

Original article

Frailty screening of Tunisian older adults: feasibility and usefulness in the Emergency Department



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ABSTRACT

Introduction: Frail older adults are at an increased risk for adverse outcomes after an Emergency Department (ED) visit. Several tools exist for the screening of frailty among these patients. However, no tool has been validated in Tunisia. This study aims to evaluate the usefulness of frailty screening in predicting the outcome of older adults presenting to the ED.

Methods: This is a prospective, monocentric study. We evaluated the eligible patients at the ED and after their discharge. Follow-up phone calls were scheduled at 1, 2, 3, and 6 months after the ED visit. All patients aged 65 years or older; and visiting the ED during the inclusion period were involved. We used the ADL index and ISAR scale for assessing frailty.

Results: We enrolled 184 patients; they were living alone in 25% of cases. Half of them had medical care insurance. The ADL index was maximum (6 = total dependency) in 20% of cases. The ISAR score was above 1 point in 38%. Unplanned hospitalizations have accounted for 34%. In univariate analysis, the ADL index and ISAR score were statistically higher in the group of “unplanned hospitalization”. In multivariate analysis, the ISAR score and ADL index have not been associated with unplanned hospitalization.

Conclusion: Our results did not demonstrate the relevance of the ISAR or ADL scales in predicting the mortality or the need for unplanned hospitalization in multivariate analysis. This study did indicate an increased mortality in the “frail” patients in the univariate analysis. Further studies with larger samples and different tools are necessary.

African relevance

- Emergency departments see the growing numbers of frail patients as a challenge.
- The concept of frailty is not well understood nor well utilized in the emergency department.
- No screening tool is recommended in Tunisia.

Introduction

In recent years the number of visits to the Emergency Departments (EDs) has increased worldwide [1–3]. Tunisia has one of the oldest populations in Africa. According to the 2019 revision of the world population prospects, the proportion of the Tunisian older adults will exponentially increase in future decades [4]. The percentage of the population aged 65 years or older will attempt an average of 25% by 2040 [4]. Oppositely, there is neither procedure nor geriatric care

systems in Tunisia. The aging Tunisian population, associated with the lack of geriatric care systems, contributes to the increased use of the EDs by older patients. One of the challenges in their management in the ED is the early identification of frail patients, those who will need hospitalization, and those with a high risk of mortality after discharge. The screening of these high-risk patients in the ED is relevant to improve outcomes. This screening may participate in promoting early identification and specific interventions for decreasing adverse events after the visit to the ED.

The frailty concept is advanced in the literature for two decades. It is defined as the increased vulnerability to adverse outcomes among people of the same chronological age [1]. This concept participated in understanding the complex health condition of older patients [1]. Older frail adults are more vulnerable to health crises. Several studies have demonstrated that frail elderly patients are more likely to be hospitalized or need critical care, to use emergency medical services, and to have a longer in-hospital length of stay [1–3]. Frailty assessment by ED

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providers may promote transfer or transport to the appropriate department [1]. Various tools have been approved in frailty screening [5–7]. However, the best operational definition and screening tool of frailty is still debated [1]. The Identification of Seniors at Risk (ISAR) and the Activities of Daily living (ADL) index is one of the most studied instruments, especially in the EDs [7–12]. In Tunisia, there is no translated tool, and the emergency physicians have no confirmed tool to use. Moreover, they are not yet aware of the feasibility of these instruments in our conditions. Besides, there are no national or local priorities around the early identification of frail older adults. Therefore, the main objective of the present study was to evaluate the relevance of the frailty screening on arrival to ED in predicting unplanned hospitalizations. The secondary objective was to evaluate the relevance of the used tools in predicting death within six months following the ED visit. We used the ISAR scale and the ADL index.

Methods

Study design and setting

This is a single-center, prospective and observational study, conducted, over a six-month period (from October 21st, 2017 to May 31st, 2018), in the ED. A convenience inclusion-period of seven days was chosen. The first day of inclusion was randomly chosen on Saturday, 21st October of 2017. We continued with a rhythm of one inclusion-day per week during seven consecutive weeks.

According to our previous annual data, older adults represent 15% of all the ED visits. > 120,000 visits per year are managed in this ED. Based on previous surveys conducted in the same ED, we estimated the proportion of inclusion to 50% of all old adults presenting to the ED. The estimated number of inclusions was 25 per day.

