Comprehensive geriatric assessment for frail older people in acute hospitals: the HoW-CGA mixed-methods study

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Disclaimer: This report contains transcripts of interviews conducted in the course of the research and contains language that may offend some readers.

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Scientific summary

The HoW-CGA mixed-methods study

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Scientific summary

Background

Frail older people admitted for acute inpatient hospital care are at a high risk of adverse events, long stays, re-admission and long-term care. Comprehensive Geriatric Assessment (CGA) improves outcomes for this group, particularly on specialised wards. However, there is uncertainty about how best to implement CGA across whole hospitals. The aim of this programme of work was to provide high-quality evidence to support the delivery of hospital-wide CGA.

Objectives

To systematically:

- define CGA, its processes, outcomes and costs in the published literature
- identify the processes, outcomes and costs of CGA in existing hospital settings in the UK
- identify the characteristics of the recipients and beneficiaries of CGA in existing hospital settings in the UK
- use this new knowledge to develop tools that will assist in the implementation of hospital-wide CGA.

Methods

There were four workstreams: (1) defining CGA (literature review), (2) identifying CGA (national survey, large data analysis), (3) characterising beneficiaries (large data analysis and costing exercise) and (4) developing implementation tools (co-production, interviews and ethnography).

Literature review

We used the Joanna Briggs Institute (JBI) umbrella review method. We included systematic reviews and meta-analyses describing the provision of CGA in patients > 65 years of age, in acute hospitals. We searched the major clinical databases. Methodological quality and data abstraction were undertaken using the JBI tools.

National survey

The survey was developed by a multidisciplinary team (MDT) and included questions informed by the umbrella review and a related community study. The survey was piloted and validated, then refined using cognitive interviewing. A trust survey asked about the provision of acute care and was sent to each Chief Executive Officer. The response to this indicated who should be contacted to complete the online service survey about care delivery.

Large data analyses

Population segmentation

Patterns of past hospital activity were examined to determine if people aged ≥ 75 years could be categorised according to hospital care use. The study used Hospital Episode Statistics (HES) with local authority population censuses to estimate denominators and levels of local deprivation. Each HES electronic record contains up to 20 diagnosis fields coded using the *International Classification of Diseases,* Tenth Edition (ICD-10). A unique anonymised Hospital Episode Statistics Identifier was used to link multiple electronic records (including emergency and outpatient attendances) for the same patient with Office for

National Statistics mortality data. The segmentation examined people aged ≥ 75 years in 2008 living in Leicester, Nottingham or Southampton.

Risk stratification development

We undertook a cluster analysis on anonymised patient-level HES data for a development cohort (n = 22,139) of people aged > 75 years who were discharged from hospital between 1 April 2014 and 31 March 2015, excluding those discharged from mental health and community hospitals.

Three sets of variables were used to create the clustering matrix: ICD-10 diagnoses, bed-days and hospital costs. To create a 'similarity score' that could be used to group patients, we used Gower's method for combining binary (ICD-10 diagnoses) and continuous (bed-days and cost) variables. The number of clusters was chosen pragmatically to balance maximising the variance in similarity scores explained by the groups against producing a minimum number of clusters for clinically relevant interpretation. To identify a cluster of patients with characteristics of frailty, we used a small set of ICD-10 codes identified a priori as candidate markers of frailty.

We derived a 'hospital frailty risk score' score based on ICD-10 codes that were at least twice as prevalent in the frail cluster than in the rest of the cohort. We divided the 'hospital frailty risk score' into three categories of 'low', 'intermediate' and 'high' risk to aid interpretation.

Hospital frailty risk score validation

A national cohort of 1,013,590 people aged > 75 years, admitted to an acute hospital as an emergency between 1 April 2014 and 31 March 2015, was used to test outcome prediction: 30-day mortality, long length of stay (> 10 days in hospital) and emergency re-admission within 30 days of discharge (excluding patients who died in hospital). We estimated models with and without adjustment for patients' age, gender, socioeconomic status, admission history and Charlson Comorbidity Index (CCI). Associations between categories and outcome are presented using odds ratios and 95% confidence intervals (CIs). Model discrimination was summarised with a mean hospital-specific c-statistic.

We used a linked data set from cohort studies in Leicester, Nottingham, Southampton and Newcastle with clinical frailty data and a linked HES record, to test agreement between frailty ratings with the Fried Phenotype and the Rockwood Frailty Index. We used kappa coefficients with 95% CIs. Pearson's correlation coefficient indicated the association between the continuous versions of the hospital frailty risk score and the Rockwood Index.

