Frailty screening with comprehensive geriatrician-led multidisciplinary assessment for older adults during emergency hospital attendance in Ireland (SOLAR): a randomised controlled trial

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Summary

Background Multidisciplinary comprehensive geriatric assessment (CGA) improves outcomes in hospitalised older adults but there is limited evidence on its effectiveness in the emergency department. We aimed to assess the benefits of CGA in the emergency department for older adults living with frailty.

Methods In this randomised controlled trial, we enrolled older adults (≥75 years) who presented to the emergency department with medical complaints at University Hospital Limerick (Limerick, Ireland). Participants screened positive for frailty on the Identification of Seniors at Risk screening tool (score ≥2). Patients requiring resuscitation as well as those with COVID-19, psychiatric, surgical, or trauma complaints were excluded. Participants were randomly allocated 1:1 to geriatrician-led multidisciplinary CGA and management or usual care. Outcome assessors were masked to treatment allocation. The primary efficacy outcome was time spent in the emergency department, defined as the time from registration on the computer database until time of discharge or admission to an inpatient ward in the intention-to-treat population. This study is registered with ClinicalTrials.gov, NCT04629690.

Findings Between Nov 9, 2020, and May 13, 2021, we recruited 228 patients. 113 participants were included in the intervention group (mean age 82·4 years [SD 4·9]; 63 [56%] women; 113 [100%] White Irish) and 115 in the control group (83·1 [5·6]; 61 [53%]; 112 [97%]). Median time in the emergency department was 11·5 h (IQR 5–27) in the intervention group and 20 h (7–29) in the control group (median difference [Hodges–Lehmann estimator] 3·1 h [95% CI 0·6–7·5]; p=0·013). There were no adverse events related to the intervention.

Interpretation Geriatrician-led multidisciplinary assessment of older adults living with frailty was associated with reduced time spent in the emergency department setting at index visit and lower rates of nursing home admission, greater increases in quality of life, and lower decreases in function at both 30 days and 180 days. Multicentre trials are needed to confirm the external validity of the findings. This study provides an evidence base for similar teams in an emergency department setting.

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Introduction

The number of older adults presenting to the emergency department is rising, and their cases are associated with increased complexity, multimorbidity, and frailty. Individuals who are identified as frail via screening have increased mortality, emergency department reattendance, rehospitalisation, nursing home admission, and functional decline following an emergency department visit.[1] It is important to identify individuals at highest risk of adverse outcomes so that age-attuned resources can be directed to meet their needs in the acute or community setting. Frailty screening is one method to achieve this and has been advocated by both the British Geriatric Society and the European Taskforce for Geriatric Emergency Medicine.[2]

Complex interventions in the busy, overcrowded emergency department setting have proven difficult to implement, and there are challenges in measuring the intended benefit. Comprehensive geriatric assessment (CGA) has proven benefit in acute geriatric wards.[3] The transferability of these benefits across different settings of care for older people has been studied,[4] with mixed results for the emergency department setting. The heterogeneity of the patient cohort and the difficulty in providing a complex intervention in the emergency department setting were key contributing factors to the mixed results. Two recent umbrella reviews highlighted the lack of studies of good quality yielding consistent results assessing the benefits of CGA in the emergency department.[5,6] However, interventions that were multidisciplinary in nature with a focus on goal setting,

Research in context

Evidence before this study

Comprehensive geriatric assessment (CGA) has been proposed in various settings as a means of providing holistic care for older people living with frailty. In advance of this trial, a literature search was conducted on PubMed to explore evidence of the effectiveness of CGA in the emergency department setting. The search strategy is included in the appendix (p 1). The search terms included were "Comprehensive Geriatric Assessment", "older patients", and "emergency department", limited from Jan 1, 2011, to April 1, 2024. Exclusion criteria included papers on CGA performed in acute geriatric wards, in community settings, or in a specific patient cohort such as surgical patients. 1765 studies were found, and 50 full-text publications were reviewed to inform the background of the manuscript. Several narrative reviews have examined the potential elements of CGA that could be of benefit. However, there was a paucity of randomised controlled trials assessing the efficacy of CGA in the emergency department setting. Previous reviews of CGA in the emergency department setting have shown inconsistent results and highlight the heterogeneity in the intervention methodology. There was substantial heterogeneity in relation to the population involved, the CGA intervention itself, and the outcomes measured. A recent randomised controlled trial showed no benefit to CGA in the emergency department setting. We aim to evaluate the effect of CGA in the emergency department setting in older adults who screen positive for frailty.

