

Original Article

Clinical Frailty Scale scores of older patients admitted to an emergency department

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ABSTRACT

INTRODUCTION. Frailty is prevalent in older adults attending emergency departments and is associated with adverse health outcomes. Early identification of frailty is important to develop appropriate care plans and targeted interventions that address specific healthcare needs. The Clinical Frailty Scale is a validated tool used to assess an individual's baseline health status and predict the risk of adverse outcomes in adults aged 65 years or older. This study aimed to delineate the demographic characteristics and baseline Clinical Frailty Scale scores of patients aged 65 years and older in three Danish emergency department populations.

METHODS. A flash mob study was conducted over two days to collect observational data from 6 AM to midnight at three emergency departments in Southern Denmark. Collected variables included demographics, the reasons for the emergency department presentation and Clinical Frailty Scale scores. The prevalence of frailty was determined using frequency and proportion analyses.

RESULTS. A total of 225 patients aged 65 years and older were recruited across three emergency departments. More than 58% exhibited mild or more severe frailty, defined by a Clinical Frailty Score of 4 or higher. Findings show that frailty was more common among the oldest patients. Participants had a median age of 78 years (IQR: 72-83 years), and 46.2% were female.

CONCLUSIONS. This study shows that frailty was prevalent among people aged 65 years and older attending the emergency departments. Terminally ill patients were underrepresented in this study, probably because patients who could not give informed consent due to cognitive impairments were excluded.

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The growing population of aged and frail individuals has resulted in increasing healthcare demands, as older age is commonly associated with multiple health challenges that often require urgent care in emergency departments (EDs) [1, 2]. Frailty is an ageing-related syndrome of physiological decline and vulnerability due to chronic diseases, which places individuals at increased risk of adverse health outcomes and prolonged recovery [3]. Furthermore, frailty has been linked to higher incidences of ED visits, hospitalisation, disability and mortality [4].

Research underscores that frailty screening tools in the ED are valuable for early recognition of elderly patients

at heightened risk of adverse outcomes and in need of comprehensive geriatric assessment [1]. Such a tool can support prognostication and empower more informed clinical decision-making, ensuring that elderly patients receive appropriate, targeted interventions that address their specific needs [5]. Patients perceive that being asked directly about their frailty contributes to a more holistic assessment by healthcare professionals and fosters reassurance by recognising their geriatric concerns [6].

The Clinical Frailty Scale (CFS), developed by Rockwood et al. in 2005 [7], is widely used in geriatric medicine, enabling easy assessment of baseline frailty status in adults aged 65 years and older, based on their condition over the preceding two weeks. The CFS predicts key outcomes such as mortality, hospitalisation and functional decline [1]. It categorises individuals from very fit (CFS score of 1) to terminally ill (CFS score of 9), providing a straightforward method for evaluating frailty [7]. It has been validated as a reliable predictor of adverse health outcomes in older adults across various healthcare settings, including hospitals, primary care and long-term care facilities [1, 4, 8]. The CFS is translated into Danish [9].

Frailty screening using the CFS for patients aged 80 years or older is planned to be implemented in emergency care across all Danish hospitals to identify frailty and improve the quality of care for frail elderly patients [10]. Understanding the prevalence and characteristics of frail older patients is essential for mapping care pathways and ensuring timely, tailored care [11]. Therefore, this study aimed to delineate the demographic characteristics and baseline CFS scores of patients aged 65 years and older across three Danish EDs.

METHODS

Study design and setting

This study employed a flash mob design, enabling the swift prospective collection of a large volume of data [12]. The design was chosen to rapidly collect generalisable data from three hospitals to delineate the demographic characteristics and baseline frailty scores of patients aged 65 years and older across the three EDs.

Data were collected from EDs at three hospitals in the Region of Southern Denmark: Odense University Hospital (OUH), Lillebaelt Hospital (Kolding) and Esbjerg University Hospital of Southern Denmark (Esbjerg).

Participants

All patients aged 65 years and older admitted to one of the participating hospitals in the inclusion period were eligible for participation. While the forthcoming implementation of CFS focuses on screening patients aged 80 years and older, this study included a broader range, as the CFS is validated for use in patients aged 65 years and older [7]. The wider age range enables assessment of whether screening should be extended to those aged 65 and over, based on the context. Patients unable to provide informed consent to participate were excluded from the study.