This ED is in a unique teaching hospital in the southern region of Tunisia. In this department, all the patients are assessed in the triage room by a physician, after registration. Patients with life-threatening pathologies or requiring continuous monitoring are routinely admitted in the Emergency Room. Patients with no disturbances in vital signs are managed in the non-vital area of the ED. When no bed is found in the hospital, the patient is admitted to the ED-based observation unit.

Participants

The study population consisted of consecutive patients presenting to the ED during the inclusion period. Eligible patients were those aged 65 years or over, presenting to the ED in the inclusion period and consenting in participate in the screening. Alert patients were eligible, as well as those who had mental disturbances but were accompanied by a relative.

The non-inclusion criteria were as follows: patients with a life-threatening presentation on arrival to the ED, immediate management in the emergency room, participants refusing phone-call follow-up, participants missing to call up to 3 days after the ED-visit.

Patients' enrolment and follow-up

During the inclusion days, the investigator was with the physician in the triage room. He identified eligible participants through the following method. On arrival in the triage room, the emergency physician performed the triage. Then, the investigator performed the screening after explaining the aims of the study and obtaining the consent of the patient or his next of kin. No changes in patients' management were required for the study. The following day, the investigator attempted to contact the patient or his relatives by telephone. Follow-up phone calls were scheduled and completed by the same investigator at 1, 2, 3, and 6 months after the ED visit. The Habib Bourguiba Hospital institutional review board considers this analysis to be exempt from ethical review.

Instruments and measures

In order to measure disability in the elderly with a variety of functional limitations, we used the basic activities of daily living (ADL) index. It consists of 6 items; each activity is scored on a two-point scale with values from 0 (total independency) to 1 (total dependency). The total scores vary from 0 to 6 points [10].

The Identification of Seniors at Risk (ISAR) is a brief screening tool that includes six items representing frequently observed problems in older adults in the ED [11,12]. The responses are dichotomized as “yes” or “no”, and for each “yes” answer one point is allocated. Those with a score ≥ 2 out of 6 are considered “at risk” of adverse outcomes [12].

The ADL index and ISAR scale was translated from English to Arabic by two different people and then retranslated from Arabic to English. The reliability of the used questionnaires was assessed by analyzing the internal consistency of items through Cronbach's alpha coefficient. The value of 0.60 was adopted as the lower limit of consistency [13]. Cronbach's alpha coefficient was 0.92 for ADL and 0.66 for ISAR.

We also described the correlation between frailty and the type of medical card. In Tunisia, the medical cards are various, depending on the professional and social situations. Medicare-insured patients have the possibility to choose their policy (third party payment system, reimbursement of medical expenses, or low-cost care in the public health facilities). Access to free or low-cost care cards (depending on the family situation) in the public health system for needy people with limited income, is also possible. This category of patients is called Medicaid-insured. Privately insured patients are usually from middle or upper social situations.

Statistical analysis

Normal distribution of the data was verified. Data reported in the text and tables indicate the mean \pm standard deviation for numeric variables and percentages or ranges for categorical variables. To compare qualitative variables, we used the Pearson Chi square-test and the Fisher's exact test. To compare numerical variables, we used Student's *t*-test. Student's *t*-test (normally assumption-verified) and the chi-square (χ^2), or Fisher's exact test (when χ^2 assumption of low expected cells was verified) was used to compare the group of patients who were hospitalized and those who were discharged after the ED visit. Receiver-Operating Characteristic (ROC) curve was used to analyze the correlation between the unplanned hospitalization after ED-visit and the ISAR score. The area under the ROC curve was estimated by the method of Hanley and McNeill [14]. Also, the Kaplan–Meier survival curve (log-rank method) was used for survival analysis. Risk factors were evaluated by univariate analysis and by multivariate analysis by a multiple logistic stepwise regression procedure. We compared age, sex, Medicaid insurance, medical transport to the ED, medical conditions, clinical signs and assessed geriatric scores in the two groups of patients (hospitalized and discharged). Odds ratios were estimated from the b coefficients obtained, with respective 95% confidence intervals (CI 95%). The significance level was a two-sided $p < 0.05$ for all the used tests.