Costing the Comprehensive Geriatric Assessment

We described key cost elements, including direct staff, training, consumables and overhead costs, using interviews, site visits and a survey. A workshop involving an External Steering Group captured the costs of CGA in frail versus non-frail older people.

Creating implementation tools

The toolkit development drew on the umbrella review, existing best practice guidance and implementation science, supported by co-production involving the External Stakeholder Group in a consensus-building exercise. The toolkit was tested in three services providing pre-operative assessment of older people who had cancer or who were awaiting vascular surgery. Data collection included ethnographic observations and interviews. Observations mainly focused on how the new intervention (both CGA content and toolkit) and concomitant changes in processes, systems and professional relationships were introduced and negotiated. We observed meetings in which care improvements were discussed, colleagues and staff were engaged, progress was evaluated and next steps were planned. Additional observations included clinicians testing new organisational arrangements and discussing interdisciplinary aspects of clinical work with colleagues within and beyond their own professions. Topic guides for interviews, and prompts for observations, drew on normalisation process theory.

External Steering Group and patient and public involvement

Throughout the programme, we drew on a specially convened group of interdisciplinary national stakeholders. We also created a bespoke older people's network aligned to the National Institute for Health Research Ageing Specialty Group, bringing in a wide range of perspectives from older people.

Results

Literature review

We screened 1010 titles and 419 abstracts for eligibility and 143 full articles for relevance, and we selected 13 for review.

Participants were older (≥ 55 years) inpatients in acute care settings. Generally frailty was not explicitly identified as a characteristic of CGA recipients. The most widely used definition of CGA was that of a multidimensional, multidisciplinary process that identifies medical, social and functional needs, and the development of an integrated/co-ordinated care plan to meet those needs. The main clinical outcomes included mortality, activities of daily living, cognition and dependency. Key operational outcomes were length of stay and re-admissions. 'Destinational' outcomes included living at home and institutionalisation. Patient-related outcomes were not usually reported. Few studies assessed costs and none evaluated different elements to include direct costs, subsequent costs, costs to patients and wider societal costs.

National survey

A total of 58 out of 175 (34%) trusts returned a trust survey and provided 121 service descriptions. CGA provision across inpatient settings varied, with some areas (e.g. orthopaedics, older people's medicine and stroke) more comprehensively provided with MDTs than others (surgical and oncology). Most services [108/121 (89%)] relied on clinical assessment processes to identify patients; 26% used a standardised method to identify frailty. Around 90% of services assessed cognition, activities of daily living, mobility, falls risk, medications, nutrition, continence and skin integrity routinely.

Large data analyses

Population segmentation

After 1 year, 62–76% of people aged ≥ 75 years had at least one hospital encounter, rising to 91–100% of people in this group at 4 years. At 1 year, 29% of people aged ≥ 75 years had had only outpatient contacts, falling to 13% at 4 years, at which point almost 37% of people aged ≥ 75 years had had more than one emergency admission. There was a positive correlation between deprivation levels and the proportion in the higher utilisation population segments.

Risk stratification

Among the 22,139 patients (58% female; mean age 83 years) in the development study, 45% experienced at least one hospital admission over a 2-year period.

One of the six clusters was identified as likely to represent frailty based on the high proportion (83%) of patients with at least one frailty marker from a predefined list of ICD-10 codes (compared with 29% of patients in the rest of the cohort). This frail cluster constituted one-fifth of the cohort but accounted for half of all days in hospital over the 2 years. Half of those in the frail cluster died over this period, compared with < 25% of those in the rest of the cohort. Within the frail cluster, 109 three-character ICD-10 diagnostic codes were at least twice as prevalent than in other clusters. A model including these ICD-10 codes as predictors discriminated strongly between patients in the frail and other non-frail groups, with a *c*-statistic of 0.94.

In the national validation cohort of > 1 million patients, patients' hospital frailty risk scores ranged from 0 to 99: two-fifths of patients were categorised as being at low risk (score < 5), two-fifths were categorised

as being at intermediate risk (5–15) and one-fifth were categorised as being at high-risk (> 15). The proportion of patients with poor outcomes increased with increasing values of the score. The association with mortality flattened out above a score of 15.

Across the three categories of increasing frailty risk, the mean CCI score increased from 2.0 to 4.5 and the proportion of patients with three or more past admissions increased (from 8% to 50%). The proportions with at least one frailty syndrome increased (23% to 95%), particularly for cognitive impairment (from 5% to 67%).

Those at a high risk of frailty had higher adjusted odds of 30-day mortality (> 70%), emergency re-admission within 30 days (> 50%) and a long stay in hospital (sixfold higher).