Data collection

Data were collected over two days, from 6 AM to midnight: on 30-31 May 2024 at the OUH; on 28-29 October 2024 in Esbjerg; and on 21-22 November 2024 in Kolding. Data collectors were healthcare professionals not involved in patient care on the data collection days. We made this choice to ensure that the training and use of the app were applied systematically in all cases, thereby ensuring the validity and reliability of the data. Patients who agreed to participate received oral and written information about the study and provided their written consent before data collection. Participants were screened for CFS using the official mobile app [7]. Information on sociodemographic characteristics, the reason for ED presentation, the CFS score and admission outcome was collected bedside and from patient records. Reasons for ED presentation were grouped, and data were initially

entered into a REDCap database.

Outcome measures

The primary outcome was the proportion of patients aged 65 years and older with mild or more severe frailty, defined by a CFS score of 4 or higher. Descriptive and frequency analyses were conducted on demographics, frailty score, primary complaints and medical specialities. Variation in prevalence between sites was assessed using frequencies and proportions, and frailty proportions were calculated across age groups. Data analysis was managed using Stata version 14.2 (StataCorp).

Ethics and reporting

Under Danish law, formal approval from the National Committee on Health Research Ethics was not required. Data storage was approved by the Region of Southern Denmark's record of data processing activities (approval number 24/15727. All participants provided informed written consent and were assured of anonymity and confidentiality before the data collection.

Trial registration: not relevant.

RESULTS

A total of 399 patients aged 65 years or older attended the three EDs during the data collection period, of whom 301 were identified. Among these, 57 were unable to provide informed consent due to cognitive impairments, and 19 patients declined to participate.

Hence, 225 patients were ultimately included (**Figure 1**). The median participant age was 78 years (IQR: 72-83 years), and 46.2% were female. Among the participants, 97.3% resided in their own homes, and 27.6% received home care services. Before ED admission, 27.6% of the patients had a face-to-face consultation with a physician, whereas the remaining cases involved consultations by telephone or through other means, such as contact with pre-hospital services. Telephone consultations before ED admission were more frequent in Odense (71.1%) than in Esbjerg (24.4%) or Kolding (33.3%). The most common reasons for ED presentation were falls, abdominal pain and shortness of breath. The study population was most frequently presented in the medical specialities of the ED (61.8%), and medical presentations were more prevalent in Esbjerg than at the other two sites (**Table 1**).

FIGURE 1 Flow chart illustrating the patient inclusion process.