Results

We enrolled 184 of the potential 348 elderly patients presenting to the ED during the inclusion period (Fig. 1). Twenty-one patients were aged over 85 years (11.4%) (extremes: 65 and 94 years). The sex-ratio M/F was 0.9 (93 women and 91 men). In 20.6% of cases, there were at least three relatives with the patient in the ED ($n = 38$). The visit was after 7 pm in 26.1% of the cases ($n = 48$). Seventeen patients were transferred to the hospital by a medical team (9.2%), 5.4% were transferred by paramedics ($n = 10$). In 11.4% of the cases ($n = 21$), no prior medical history was reported. Hypertension ($n = 80$) and diabetes ($n = 70$) were the most common chronic pathologies (43.5 and 38.0% respectively). The most common complaints on arrival to the ED were

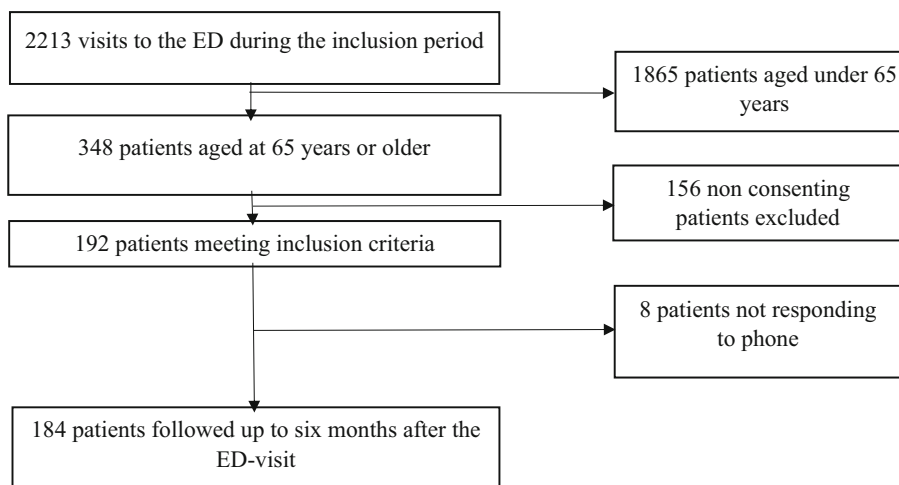


Fig. 1. Flow-chart explaining the sample of the study.

chest pain ($n = 37$; 20.1%) and dyspnea ($n = 36$; 19.5%). The patients were living with their partners in 41.8% of the cases ($n = 77$), alone in 9.8% ($n = 18$) or in their children's homes in the remaining cases ($n = 89$; 48.4%). Half of the patients were Medicare-insured ($n = 92$) and 47.8% had a Medicaid insurance ($n = 88$).

In one-third of cases ($n = 64$), the patients were independent with an ADL index = 0. The ADL index was 6 – total dependency – in 20.0% of the cases. The ISAR score was higher than 1 point in 38.0% of the cases.

The rate of unplanned hospitalization after the ED visit was 34.2%

($n = 63$) (Table 1): 20 in the ED-based observation unit, 10 in the cardiology department, 10 in the neurology department, 8 in a medical ward, 14 in a surgical ward and one patient was transferred to a private clinic.

In univariate analysis, the medical transport to the ED was statistically associated with unplanned hospitalization. Of all the complaints, the mental and behavioral disorders and the impaired general condition had higher rates in the hospitalized group of patients. The proportion of Medicaid-insured patients was higher in the group of unplanned hospitalization (Table 1). ADL index and ISAR scores were higher in the

Table 1

Comparison of demographic and clinical data in ‘unplanned admitted patients’ and ‘discharged patients’ groups.