See Online for appendix

Added value of this study

This study evaluated the effect of CGA on a cohort of older adults who have screened positive for frailty on the Identification of Seniors at Risk screening tool. This geriatrician-led holistic interdisciplinary intervention was feasible in the emergency department setting and had improved hospital-related and patient-related outcomes at both 30 days and 180 days from the index emergency department visit. The intervention was associated with lower rates of hospital readmission and nursing home admission and with less decrease in functioning (as determined by the Barthel index) at 180 days. These results highlight the sustained benefit to frail older adults from the CGA that was performed in the emergency department setting at their index visit. This study shows the benefit of this complex intervention delivered by a specialist team, which contrasts with previous single interventions that had inconsistent results in this environment. Due to the wide inclusion criteria, this study mirrors the heterogeneous presentations of older adults living with frailty who attend the emergency department and is therefore translatable to routine clinical practice.

Implications of all the available evidence

Globally, health-care systems are endeavouring to manage patients who are older and have complex comorbidities with an increasing burden of disease. It is necessary to risk-stratify patients for evidence-based CGA; frailty screening is one such method that enables clinicians to identify the most suitable patients for this intervention. CGA has shown an improvement in outcomes for older adults living with frailty in this study. This study could form the basis for integrating CGA into the routine care of older adults who screen positive for frailty in emergency department settings. This approach will require the recruitment of age-attuned specialist teams in this setting. Future research should explore the effectiveness of this intervention in other emergency department settings and health-care systems. Frailty screening and subsequent geriatrician-led multidisciplinary assessment should be key elements in future policy for the management of older adults in the emergency department setting.

discharge planning, and risk stratification were noted to be more beneficial compared with single interventions.[6]

The high risk of adverse outcomes associated with frailty identified using the Identification of Seniors at Risk (ISAR) screening tool at the index emergency department visit has been shown.[7] Frailty screening provides a mechanism to target a high-risk group for resource-intensive CGA. The aim of this study was to assess whether a geriatrician-led multidisciplinary assessment and management plan (the CGA) in an emergency department setting affects patient experience time (PET) in the emergency department, mortality, emergency department reattendance, rehospitalisation, nursing home admission, and functional decline at 30 days and 180 days from the index visit.

Methods

Study design

This study was a single-centre, two-armed randomised controlled trial with 1:1 allocation. It was performed in the emergency department of University Hospital Limerick (Limerick, Ireland) with a catchment area of 400 000 patients. The study adhered to the CONSORT guidelines[8] and was registered at ClinicalTrials.gov (NCT04629690).

Focus groups were conducted before the initiation of the study to determine the priorities and preferences of older people in relation to the CGA model of care. Older adults were particularly keen to have outcomes of function and quality of life included in the trial. Furthermore, a measure of their satisfaction with care was also discussed. These outcomes were incorporated in a pro forma that was used as part of the study. The initial protocol was reviewed by a patient representative whose views greatly influenced the design of the study. The team liaised with a group of older adults in the Ageing Research Centre at University of Limerick. A patient and public involvement representative (MO'L) contributed as an author of this paper.

Participants

All adults aged 75 years or older who presented to the emergency department with medical complaints were screened by the research nurse for frailty using the ISAR tool.[9] Those who scored greater than or equal to 2 were identified as screening positive for frailty and therefore eligible for inclusion in the study. Patients requiring care in the resuscitation area or those with psychiatric, surgical, or trauma complaints were excluded. Patients with a high likelihood of having COVID-19 were also excluded. This decision deviated from the original protocol. Patients were recruited between 0800 h and 1600 h, Monday to Thursday, by a research nurse (GC or Ida O'Carroll [University Hospital Limerick, Limerick, Ireland; appendix]) who also obtained written informed consent. The protocol for the study is published elsewhere.[10] Ethical approval was obtained before recruitment began from the Mid Western Regional Hospital Ethics Committee. Baseline demographic information was collected at the index visit and included: age, gender, presenting complaint, conveyance method to emergency department, history of falls, Manchester Triage Category,[11] Clinical Frailty Scale,[12] Charlson Comorbidity Index score,[13] and Waterlow Score (appendix pp 19–21).[14]

Randomisation and masking

Following baseline evaluation, the research nurse used the Sealed Envelope website to allocate patients to the intervention or control groups in a 1:1 ratio. Randomisation was completed in blocks of 50 to ensure equal numbers of patients in both groups. Access to the website was limited to the research nurse (GC) and the intervention team was blinded to group assignment until after allocation. It was not possible for participants to be blinded to their allocation. The outcome assessor was blinded to the allocation.