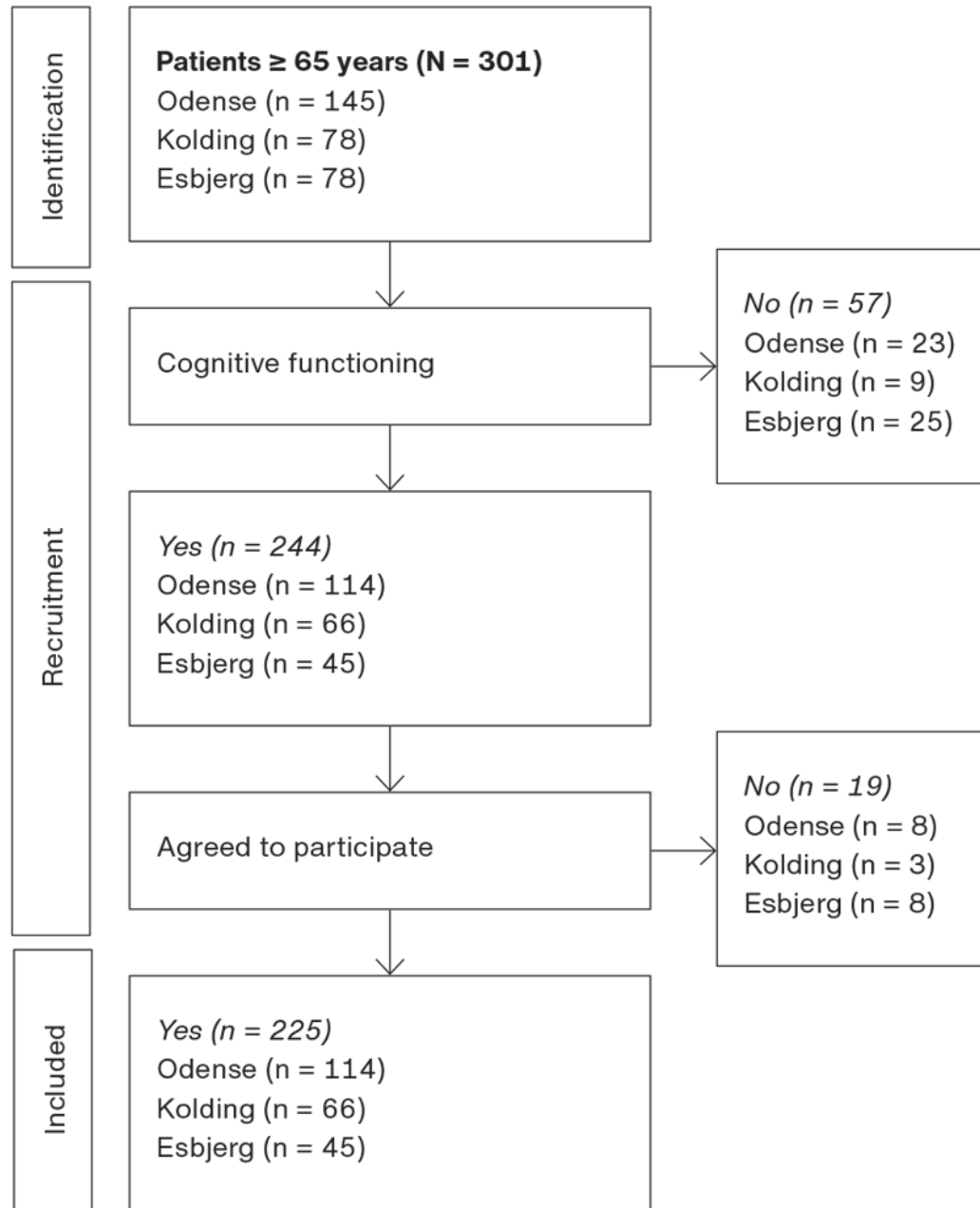


TABLE 1 Characteristics of the study population.