	Unplanned hospitalization ($n = 63$)	Discharged at home ($n = 121$)	p
Circumstances of ED-visit			
With relatives; n(%)	61 (96.8)	114 (94.2)	0.43
Number of relatives; Mean \pm SD	2 \pm 1	1 \pm 1	0.33
Visit to the ED during the nightshift; n(%)	16 (25.4)	29 (24.0)	0.55
Visit to the ED during the week-ends. n(%)	21 (33.3)	30 (24.8)	0.22
Medical transport to the ED; n(%)	11 (17.5)	6 (5.0)	0.005
Main complaint on arrival to the ED			
Mental and behavioral disorders; n(%)	8 (12.7)	3 (2.5)	0.009
Neurological motor deficit; n(%)	7 (11.1)	6 (5.0)	0.14
Chest pain; n(%)	12 (19.0)	21 (17.4)	0.77
Palpitations; n(%)	0 (0.0)	6 (5.0)	0.09
Dyspnea; n(%)	10 (16.1)	24 (20.0)	0.52
Abdominal pain; n(%)	6 (9.5)	9 (7.4)	0.62
Minor trauma; n(%)	4 (6.3)	12 (9.9)	0.58
Impaired general condition; n(%)	9 (14.3)	3 (2.5)	0.004
Demographic features			
Sex-ratio (M/F)	1.1	0.9	0.56
Age (years); mean \pm SD	76.9 \pm 7.3	74.8 \pm 6.9	0.05
Social features			
Living alone at home; n(%)	7 (11.1)	11 (9.1)	0.39
Medicaid-insured patient; n(%)	51 (81.0)	79 (65.3)	0.02
Comorbidities			
Body Mass Index; mean \pm SD	27.0 \pm 3.6	7.4 \pm 3.6	0.48
Number of chronic pathologies; mean \pm SD	2.0 \pm 1.2	1.5 \pm 1.0	0.52
Diabetes; n(%)	27 (42.9)	43 (35.5)	0.33
Hypertension; n(%)	33 (52.4)	47 (38.8)	0.07
Coronary syndrome; n(%)	16 (25.4)	14 (11.6)	0.01
Heart failure; n(%)	10 (15.9)	14 (11.6)	0.41
Stroke; n(%)	8 (12.7)	4 (3.3)	0.02
Chronic renal failure; n(%)	8 (12.7)	5 (4.1)	0.03
Geriatric assessment scores on arrival to the ED			
ADL index; mean \pm SD	3.2 \pm 2.5	1.8 \pm 2.2	$< 10^{-3}$
ISAR score; mean \pm SD	3.4 \pm 1.8	2.2 \pm 1.6	$< 10^{-3}$
Deaths; n(%)	30(47.6)	34 (28.1)	$< 10^{-3}$

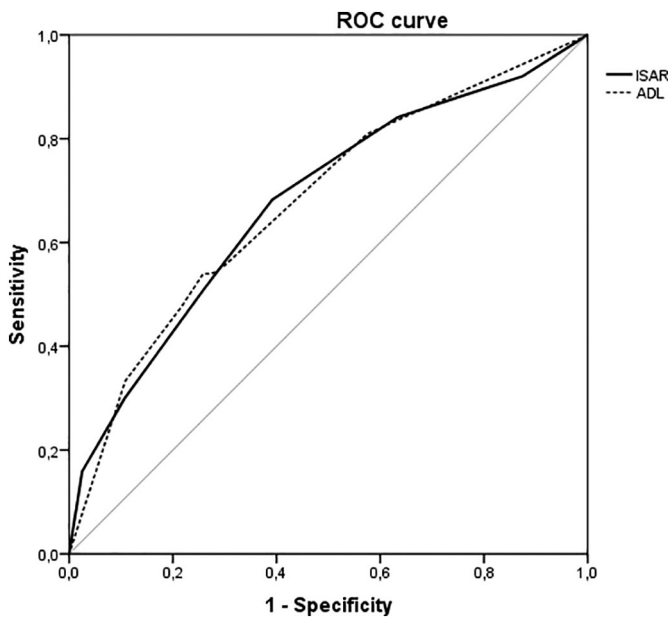


Fig. 2. ROC curve (unplanned hospitalization); Receiver-operating characteristic curve (ROC curve) for the correlation between the ISAR score (—) and the ADL index (.....) and the risk of unplanned hospitalization after the ED-visit. The area under the curve was at 0.7 for both scores indicating a good association ($p < 10^{-3}$).

Table 2

Multivariate analysis of independent factors associated with unplanned hospitalization after ED-visit.

	p	Odds-ratio	Confidence interval
ED-visit for impaired general condition	0.03	5.8	1.1–28.6
Medicaid-insured patient	0.02	3.0	1.2–7.8
Medical history of coronary syndrome	0.008	4.8	1.5–15.4

group of unplanned hospitalization (Table 1). An ISAR score higher than 2 was associated with a higher risk of unplanned hospitalization (area under the curve = 0.7; sensitivity = 68.0% and specificity = 60.0%) (Fig. 2). An ADL index higher than 1.5 was statistically associated with unplanned hospitalization after ED visit (area under the curve = 0.7; sensitivity = 55.6% and specificity = 70.0%) (Fig. 2). In multivariate analysis (Table 2), the ISAR score and the ADL index were not associated with a higher risk of unplanned hospitalization.