Procedures

The control group were managed as per the usual care pathway, with assessment by the emergency department physician and subsequent assessments by allied health professionals or the medical team if indicated by the treating physician. The composition of the admitting medical team for the control arm varied depending on the medical consultant overseeing the admission, which could have been a general medicine consultant or one specialising in geriatric medicine. The control group did not have access to a specialised geriatric ward and thus had variable access to multidisciplinary teams on the wards. There was also no team of health and social care professionals available in the emergency department for admitted patients in either group—these services were only accessible once patients were admitted to the ward. A flow diagram of an example of the control care pathway is available in the appendix (p 1).

For participants in the intervention group, a geriatrician-led multidisciplinary holistic assessment was performed in the emergency department at the index visit by a multidisciplinary team including a doctor, advanced nurse practitioner, senior occupational therapist, senior social worker, senior physiotherapist, and pharmacist. The CGA encompassed management of the presenting complaint, falls review, cognitive assessment, medication review by a pharmacist, bone health assessment, and social and environment assessment. This holistic assessment was based on the CGA processes proposed by Ellis and Langhorne.[3] Patients were either admitted for further care if required, followed up by outpatient services (if deemed necessary), or discharged to their general practitioner with a comprehensive discharge letter detailing the assessment and recommended follow-up. A dedicated pro forma was used to maintain fidelity (appendix pp 2–18). The pro forma was based on consultation with clinicians in allied health, nursing, geriatrics, and emergency medicine.

Outcomes

The primary outcome was time spent in the emergency department or acute medical assessment unit (AMAU) setting before admission to a ward bed or discharge home (known as the patient experience time [PET]). This outcome was used as it is a national key performance indicator for emergency department care in Ireland, similar to other health-care settings such as the NHS in the UK.[15] A 2022 study highlighted the adverse events associated with longer PET in the emergency department, including an increased mortality rate associated with PET of longer than 5 h.[16] The PET was calculated as the time from registration on the hospital computer system to the time when the patient left the emergency department or arrived in the inpatient ward. Secondary outcomes were mortality, hospital admission at index emergency department visit and length of stay, emergency department reattendance, hospital admission at subsequent emergency department presentation and subsequent length of stay, functional decline (defined as decrease in baseline score on the Barthel Index [0–20]),[17] primary care service use (visit to general practitioner or public health nurse), geriatric service use (visit to geriatrician), nursing home admission, quality of life measured by the 3-level EQ-5D[18] and the EQ visual analogue scale (EQ5D-VAS),[19] and satisfaction measured using the Patient Satisfaction Quality-18 [20], a short-form version of the Patient Satisfaction III questionnaire. Outcomes were assessed by a blinded telephone assessor (LB) at 30 days and 180 days. Satisfaction surveys using the Patient Satisfaction Quality-18[20] were administered at 30 days only. Hospital-related outcomes were assessed using data from hospital management systems.

For **Sealed Envelope**, see https://www.sealedenvelope.com

Statistical analysis

A study sample of 236 patients was estimated based on the primary outcome (emergency department length of stay) using G*Power version 3.1. Based on data from the PET database used in the emergency department at University Hospital of Limerick (unpublished), the average emergency department length of stay for patients aged 75 years or older for 2019 was 18·63 h (SD 19·91). Estimating a 50% decrease

in emergency department length of stay in the intervention group (mean 9·31 h; based on the average PET in the previous year), and with a 20% attrition rate to follow-up, a sample size of 236 patients (118 in each group) was required to achieve 90% power with two-tailed tests at an alpha level of 0·05.