The hospital frailty risk score discriminated weakly between individuals with different outcomes within hospitals; the *c*-statistics were 0.60 for 30-day mortality, 0.68 for a long stay and 0.56 for 30-day re-admission, respectively. The inclusion of patients' other characteristics (age, gender, deprivation, admission history, comorbidity) improved discrimination to 0.69 for mortality, 0.73 for long length of stay and 0.61 for re-admission.

In the second local validation cohort (56% female; mean age 80 years), 40% of participants had a hospital frailty risk score above 5 (indicating 'intermediate' or 'high' risk). Compared with a dichotomised version of Fried (≥ 3 items present), the kappa score was 0.22. Compared with the Rockwood classification (using a cut-off of 0.25), the kappa score was 0.30. There was a positive linear association between the Rockwood index and hospital frailty risk score (Pearson's correlation coefficient of 0.41).

Costing the Comprehensive Geriatric Assessment

The stakeholder workshops used a range of patient care scenarios, estimating that additional staffing costs of performing a CGA were £90 for someone with marginal frailty and £172 for someone with severe frailty. The overall hospital costs for an average inpatient visit for a frail patient is around £2000–3000, representing an estimated 4.5–5.7% increase in cost from providing CGA.

Creating implementation tools

A multilevel approach was used:

- strategic (regional) level – aimed at System Resilience Groups and leads of Sustainability and Transformation Plans; content included data on higher-than-expected attendance/admission rates, length of stay, re-admission rates and institutionalisation among frailer individuals
- operational (acute trust) level – aimed at operational managers; content included national reports and data from this project to identify opportunities for improvement
- service level – aimed at clinical teams; content included a self-assessment tool to identify what processes needed development, supported by clinical, improvement and evaluation tools
- patient and carer level – aimed at empowering patients to take a more active role in their care; content included guidance on influencing acute service provision and information to increase awareness.

In total we undertook 28 hours of observational work and 52 interviews across three pilot services.

At sites 1 and 2, clinicians involved in surgery agreed to use the CGA toolkit, identifying potential benefits, including improved surgical decision-making and the delivery of interventions preoperatively to improve patient experience and outcomes. Sites ultimately concluded that pre-operative assessment was not the best place for the CGA, and, at the end of the 12-month trial, sites 1 and 2 were still at the start of implementation.

Clinicians understood that the new model of care could improve outcomes. The entanglement of CGA with ideas about holistic care and improving all patients' experiences meant that the specific focus of CGA

and frail older patients was partly sidelined. A final challenge was limited time, attention and resources, in light of completing day-to-day business.

At sites 1 and 2, the toolkit could not operate as a 'standalone' intervention without support from geriatricians. At site 3, the geriatrician took an active role, using the toolkit with the surgical lead to complete an informal assessment of current practice and competencies available, and to introduce CGA to clinicians. However, the extent to which the toolkit further influenced practice was unclear.

Sites 1 and 2 identified that clinical specialisms (e.g. pharmacy, physiotherapy, dietetics, nutrition, social work and discharge-planning) could contribute to holistic care and started thinking about how to create these 'missing' links. However, these efforts were competing against the dominance of national time-limited targets for treatment.

Geriatrician availability to work with the site teams regularly for a sustained period seemed critical, and it seems likely that initiatives would have progressed little without this. The geriatrician support was a driver but also an important source of ambiguity. Although the participating geriatricians were able to find time to support the teams during the pilot, it was not clear if this was sustainable. In effect, despite their initial differences in aims, the teams at sites 1 and 2 converged on setting up a liaison service in which a geriatrician was seen as crucial in offering help to those responsible for co-ordinating existing pathways.

Conclusions

Older people in acute hospitals are at high risk of poor outcomes, which can be improved through the delivery of specialist geriatric care in dedicated ward areas. The optimal method by which to deliver such care across the whole hospital is unclear. Current service provision is patchy, poorly standardised and, in surgical and oncology settings, does not usually involve teams specialised in older people's care.

It is possible to use predefined lists of diagnostic codes associated with frailty to identify people retrospectively following hospital admission.

A frailty risk score derived from routine data was tested in > 1 million patients. Those with a high frailty risk had 70% higher odds of inpatient mortality, six times the odds of a prolonged stay and 50% increased odds of emergency re-admission within 30 days. Although predictive at the group level, the ability of the risk categories to discriminate between individuals with different outcomes was low.

Clinical toolkits designed to empower non-geriatric teams to deliver CGA were received with initial enthusiasm but did not fully achieve their stated aims owing to the need for an extended period of service development with geriatrician support and to competing priorities.

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