After the ED visit, the overall mortality rate was 20.6% ($n = 38$). Most of the deaths were reported within the first month of follow-up ($n = 26$; 14.1%). We did not record deaths within the second and third months of follow-up. Twelve patients died in the sixth month following their visit to the ED. An ISAR score higher than 2 was not predictive of death (Fig. 3). Within the first month of follow-up, the death rate was higher among frail patients according to the ISAR score, but this trend was not confirmed later (Fig. 3).

Discussion

In this pilot study, we had demonstrated that frailty screening is possible to perform in the ED. The main second finding of this research was the lack of a significant relationship, in multivariate analysis, between the used tools (ISAR and ADL) and unplanned hospitalizations. Nevertheless, hospitalized patients had higher scores in univariate analysis. Moreover, the ISAR score predicted mortality within the first month of the ED visit. Some limitations should be considered in this study. Although this was a prospective study, the sample size was small.

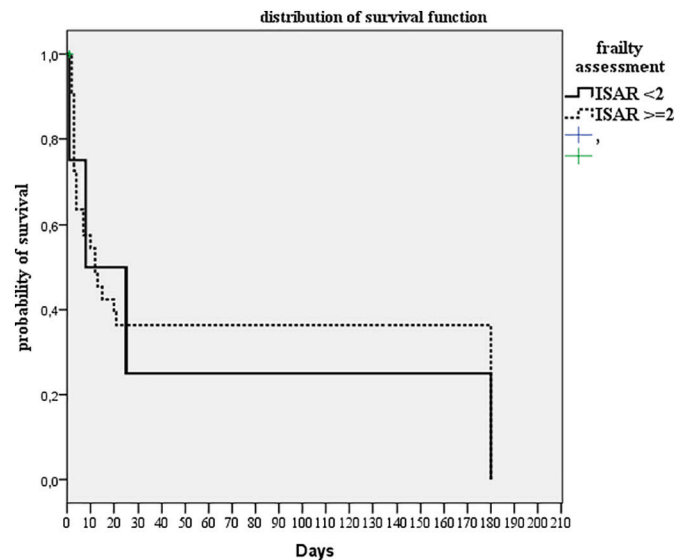


Fig. 3. Survival analysis up to 6 months after ED-visit among patients with 'ISAR score > 2' (.....) and 'ISAR ≤ 2' (—) using the Kaplan–Meier survival curve ($p = 0.09$).

Besides, it was a monocentric study in an urban region. Besides, the clinical severity of the included patients and the medical file records were not analyzed. We focused in this study on the geriatric features and not on the vital signs.

Comprehensive geriatric assessment is a multidisciplinary management process that identifies the medical, psychosocial, and functional capabilities of older adults. It aims to develop a coordinated plan to improve their quality of life [15]. It has been shown that home and in-hospital geriatric assessment programs are consistently beneficial for several health outcomes [15]. In Tunisia, there is no procedure of standardized geriatric assessment in or out of the hospital. To the best of our knowledge, this is the first study focusing on geriatric assessment in Tunisian ED. We believe that geriatric screening is crucial to detect patients at high-risk of poor outcomes. The importance of clinical frailty was also demonstrated in the risk stratification of older patients admitted in intensive care units with suspected infection [16]. The presence of frailty is associated with greater risks of postoperative mortality and morbidity. Some authors suggest that frailty scoring should be integrated into acute surgical assessment practices to guide decision-making [17]. We tried to realize a geriatric screening in the ED. This approach is debatable: a standardized geriatric assessment requires optimal conditions. Several authors had demonstrated that it may take 1 min per patients [18]. However, no universal criteria have been agreed upon to readily identify patients who are likely to benefit from comprehensive geriatric assessment [15]. In ED, inconsistencies in assessment and interventions for the older person are apparent [19]. The best-standardized assessment tool in the ED is still lacking [19]. The applied tools are not used to indicate frailty in the general geriatric environment. Their correlation with a functional impairment has been commonly confounded to association with frailty. In this study, we decided to use the ISAR and the ADL scales like many studies conducted in EDs [5,7,20,21]. The internal validity in our sample was acceptable for the two used tools. Our results show that the ISAR and ADL scores have a limited ability to predict the outcome of older adults visiting the ED. We found that the 6-months mortality was not associated with the ISAR score. But the survival analysis shows a potential association with the frailty within the first month after the ED visit. The multivariate analysis did not confirm these scales as independent predictors of unplanned hospitalization. The prediction of poor outcome and not the mortality was also reported in prior review [20]. In a recent review, two studies suggested that the mortality predictive validity of the ISAR