Participants' demographic characteristics at the index visit, and outcome variables at the index visit, day 30, and day 180 for both the CGA intervention and control groups were summarised using descriptive statistics. Numerical data were assessed for skewness through visual inspection of histograms and quantile–quantile plots and summarised as mean (SD) if symmetrical, and median (IQR) otherwise. Categorical data were summarised as number (%). Differences between groups in the primary outcome at the index visit were compared using a Mann–Whitney test (*U*), due to the skewness of the data. The Hodges–Lehmann estimator was used to calculate median differences with 95% CIs. Differences between groups in continuous secondary outcomes were assessed at the three timepoints (index, 30 days, and 180 days) by the Mann–Whitney test due to the skewness of data. Categorical secondary outcomes were compared between groups at the three timepoints (index, 30 days, and 180 days) using risk ratios (RR) with associated 95% Wald confidence interval,[21] where p values were computed using the χ^2 test or Fisher's exact test as appropriate. The Haldane–Anscombe correction was applied to compute RR (95% CI) in the case of zero values. Intention-to-treat analyses of change from baseline in the Barthel Index and EQ5D-VAS were undertaken using linear mixed models as a repeated measures ANCOVA with baseline score as a covariate and time (30 days and 180 days), treatment (CGA and control), and time by treatment as fixed effects. An unstructured covariance structure was selected to account for within-person correlation, having better model fit when compared to a compound symmetry covariance structure as assessed using likelihood ratio tests. Normality and homogeneity of variance of residuals from the mixed-effects models were assessed through residual diagnostic plots. All randomised participants were included in the analyses as per the intention-to-treat principle. A 5% level of statistical significance was applied throughout the analyses. Statistical analyses were undertaken using IBM SPSS V28 software.

Process evaluation and cost analysis are currently in progress and will be published separately.

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Results

228 participants were recruited to the study between Nov 9, 2020, and May 13, 2021 (table 1). 113 participants were included in the intervention group (mean age 82·4 years [SD 4·9]; 63 [56%] women; 113 [100%] White Irish) and 115 were included in the control group (83·1 [5·6]; 61 [53%]; 112 [97%]). 48 (42%) of participants in each group had been referred to the emergency department by their general practitioner before their index visit. There was significant variation in the indication for hospital presentation (appendix 7). Six patients were lost to follow-up or withdrew

	Comprehensive multidisciplinary geriatric assessment (n=113)	Control (n=115)
Age (years)	82·42 (4·92)	83·08 (5·61)
Sex		
Female	63 (56%)	61 (53%)
Male	50 (44%)	54 (47%)
Marital status		
Married or in a relationship	35 (31%)	48 (42%)
Widowed	60 (53%)	53 (46%)
Single	13 (12%)	10 (9%)
Separated or divorced	5 (4%)	4 (3%)
Residential status		
Lives with family	53 (47%)	64 (56%)
Lives alone	52 (46%)	45 (39%)
Nursing home	8 (7%)	6 (5%)
Ethnicity		
White Irish	113 (100%)	112 (97%)
Unknown	0	3 (3%)
Mode of entry		
Ambulance	60 (53%)	66 (57%)
Private transport	50 (44%)	47 (41%)
Public transport	3 (3%)	2 (2%)
Referral		
General practitioner	48 (42%)	48 (42%)
Self	58 (51%)	61 (53%)
Nursing home	2 (2%)	3 (3%)
Other	4 (4%)	3 (3%)
Triage category		
2	9 (8%)	12 (10%)
3	101 (89%)	102 (89%)
4	3 (3%)	1 (1%)
Reported a fall in the past 3 months	51 (45%)	54 (47%)
Barthel	18 (12–19)	17 (13–18)
EQ5D-3L		
Mobility	2 (2–2)	2 (2–2)
Self-care	2 (1–2)	2 (1–2)
Usual activities	2 (2–2)	2 (2–3)
Pain or discomfort	2 (1–2)	2 (1–2)
Anxiety or depression	1 (1–2)	2 (1–2)
EQ5D-VAS	45 (40–50)	40 (30–50)
ISAR	3 (2–4)	3 (3–4)
CFS	5 (5–6)	5 (5–6)
Charlson	4 (3–5)	4 (3–5)

Data are n (%), median (IQR), mean (SD), or n/N (%). Barthel=Barthel Index for Activities of Daily Living. CFS=Clinical Frailty Scale. Charlson=Charlson Comorbidity Index. EQ5D-VAS=EQ5D-visual analogue scale. ISAR= Identification of Seniors at Risk.

