty: a systematic review and meta-analysis. *BMJ Open*. 2018;8(12):e024406.
27. Assar ME, Laosa O, Rodríguez Mañas L. Diabetes, and frailty. *Curr Opin Clin Nutr Metab Care*. 2019;22(1):52–57.