within 90 days and 120 days was ‘poor’ [9,21,22]. The areas under the curves were 0.62 and 0.58 respectively. According to this review, the ISAR seems to be useful for screening high-risk older patients seen in the ED, but its discriminating value in predicting adverse health outcomes was ‘poor’ for elderly patients discharged from the ED [21]. Different tools have been more reliable and accurate [5,6,18,23,24]. Concerning death, only two studies demonstrated its validity in predicting mortality up to six months after discharge from ED [8,9,21]. Although our sample is not European, our results are similar concerning the prediction of poor outcome. In addition, our cut-off of the ISAR score was as suggested in several studies conducted in EDs. An ISAR score higher than 2 points seems to be more appropriate to ED screening than ≥ 2 [21,23].

The last finding of this study was the association between the hospitalization rate and the payer. Unplanned hospitalization rates were higher in the group of patients with Medicaid insurance ($p = 0.02$; OR = 3; CI [1.2–7.8]). Accordingly, several other epidemiological studies reported this trend [25]. Hsia et al. [25] found that, between 2005 and 2015, the number of ED visits resulting in hospitalization grew for Medicaid-insured and Medicare-insured patients by 72.0% and 18.5%, respectively, but declined for privately insured and uninsured patients. This was explained by the affordability, accessibility, availability, and high disease burden [25–27]. In Tunisia, this finding could be explained by the easy accessibility to physicians, and especially by the low reimbursement rates in private clinics. This result is alarming; this correlation is probably signifying that even public hospitals are becoming unaffordable for older patients with a low socioeconomic status. These results are important to consider when proposing solutions to improve the quality of care in our health system.

Conclusion

Our results did not demonstrate the prediction of unplanned hospitalization nor death in multivariate analysis using the ISAR or ADL scale. This study did indicate an increased mortality in the “frail” patients in the univariate analysis. In summary, this study shows the feasibility of the early frailty assessment on arrival to the ED. We propose to consider the frailty screen as the first step of multidisciplinary management of older adults. Further larger studies indicate show additional findings. Different screening tools also worth being tried in the Eds.

Dissemination of results

Results from this study show the feasibility of the early frailty assessment on arrival to the ED. They were shared with staff members through an informal presentation.

Authors' contribution

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: OCW contributed 45%; AW 15%; HB 15%; and AN, MJ, RK, RT and NR contributed 5% each. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declared no conflicts of interest.