Table 1: **Baseline characteristics**

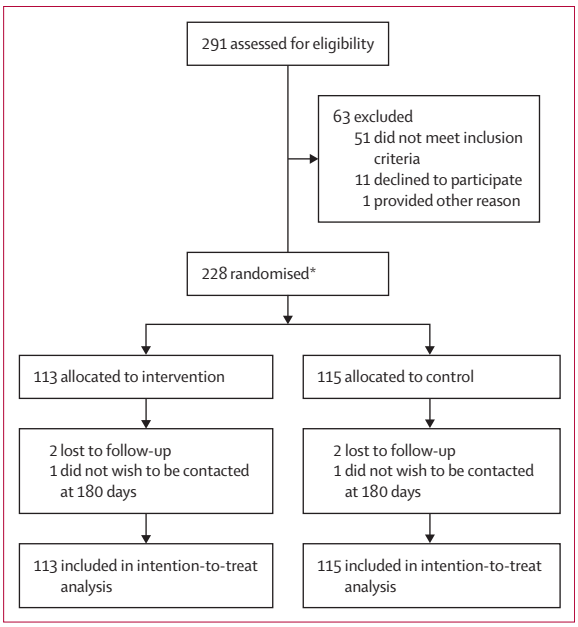

Figure 1: **Trial profile**
*229 participants were initially recruited, with one erroneously recruited twice.

from the study by 180 days (figure 1). The median follow-up was 30 days (IQR 30–30). No adverse events occurred that were related to the conduct of the study.

The median PET was 11·5 h (IQR 5–27) in the intervention group, compared with 20 h (7–29) in the control group (median difference [Hodges–Lehmann estimator] 3·1 h, [95% CI 0·6–7·5]; p=0·013; table 2). Probability of hospital admission (p=0·082) or the length of stay of those admitted (p=0·51) did not differ between groups (table 2).

At 30-day follow-up, incidence of emergency department reattendance or hospital readmission did not differ between groups (table 3). However, primary care service use was lower in the intervention group (65 [64%] of 102 patients in the intervention group *vs* 85 [83%] of 103 in the control group; risk ratio [RR] 0·77, 95% CI 0·65–0·92) and geriatric service use was higher in the intervention group (45 [44%] of 102 *vs* 26 [25%] of 103; 1·75, 1·17–2·60). Only one (1%) of 102 patients in the intervention group was admitted to a nursing home, compared with nine (9%) of 102 in the control group (RR 0·11, 0·01–0·86); the sparseness of the data is reflected in the width of the confidence interval. For those readmitted to hospital, length of stay did not differ between groups (p=0·089). Observed median values were higher in the intervention group for both the EQ5D-VAS and Barthel (table 3). Median satisfaction was higher in the intervention group compared with the control group (31·6 *vs* 22·3, p<0·0001).

At the 180-day follow-up, observed emergency department reattendance rate did not differ between groups (table 4). Hospital readmission rates (34 [37%] of 93 patients *vs* 56 [57%] of 98 patients, RR 0·64 [95% CI 0·47–0·88]) and nursing home admission rates (9 [9%] of 95 patients *vs* 27 [27%] of 100 patients, 0·35 [0·17 to 0·71]) were lower in the intervention group. Geriatric service use was higher in the intervention group (68 [72%] of 94 patients *vs* 52 [53%] of 99 patients, RR 1·38 [1·10–1·73]). At 180 days all participants analysed had visited their general practitioner. Of those readmitted to hospital by 180 days, length of stay did not significantly differ between treatment groups (p=0·92). Observed median values were higher in the intervention group for both the EQ5D-VAS and Barthel (table 4).

Results from the mixed-effects ANCOVA of change from baseline for the quality of life (EQ5D-VAS) and function

	Comprehensive multidisciplinary geriatric assessment (n=113)	Control (n=115)	Risk ratio (95% CI)	p value
ED PET, h	11·5 (5–27)	20 (7–29)	..	0·013
Hospital admission	78 (69%)	91 (79%)	0·87 (0·75–1·02)	0·082
Length of stay, days	7·5 (3–13)	7 (4–17)	..	0·51

Data are n (%) or median (IQR). ED=emergency department. PET=patient experience time.

