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SHORT REPORT

Improving delirium screening and recognition in UK hospitals: results of a multi-centre quality improvement project

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Abstract

Background: delirium is an acute severe neuropsychiatric condition associated with adverse outcomes, particularly in older adults. However, it is frequently under-recognised.
Methods: this multi-centre quality improvement project utilised a collaborative approach to implementation of changes at sites, with the aim to improve delirium screening, recognition and documentation on discharge summaries. Resources, including delirium guidelines and presentations, were shared between sites, and broad details of local interventions were collected. Three timepoints of data collection (14 March 2018, 14 September 2018 and 13 March 2019) were conducted to assess screening, recognition and documentation of delirium in unscheduled admissions of adults aged ≥65 years old. The impact of local interventions and site-specific factors was assessed using logistic regression analysis, adjusting for patient factors.
Results: a total of 3,013 patients (mean age 80.2, 53.8% females) were recruited across the three timepoints. Screening for delirium was associated with increased odds of recognition (aOR 4.75, CI 2.98–7.56; $P < 0.001$); this was not affected by grade/profession of screener. Rates of screening, recognition and discharge documentation improved across the three timepoints of data collection. The presence of a local delirium specialist team was associated with increased rates of screening for delirium (aOR 1.75, CI 1.41–2.18; $P < 0.001$), and the presence of a geriatric medicine team embedded into the admissions unit was associated with increased recognition rates (aOR 1.78, CI 1.09–2.92; $P = 0.022$).
Conclusion: delirium screening is associated with improved recognition. Interventions that strive to improve screening within a culture of delirium awareness are encouraged.

Keywords: delirium, quality improvement, collaborative, education, older people

Key Points

- A multi-centre 'crowdsourcing' approach to quality improvement is feasible.
- Delirium screening, recognition and discharge documentation improved across each round of data collection.
- Screening for delirium increases the odds of recognition, and drives to improve screening are recommended.

Background

Delirium is an acute neuropsychiatric state defined by cognitive change and altered consciousness that occurs secondary to physical precipitants, particularly in older adults during hospitalisation [1]. Delirium is associated with adverse outcomes, but is frequently under-recognised [2]. Our previous research demonstrated that delirium screening increases recognition [1]. However, delirium screening was inconsistent. Screening and recognition were particularly reduced in surgical specialties [1]. Although delirium is reversible, it is associated with increased risk of later life dementia diagnosis [3]. Follow-up of patients who have experienced delirium is, therefore, vital. Unfortunately, delirium documentation on discharge summaries is infrequently performed [4]. In the UK, National Institute for Health and Care Excellence guidelines recommend that all adults aged ≥65 years old are screened for delirium on admission to hospital [5], and that delirium diagnoses are communicated to General Practitioners (GPs) on hospital discharge [6].

Aims

- To improve screening and recognition of delirium in older adults admitted to acute care hospitals as unscheduled admissions.
- To improve documentation of delirium diagnoses on discharge summaries.

Methods

This study presents results of a multi-centre quality improvement project, utilising a collaborative approach. Resources and knowledge were shared between sites, and sites were able to implement interventions locally according to service needs. Three timepoints of data collection were utilised (14 March 2018, 14 September 2018 and 13 March 2019). All timepoints of data collection included newly admitted (unscheduled) patients aged ≥65 years old to acute care trusts (all specialties, excluding critical care). We assessed for statistical significance of differences in likelihood of screening, recognition and discharge documentation across timepoints using multivariable logistic regression analysis. Full methodology is Supplementary data (Figure S1, Figure S2) are available in *Age and Ageing* online.

Results

Timepoint 1 included 1,507 patients from 44 sites, Timepoint 2 included 656 patients from 26 sites and Timepoint 3 included 850 patients from 48 sites. Eighty-two sites contributed data to at least one timepoint (Table S1, Supplementary data are available in *Age and Ageing* online). Overall prevalence of delirium across all timepoints was 16.3% (491/2,522). Characteristics of patients at each timepoint are shown in Table 1. Interventions implemented at sites between timepoints are shown in Table S2, Supplementary data (Figure S1, Figure S2) are available in *Age and Ageing* online.

Delirium screening

Delirium screening increased across timepoints (27.3% versus 29.6% versus 37.1%; $P < 0.001$). Odds of screening increased between Timepoints 1 and 3 (aOR 1.33, CI 1.08–1.65; $P = 0.001$; Table 2). Delirium screening was associated with increasing age, mild–moderate (but not severe) frailty and dementia. Odds of delirium screening were increased with presence of specialist delirium teams (aOR 1.75, CI 1.41–2.18; $P < 0.001$; Table S3, Supplementary data are available in *Age and Ageing* online).