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References

- [1] Theou O, Squires E, Mallery K, et al. What do we know about frailty in the acute care setting? A scoping review. *BMC Geriatr* 2018;18:139. <https://doi.org/10.1186/s12877-018-0823-2>.
- [2] Latham LP, Ackroyd-Stolarz S. Emergency department utilization by older adults: a descriptive study. *Can Geriatr J* 2014;17:118–25. <https://doi.org/10.5770/cgj.17.108>.
- [3] Lowthian JA, Jolley DJ, Curtis AJ, et al. The challenges of population ageing: accelerating demand for emergency ambulance services by older patients, 1995–2015. *Med J Aust* 2011;194:574–8.
- [4] United Nations. World population prospects: the 2019 revision. <https://population.un.org/wpp/Maps/>; 2019.
- [5] Jorgensen R, Brabrand M. Screening of the frail patient in the emergency department: a systematic review. *Eur J Intern Med* 2017;4:5:71–3. <https://doi.org/10.1016/j.ejim.2017.09.036>.
- [6] Sternberg SA, Wershof Schwartz A, Karunanathan S, Bergman H, Mark Clarfield A. The identification of frailty: a systematic literature review. *J Am Geriatr Soc* 2011;59:2129–38. <https://doi.org/10.1111/j.1532-5415.2011.03597.x>.
- [7] Brousseau AA, Dent E, Hubbard R. Identification of older adults with frailty in the emergency department using a frailty index: results from a multinational study. *Age Ageing* 2018;47(2):242–8. <https://doi.org/10.1093/ageing/afx168>.
- [8] 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;16:313–8.
- [9] Di Bari M, Salvi F, Roberts AT, Balzi D, et al. Prognostic stratification of elderly patients in the emergency department: a comparison between the “Identification of Seniors at Risk” and the “Silver Code”. *J Gerontol A Biol Sci Med Sci* 2012;67:544–50. <https://doi.org/10.1093/gerona/glr209>.
- [10] Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of the illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function. *JAMA* 1963;21:914–9.
- [11] Thiem U, Heppner HJ, Singler K. Instruments to identify elderly patients in the emergency department in need of geriatric care. *Z Gerontol Geriatr* 2015;48:4–9. <https://doi.org/10.1007/s00391-014-0852-1>.
- [12] Dendukuri N, McCusker J, Belzile E. The identification of seniors at risk screening tool: further evidence of concurrent and predictive validity. *J Am Geriatr Soc* 2004;52:290–6.
- [13] Bland JM, Altman DG. Cronbach's alpha. *BMJ* 1997;314:572.
- [14] Hanley JA, McNeil BJ. The meaning and use of the area under a receiver operating characteristic (ROC) curve. *Radiology* 1982;143:29–36. <https://doi.org/10.1148/radiology.143.1.7063747>.
- [15] Pilotto A, Cella A, Pilotto A, et al. Three decades of comprehensive geriatric assessment: evidence coming from different healthcare settings and specific clinical conditions. *J Am Med Dir Assoc* 2017;18:192.e1–192.e11. <https://doi.org/10.1016/j.jamda.2016.11.004>.
- [16] Fernando SM, Melsaac DI, Perry JJ, et al. Frailty and associated outcomes and resource utilization among older ICU patients with suspected infection. *Crit Care Med* 2019;47:e669–76. <https://doi.org/10.1097/CCM.0000000000003831>.
- [17] Parmar KL, Law J, Carter B, et al. Frailty in older patients undergoing emergency laparotomy: results from the UK observational emergency laparotomy and frailty (ELF) study. *Ann Surg* 2019. <https://doi.org/10.1097/SLA.0000000000003402>. Epub ahead of print.
- [18] Theou O, Campbell S, Malone ML, et al. Older adults in the emergency department with frailty. *Clin Geriatr Med* 2018;34(3):369–86. <https://doi.org/10.1016/j.cger.2018.04.003>.
- [19] Malik M, Moore Z, Patton D, O'Connor T, Nugent LE. The impact of geriatric focused nurse assessment and intervention in the emergency department: a systematic review. *Int Emerg Nurs* 2018;37:52–60. <https://doi.org/10.1016/j.ienj.2018.01.008>.
- [20] Mlinac ME, Feng MC. Assessment of activities of daily living, self-care, and independence. *Arch Clin Neuropsychol* 2016;31:506–16. <https://doi.org/10.1093/arclin/acw049>.
- [21] Yao JL, Fang J, Lou QQ, Anderson RM. 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;8:4778–86.
- [22] Graf CE, Giannelli SV, Herrmann FR, et al. Identification of older patients at risk of unplanned re hospitalization after discharge from the emergency department comparison of two screening tools. *Swiss Med Wkly* 2012;141. <https://doi.org/10.4414/smw.2011.13327>.
- [23] O'Caomh 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. <https://doi.org/10.3390/ijerph16193626>.
- [24] Singler K, Heppner HJ, Skutetzky A, Sieber C, Christ M, Thiem U. Predictive validity of the identification of seniors at risk screening tool in a german emergency department setting. *Gerontology* 2014;60:413–9. <https://doi.org/10.1159/000358825>.
- [25] Hsia RY, Sabbagh SH, Guo J, Nuckton TJ, Niedzwiecki MJ. Trends in the utilisation of emergency departments in California, 2005–2015: a retrospective analysis. *BMJ Open* 2018;23:e021392. <https://doi.org/10.1136/bmjopen-2017-021392>.
- [26] Kangovi S, Barg FK, Carter T, et al. Understanding why patients of low socioeconomic status prefer hospitals over ambulatory care. *Health Aff* 2013;32:1196–203. <https://doi.org/10.1377/hlthaff.2012.0825>.
- [27] Hudon C, Sanche S, Haggerty JL. Personal characteristics and experience of primary care predicting frequent use of emergency department: a prospective cohort study. *PLoS One* 2016;11:e0157489. <https://doi.org/10.1371/journal.pone.0157489>.