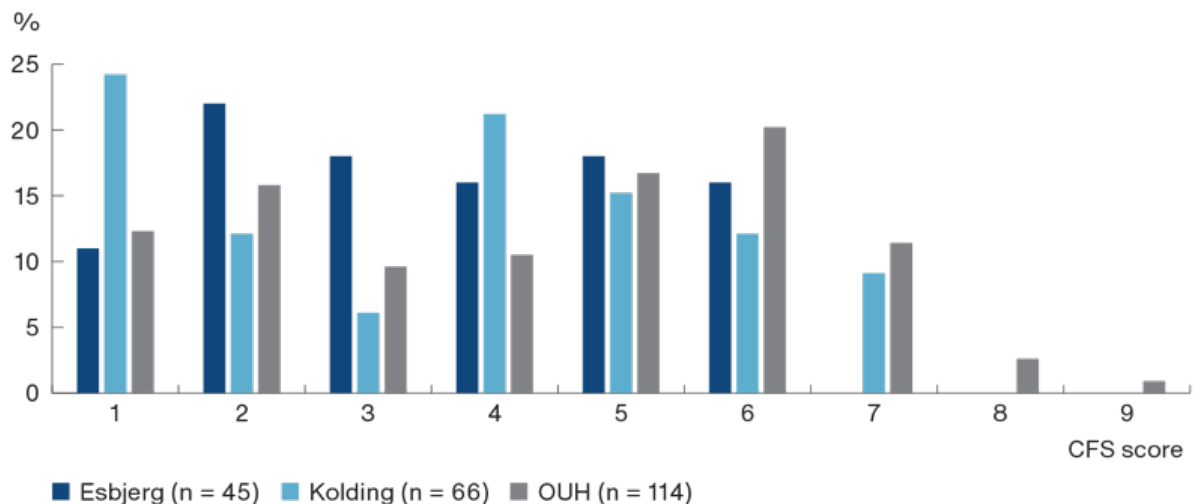
	Esbjerg (N_E = 45)	Kolding (N_K = 66)	Odense (N_O = 114)	Total (N_{tot} = 225)
<i>Sex, n (%)</i>				
Female	17 (37.8)	32 (48.5)	55 (48.2)	104 (46.2)
Male	28 (62.2)	34 (51.5)	59 (51.8)	121 (53.8)
Age, median (IQR), yrs	78 (70-83)	77 (71-82)	78 (73-85)	78 (72-83)
<i>Living situation, n (%)</i>				
Own home	44 (97.8)	62 (93.9)	113 (99.1)	219 (97.3)
Nursing home/respite care placement/unknown	1 (2.2)	4 (6.1)	1 (0.9)	6 (2.7)
<i>Consultation with physician before admission, n (%)</i>				
Face-to-face consultation	15 (33.3)	23 (34.8)	24 (21.1)	62 (27.6)
Telephone consultation	11 (24.4)	22 (33.3)	81 (71.1)	114 (50.7)
Other consultations ^a	19 (42.2)	21 (31.8)	7 (6.1)	47 (20.9)
Unspecified	0	0	2 (1.7)	2 (1.7)
<i>Primary complaint, n (%)</i>				
Unspecified cause	2 (4.4)	7 (10.6)	15 (13.2)	24 (10.7)
Infection	5 (11.1)	3 (4.5)	13 (11.4)	21 (9.3)
Fainting/near-fainting/dizziness	5 (11.1)	5 (7.6)	8 (7.0)	18 (8.0)
Chest pain/palpitations	5 (11.1)	3 (4.5)	11 (9.6)	19 (8.4)
Shortness of breath	7 (15.6)	9 (13.6)	10 (8.8)	26 (11.6)
Abdominal pain	7 (15.6)	10 (15.2)	13 (11.4)	30 (13.3)
Injury/musculoskeletal problems	2 (4.4)	11 (16.7)	12 (10.5)	25 (11.1)
Fall	6 (13.3)	12 (18.2)	14 (12.3)	32 (14.2)
Other complaints ^b	6 (13.3)	6 (9.1)	18 (15.8)	30 (13.3)
<i>Distribution of specialties, n (%)</i>				
Medical	36 (80.0)	37 (56.1)	66 (56.9)	139 (61.8)
Surgical	8 (17.8)	29 (43.9)	47 (40.5)	84 (37.3)
Unspecified	1 (2.2)	0	1 (0.9)	2 (0.9)

a) Could be prehospital or self-omitted cases.

b) Could be bleeding, allergy, paralyses, sensory disturbances, dehydration.

Among patients aged 65 years or older, over 58% exhibited mild or more severe frailty. Patients with a frailty score of 9 were rare, representing only 0.4%. The prevalence of mild or more severe frailty ranged from 49% to 62.3% across sites (Figure 2). See [supplemental Table S1](#) for further details.