Delirium recognition

Delirium recognition increased across timepoints (34.2% versus 57.1% versus 63.2%; $P < 0.001$). Odds of recognition increased between Timepoints 1 and 2 (aOR 1.93, CI 1.11–3.35; $P = 0.019$), and 1 and 3 (aOR 2.33, CI 1.31–4.15; $P = 0.004$; Table 2). Screening for delirium was associated with delirium recognition (aOR 4.75, CI 2.98–7.56; $P < 0.001$); this was not affected by grade/profession of screener. Recognition odds were increased in patients with dementia (aOR 1.73, CI 1.06–2.84; $P = 0.029$), and presence of geriatric teams embedded into admissions units (aOR 1.78, CI 1.09–2.92; $P = 0.022$). Admissions under general (aOR 0.11, CI 0.02–0.58; $P = 0.009$) or orthopaedic (aOR 0.27, CI 0.09–0.79; $P = 0.017$) surgery were associated with reduced delirium recognition (Table S4, Supplementary data are available in *Age and Ageing* online).

Discharge documentation

Discharge documentation increased across timepoints (28.6% versus 48.4% versus 46.6%; $P = 0.002$) (Table 2). Odds of discharge documentation increased from Timepoint 1 to 2 (aOR 2.34, CI 1.23–4.46; $P = 0.009$). Odds of delirium documentation were increased in patients with dementia (aOR 2.01, CI 1.16–3.48; $P = 0.012$), but not affected by site-specific factors (Table S5, Supplementary data are available in *Age and Ageing* online).

Discussion

Delirium screening, recognition and discharge documentation all improved overall, demonstrating that rates of these are not fixed/inalterable. Importantly, screening is associated with increased odds of recognition; efforts to increase screening should be encouraged. Notably, grade and profession of screener did not affect recognition. Therefore, interventions to improve recognition may utilise trained multiprofessional screeners and junior staff. The 4AT has been validated for use by all healthcare professionals with minimal training [7, 8].

Table 1. Characteristics of study population across all timepoints

		Timepoint 1		Timepoint 2		Timepoint 3	
		Delirium (*N* = 222)	No delirium (*N* = 1,285)	Delirium (*N* = 133)	No delirium (*N* = 523)	Delirium (*N* = 136)	No delirium (*N* = 714)
Age—mean (SD)		84.0 (7.4)	79.3 (8.3)	82.8 (8.1)	79.6 (8.2)	83.3 (7.9)	80.0 (8.5)
Gender—% females (*N*)		60.8 (135)	51.6 (663)	50.4 (67)	55.3 (289)	60.3 (82)	53.8 (384)
Dementia—% (*N*)		35.1 (78)	12.9 (166)	41.4 (55)	14.0 (73)	54.4 (74)	16.2 (116)
Clinical Frailty Scale	1	0.5 (1)	4.3 (55)	1.5 (2)	4.1 (21)	0	5.4 (39)
	2	2.7 (6)	11.3 (145)	1.5 (2)	10.9 (57)	2.2 (3)	9.7 (69)
	3	3.6 (8)	19.7 (253)	6.8 (9)	21.0 (110)	2.2 (3)	17.8 (127)
	4	10.8 (24)	18.1 (232)	15.0 (20)	19.5 (102)	8.1 (11)	16.0 (114)
	5	21.2 (47)	15.9 (204)	10.5 (14)	15.1 (79)	19.1 (26)	17.9 (128)
	6	28.4 (63)	17.6 (226)	30.8 (41)	15.9 (83)	29.4 (40)	17.4 (124)
	7	25.7 (57)	9.3 (119)	26.3 (35)	10.5 (55)	32.4 (44)	9.7 (69)
	8	4.5 (10)	0.9 (12)	6.0 (8)	1.5 (8)	5.1 (7)	1.3 (9)
	9	0 (0)	0.2 (3)	1.5 (2)	1.3 (7)	0 (0)	0.6 (4)
Specialty	Acute medicine	47.7 (106)	42.2 (542)	21.8 (29)	21.2 (111)	27.2 (37)	18.5 (132)
	Geriatric medicine	26.6 (59)	16.0 (206)	45.1 (60)	20.3 (106)	37.5 (51)	18.8 (134)
	Stroke	1.8 (4)	4.0 (52)	0.8 (1)	5.0 (26)	1.5 (2)	3.9 (28)
	Other medicine	14.0 (31)	22.1 (284)	21.1 (28)	27.9 (146)	19.1 (26)	35.9 (256)
	Orthopaedic surgery	6.8 (15)	6.2 (80)	6.0 (8)	9.0 (47)	8.1 (11)	9.0 (64)
	General surgery	3.2 (7)	6.5 (83)	4.5 (6)	8.0 (42)	4.4 (6)	9.1 (65)
	Other surgery	1.8 (4)	3.0 (38)	0.8 (1)	8.6 (45)	2.2 (3)	4.3 (31)

Table 2. Logistic regression analysis for odds of screening, recognition and discharge documentation between timepoints