Table 2: **Index visit outcomes**

	Comprehensive multidisciplinary geriatric assessment	Control	Risk ratio (95% CI)	p value
Emergency department reattendance	18/101 (18%)	15/102 (15%)	1·21 (0·65–2·27)	0·55
Hospital readmission	18/101 (18%)	18/102 (18%)	1·01 (0·56–1·83)	0·97
Length of stay, days	5 (2–10)*	5 (0–10)†	..	0·089
Mortality	13/113 (12%)	7/115 (6%)	1·89 (0·78–4·56)	0·15
Primary care service use	65/102 (64%)	85/103 (83%)	0·77 (0·65–0·92)	0·0024
Geriatric service use	45/102 (44%)	26/103 (25%)	1·75 (1·17–2·60)	0·0045
Nursing home admission	1/102 (1%)	9/102 (9%)	0·11 (0·01–0·86)	0·019‡
Barthel	17·5 (13–20)§	14 (9–18)¶	..	..
EQ5D-VAS	80 (50–80)§	40 (27–60)¶	..	..
Patient satisfaction	31·6 (29–35)‡	22·3 (17–26)*	..	<0·0001

Data are median (IQR) or n/N (%). Barthel=Barthel Index for Activities of Daily Living. EQ5D-VAS=EQ5D-visual analogue scale. *n=21. †n=26. ‡Fisher's exact test. §n=100. ¶n=108.

Table 3: **30-day outcomes**

	Comprehensive multidisciplinary geriatric assessment	Control	Risk ratio (95% CI)	p value
Emergency department reattendance	37/93 (40%)	50/99 (51%)	0·79 (0·57–1·08)	0·14
Hospital readmission	34/93 (37%)	56/98 (57%)	0·64 (0·47–0·88)	0·0044
Length of stay, days	10 (5–20)*	10·5 (4–27)†	..	0·92
Mortality	22/111 (20%)	17/111 (15%)	1·29 (0·73–2·30)	0·38
Primary care service use	95/95 (100%)	107/107 (100%)	1·00 (0·97–1·03)‡	1·00
Geriatric service use	68/94 (72%)	52/99 (53%)	1·38 (1·10–1·73)	0·0045
Nursing home admission	9/95 (9%)	27/100 (27%)	0·35 (0·17–0·71)	0·0016
Barthel	18 (12–20)§	13 (8–17)¶	..	..
EQ5D-VAS	90 (60–100)§	40 (20–60)¶	..	..

Data are median (IQR) or n/N (%). Barthel=Barthel Index for Activities of Daily Living. EQ5D-VAS=EQ5D-visual analogue scale. *n=26. †n=46. ‡Haldane–Anscombe correction. §n=89. ¶n=92.

Table 4: **180-day outcomes**

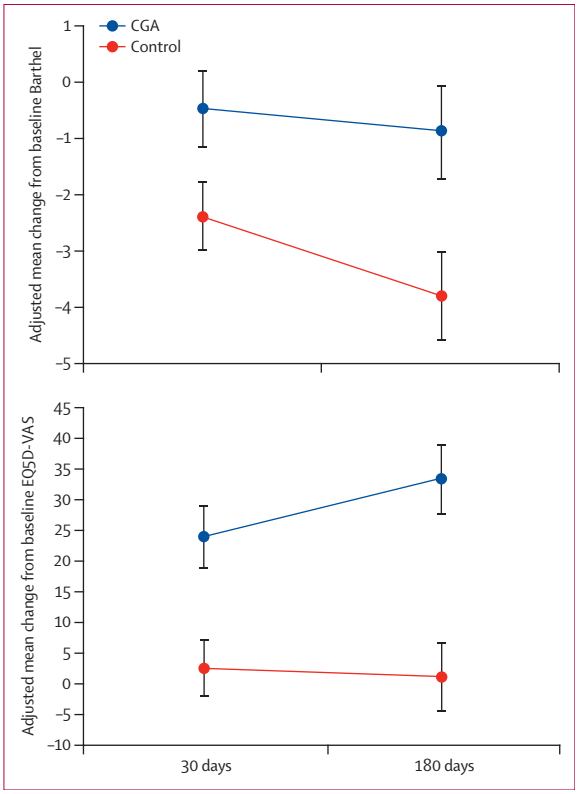

Figure 2: **Comparison of the Barthel Score and EQ5D VAS across groups over time in the intervention and control group.**