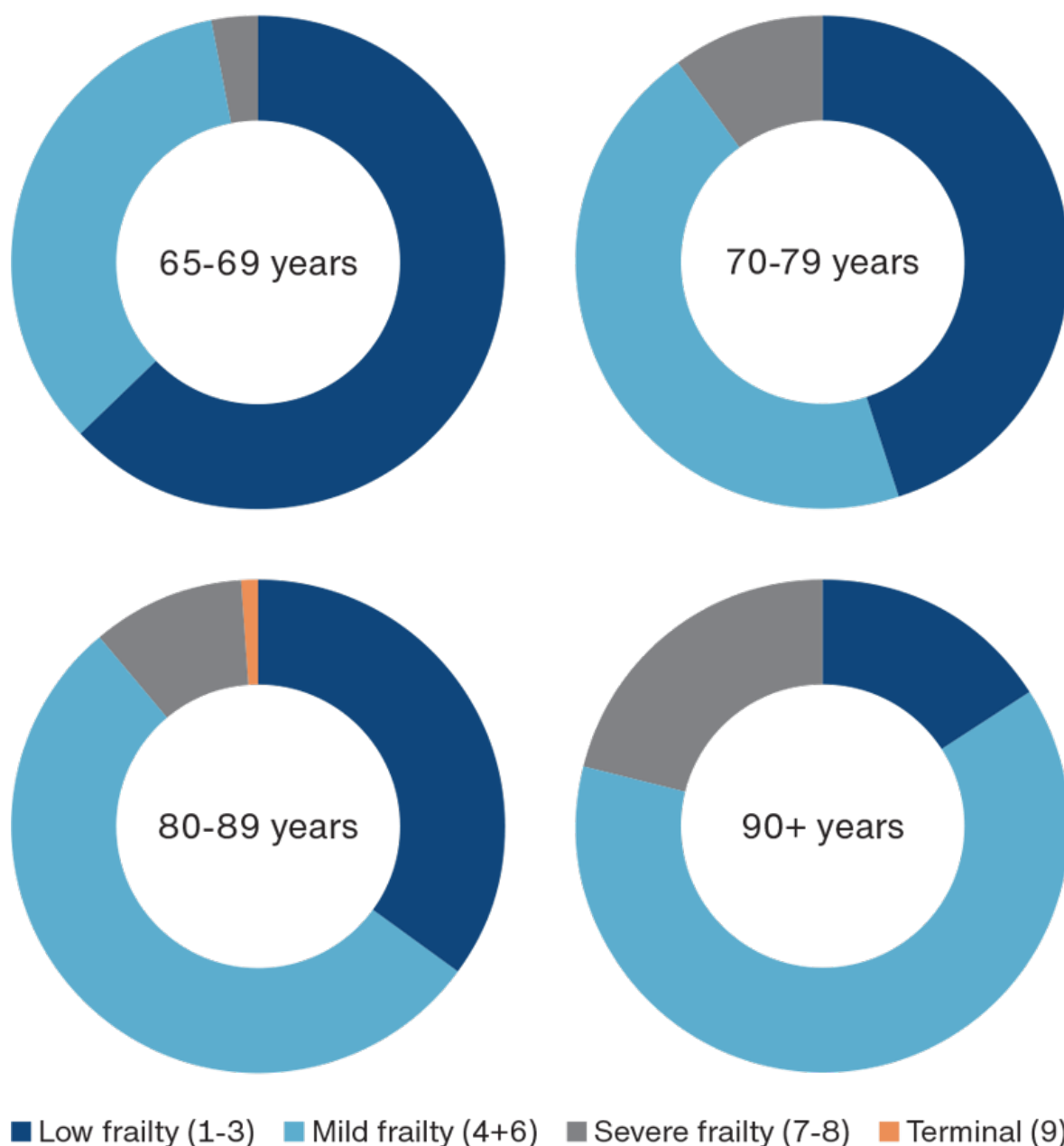
FIGURE 2 Clinical Frailty Scale score distribution at all three emergency departments.



CFS = Clinical Frailty Scale; OUH = Odense University Hospital.

Among patients aged 65-69 years, over 37% exhibited mild or more severe frailty. The prevalence of frailty increased with age, with more than 84% of patients aged 90 years and older exhibiting mild or more severe frailty (Figure 3).

FIGURE 3 Clinical Frailty Scale score distribution by age group.



Nearly half of the patients were dismissed from the ED without hospitalisation, with more than 55% exhibiting mild or more severe frailty. Among the admitted patients, mild or more severe frailty was frequent in all specialities, affecting over 47% of ED patients and more than 62% of those in medical departments. Frailty was most prevalent in the surgical specialities, accounting for over 68% of admitted patients ([Table S2](#)).

DISCUSSION

Discussion of results

This study examined the demographic characteristics and baseline CFS scores among patients aged 65 years or older in three Danish EDs. The findings indicate that over 58% of all patients had mild or more severe frailty, with prevalence rising with age. Importantly, a substantial proportion of patients aged 65-80 years also demonstrated frailty, indicating that clinically relevant frailty presents well before the age threshold currently planned for national screening. Notably, patients with terminal illnesses were underrepresented in this study, likely because those with cognitive impairments, who could not provide informed consent, were excluded. Since severe frailty often correlates with cognitive impairments [13], it is reasonable to assume that many terminally ill patients were omitted. However, the overall frailty prevalence observed in this study aligns with the findings from a European flash mob study [14] and a systematic review of hospitalised older adults [15].

The frailty prevalence at the OUH (> 62%) was slightly higher than at Esbjerg (49%) and Kolding (> 57%). These differences may reflect variations in hospital size, with the OUH being a highly specialised facility, as well as differences in pre-hospital services, such as the mobile consultation initiatives implemented in Odense [16] and Esbjerg [17]. Additionally, variations in physician consultations before ED admission should be mentioned, as these may have influenced which patients were admitted to the ED. Remarkably, Esbjerg did not receive patients with severe frailty. This might be a result of pre-hospital services and/or primary care set-ups, but this remains unknown. The study population most frequently presented with medical conditions in the EDs, with medical cases being more prevalent in Esbjerg than at the other two sites. Notably, frailty was more prevalent in the surgical speciality, which should be considered as a potential factor contributing to the differences in frailty prevalence across the three sites.

Research emphasises the importance of identifying frailty in the ED using standardised terminology and assessment tools that are evidence-based and clinically usable [18]. The implementation of national frailty screening using the CFS for patients aged 80 years and older aims to monitor and improve the assessment and treatment of frail elderly patients nationwide [10]. As part of this screening implementation, generating evidence that is directly applicable to clinical practice is essential. The observed prevalence of frailty among patients aged 65 years and older indicates that screening these patients is also highly relevant. Notably, more than 35% of patients aged 65-69 years and more than 58% of patients aged 70-79 years exhibited mild or more severe frailty. This group of patients will remain unidentified if screening is limited to patients aged 80 years or older, which may be an important consideration for the implementation process. Limiting routine assessment to individuals aged 80+ years risks missing a clinically significant segment of the population. Based on the results of the study, we consider that attention to frailty may be equally relevant for all older adults, not only those over 80 years of age.

Early attention to the patient's frailty status, based on their condition within the preceding two weeks, may enhance multi-disciplinary collaboration and information sharing regarding the progression of frailty [19]. Therefore, screening for frailty both in and outside the hospital may be a key means to developing more coherent and holistic care for older frail patients.

Methodological considerations

The recruitment approach should be noted as a limitation, as patients who were unable to give informed consent were excluded. This exclusion may have underrepresented patients with terminal illnesses in the ED population, potentially distorting the full picture. Additionally, acute illness can impair patients' ability to concentrate [20], possibly leading to lower test scores and an overestimation of the prevalence of cognitive dysfunction. However, the findings presented remain highly relevant, reflecting real-world clinical practice, especially since terminally

ill patients are not the target group for developing long-term targeted interventions in the ED.

Another limitation of the data collection in this study is that participants were included over two days, from 6 AM to midnight, with data in Kolding being collected by a single person. As a result, 98 eligible patients were not reached, which may have introduced bias affecting the representativeness of the patient population. The data collectors did not report any problems using the CFS app.

We chose to categorise frailty based on a recognised classification [11]; had we used a different framework, the results might have been distributed differently.

The frailty screening was conducted by healthcare professionals using the validated CFS score, ensuring a reliable representation of the clinical situation, which is an important strength of this study. This approach probably improves external validity compared with assessments based solely based on medical records, which may have missing or incomplete data. Additionally, including a multicentre population from Southern Denmark is considered to have strengthened the study's generalisability.

Conclusions

This flash mob study across three ED sites in Southern Denmark found a high prevalence of frailty among adults aged 65 years and older, including a substantial proportion aged 65-80 years, who risk remaining unrecognised if screening focuses exclusively on those aged 80 years and above. The prevalence of frailty increased with age and varied across sites. Patients with terminal illness were underrepresented in this study, likely due to the exclusion of patients who were unable to give informed consent due to cognitive impairments. The findings emphasise the importance of adjusting EDs to provide effective and comprehensive care for frail patients with complex healthcare needs.

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