(Barthel) scales are presented in the appendix (p 21). Quality of life increased more in the intervention group compared with control at 30 days (mean difference 21·43, 95% CI 14·71–28·16; p<0·0001) and at 180 days (32·48, 24·87–40·10; p<0·0001). The time by treatment interaction term was significant for EQ5D-VAS (p=0·0085), suggesting that treatment-related differences in quality of life significantly increased between 30 days and 180 days. Function decreased in the intervention group compared with control at 30 days (1·93, 1·06–2·81; p<0·0001) and 180 days (2·95, 1·82–4·08; p<0·0001). The time by treatment interaction term was not statistically significant for Barthel (p=0·055). Estimated mean change scores (95% CI) at 30 days and 180 days are illustrated in figure 2.

Discussion

Our study showed that emergency department and acute medical admission unit PET were significantly lower with a dedicated CGA intervention, with a median time of 11·5 h compared with 20 h in the control group. There were also improvements in hospital-related outcomes including lower hospital reattendance and nursing home admission at 180 days. Observed emergency department reattendance was lower in the intervention group (37 [40%] of 93 patients *vs* 50 [51%] of 99 patients, RR 0·79 [95% CI 0·57–1·08]) at 180 days, a clinically relevant but not statistically significant difference. With regard to patient-reported outcomes, quality of life measurements increased from baseline to 30 days and 180 days for the intervention group, and these changes were higher than noted in the control group. Changes in function showed larger decreases in the control group than in the intervention group at 30 days and 180 days, highlighting that older adults were more likely to maintain function in the intervention group. Satisfaction measured at 30 days was higher in the intervention group. Our findings show the benefit of this CGA intervention in the emergency department setting, and we postulate several reasons underpinning these findings. Identification of a holistic range of issues at an early stage allows clinicians to intervene earlier—typically, it can be difficult to identify these complex multifaceted issues during acute medical assessments by junior staff in this environment. Second, increased communication by the intervention team to the patient and families might have allowed patients to have greater agency and to advocate for themselves going forward. Third, the referrals organised by the intervention team allowed the community health-care services to proactively follow patients on discharge.

Both Hogervorst and colleagues[22] and Conroy and colleagues[23] have provided an extensive review of the importance of CGA in hospitalised older adults, and hypothesise that routine hospital measures might not be applicable to stratify care for older adults. Frailty screening could provide a better method for risk stratification in older adults than the routine measures currently used. In the SOAED study, we showed that one in 20 older adults living with frailty had died by 30 days post initial index emergency department visit and one in five had been readmitted to hospital. Almost half of these older adults reported functional decline.[1] Furthermore, improvements in satisfaction, function, and quality of life could have a greater effect on the lives of older adults than hospital process-focused outcomes. A systematic review by Van Oppen and colleagues proposed patient-related outcome measures that might be more suitable for older adults in emergency department settings.[24]

A systematic review and meta-analysis by Rezaei-Shahsavarloo and colleagues noted the paucity of randomised control trials investigating interventions for older patients living with frailty in acute hospitals.[25] However, there was a trend towards improved outcomes in studies that incorporated multidimensional interventions with multidisciplinary teams, similar to the intervention used in this study.[25] The current randomised controlled trial is one of the first to investigate a multicomponent, multidisciplinary CGA in the emergency department setting. A previous trial showed that a multidisciplinary intervention in the emergency department had more benefit for 6-month outcomes compared with usual care.[26] Other work suggests that interventions performed in the emergency department do not confer improvements in outcomes at 30 days, similar to the findings of this study, but do show statistically significant improvements in outcomes at 180 days, showing that the benefit of these interventions might be more significant for longer-term outcomes.[27]

Our findings further align with the EDIFY study, set in a tertiary unit in Singapore, which showed that early specialist geriatric involvement in the emergency department was associated with lower acute admission in patients aged 85 years and older.[28] There was less evidence towards fewer hospital admissions at index visit in the intervention group of our study, albeit not statistically significant.

Previous research by the author group of this study has confirmed the adverse outcomes associated with screening positive for frailty in older adults presenting to the emergency department.[1] The implementation of a geriatrician-led interdisciplinary team improves both short-term outcomes of PET in the emergency department and AMAU setting and long-term outcomes of emergency department re-presentation, hospital admission, nursing home admission, and functional decline at 180 days. Prolonged periods on a trolley are known to be harmful to older adults and therefore interventions such as the CGA intervention in this trial that improve PET in the emergency department are of crucial importance to the overall care of these patients.[29] The Integrated Care Programme in the Irish health-care setting has highlighted the importance of frailty screening and frailty within geriatric emergency medicine specific teams to improve outcomes in this cohort of older patients presenting to the emergency department.[30] Our translational research augments the evidence base for these recommendations.

The heterogeneity of the presentations to hospital in this study mirrors the varying presentations that are assessed daily in an emergency department setting. This study confirms the benefit that this CGA intervention can have for older adults living with frailty who present with a wide range of medical complaints in this environment, and that these interventions should not be restricted to individual cohorts.

A key strength of this study was the randomisation of participants with blinded outcome assessment. Second, 180-day follow-up was provided with interrogation of both hospital databases as well as patient interviews, ensuring the robustness of the outcome data. Third, the trial had a very low attrition rate (2%) with low rates of missing data, and a broad cohort of older adults with varying medical presentations and acuity provides a population representative of older adults attending the emergency department during the working week. The primary outcome had no missing data and an intention-to-treat analysis of function and quality of life was undertaken; however, length of hospital stay at 30 days and 180 days was only relevant to those patients who were readmitted and therefore could not be analysed using intention-to-treat. Limitations on generalisability could result from inclusion of primarily a White Irish population at a single site and the inclusion of patients attending between 0800 h and 1600 h Monday to Thursday—thus patients presenting at night or at weekends are not represented as this cohort of patients may be of higher acuity as they are presenting out of hours, and therefore might require more intensive assessment than what is described in this study. Future studies should be extended to multiple sites and should include patients from diverse racial and ethnic backgrounds and patients presenting at night and weekends. Moreover, the study was carried out during the COVID-19 pandemic, and hospital processes were altered to comply with infection control issues; however, this would have affected both the intervention and the control group similarly and is unlikely to affect the overall results. Statistical limitations include low numbers of participants for some secondary outcomes that could result in sparse-data bias, not assessing for Type 1 error, and not controlling for multiple assessments. Finally, our study was not powered to assess differences in all secondary outcomes, which could be determined in future studies.

The development of a core set of outcomes for studies evaluating the effectiveness of CGA that incorporates both outcomes related to hospital processes and patient-related outcomes would provide a more holistic approach to determine the potential benefits of CGA. Furthermore, in addition to variations in outcome measures, there is heterogeneity in the description of CGA across studies, which creates difficulty for implementing CGA in practice. A framework that characterises CGA would aid in translating these studies into routine clinical practice. There is increased emphasis on developing an integrated approach to the management of older adults across the interface of acute and community settings. Further studies are necessary to show the potential benefits of this integration of care for older people.

Contributors

The SOLAR team carried out the intervention and contributed to study conceptualisation. AL contributed to conceptualisation, data curation, formal analysis, investigation, methodology, project administration, resources, software, supervision, validation, visualisation, writing of the original draft, and subsequent editing. LB contributed to the conceptualisation, formal analysis, methodology, validation of data, and editing of the original manuscript. GC contributed to the conceptualisation, data collection, investigation, project administration, and editing of the manuscript. AW contributed to conceptualisation, methodology, statistical analysis, drafting of original manuscript, and subsequent editing. HP contributed to the conceptualisation, methodology, statistical analysis, writing of the original draft, and editing the subsequent draft. ES, DS, and DR contributed to the conceptualisation, methodology, supervision, and editing of the manuscript. MO'L contributed to the conceptualisation, methodology, and the editing of the manuscript. MO'C contributed to conceptualisation, investigation, methodology, project administration, supervision, writing of the original manuscript, and subsequent editing. RG contributed to the conceptualisation, funding acquisition, methodology, project administration, resources, supervision, writing of the original draft, and subsequent editing. AL and LB accessed and verified all data. All authors had full access to all of the data in the study and had final responsibility for the decision to submit for publication.

Declaration of interests

We declare no competing interests.

Data sharing

The data collected in this study will be available on publication in a data repository. This will include the de-identified participant data and the data dictionary. The study protocol is already available online.

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