	Timepoint 2 versus Timepoint 1		**Timepoint 3 versus Timepoint 1**	
	OR (CI)	***P* value**	**OR (CI)**	***P* value**
Delirium screening				
Unadjusted	1.18 (0.95–1.46)	0.142	1.45 (1.18–1.78)	<0.001
Adjusted[¥]	1.07 (0.85–1.34)	0.570	1.33 (1.08–1.65)	0.001
Delirium recognition				
Unadjusted	2.60 (1.62–4.16)	<0.001	2.31 (1.41–3.77)	0.001
Adjusted[‡]	1.93 (1.11–3.35)	0.019	2.33 (1.31–4.15)	0.004
Discharge documentation				
Unadjusted	2.34 (1.23–4.46)	0.009	1.78 (1.02–3.11)	0.042
Adjusted[¥]	2.27 (1.10–4.68)	0.026	1.73 (0.93–3.24)	0.085

[¥]Adjusted for Clinical Frailty Scale, age, gender, dementia status, specialty and site-specific factors. [‡]Adjusted for screening, subtype, Clinical Frailty Scale, age, gender, dementia status, specialty and site-specific factors.

Discharge documentation was more likely in patients with pre-existing dementia. Reasons for this are unclear, but may relate to greater awareness of importance of delirium in dementia, in a similar manner to increased recognition rates. There may be a general misunderstanding as to why communication of delirium diagnoses to GPs is important, in terms of highlighting risk of future cognitive decline [3, 9]. Encouragingly, documentation improved across timepoints. Previous studies have shown that discharge documentation is often inadequate across many settings [10].

External validity

Overall delirium prevalence was 16.3%. This is lower than a previous single-site point prevalence study (19.6%) [11]. Differences are accounted for by inclusion of incident delirium in the latter study; only prevalent cases at admission were included at Timepoints 1 and 3. A higher prevalence rate (22.9%) was reported in a study considering positive screen with 4AT alone and not reference-standard delirium diagnosis [12]. Previous single centre quality improvement projects have demonstrated similar improvements in delirium screening and recognition with local interventions. A previous study involving implementation of a local delirium pathway and multidisciplinary teaching programme demonstrated improvement in delirium recognition rates from 5.7 to 35% over 11 weeks [13]. Similarly, implementation of dedicated teaching sessions within an acute medical unit, and management bundle with checklists, resulted in improved delirium screening rates from 40 to 61% [14].

Internal validity

Patient characteristics were similar across timepoints with regards to age, gender and specialties. Most patients were

within acute and geriatric medicine specialties, which is consistent with recognised pathways of care within the UK [15]. However, at later timepoints higher dementia rates were recorded. Our results demonstrated that delirium was more likely to be recognised in patients with dementia. However, effects persisted in multivariable models adjusting for dementia.

We recognise that a significant limitation is that not all the same sites participated at each timepoint. Analyses and interpretation were performed for sites overall rather than at site level; site level analysis was not possible due to individually small numbers. Nevertheless, improvement in screening, recognition and documentation across timepoints demonstrates that such improvements are possible. We acknowledge that methodology differed between timepoints; data was collected prospectively at Timepoints 1 and 3 but retrospectively at Timepoint 2. We consider this variation unlikely to have significantly impacted upon results. Validated methodology for retrospective delirium ascertainment was used at Timepoint 2 [16, 17]. In addition, although this may have led to differences in recognition rates, this should not have affected screening rates. Documentation of screening was extracted from clinical records across all timepoints.

We cannot be certain specific interventions led to improvements, or if these relate to external factors. It is conceivable that improvements across timepoints related to improved culture of embedding delirium screening and assessment into clinical practice. This may have occurred due to leadership of collaborators at sites. However, many doctors rotated sites during this project, and collaborators at sites differed between timepoints. This suggests that changes can be sustained, even where leadership is rotated. Improved delirium screening and recognition rates may also be related to external factors. The International Federation of Delirium Studies (iDelirium) is an international collaboration of societies, which seeks to educate patients, caregivers, professionals and policy makers about delirium [18]. The society constantly aims to increase awareness of delirium, however, national campaigns peek around the time of WDAD (i.e. first and last timepoints) [18].

Recommendations

Our approach of sharing guidelines, resources and a central data collection point is feasible in involving multiple centres across multiple timepoints. Methodology was sufficiently simple to enable healthcare professionals of any grade or profession to be involved with screening and data collection. This is a model that may be replicated in future collaborative quality improvement projects.

Despite the focus on screening and recognition, it is important to recognise that assessment is only part of management. If delirium is present and recognised this should prompt healthcare professionals to take action by identifying and treating underlying causes [19]. Education should focus on rationale behind actions, such as the need to ensure delirium is communicated to primary care to enable appropriate follow-up of cognitive trajectories. Delirium may take some time to fully resolve [20], and communication to primary care is of utmost importance.

Although it was not possible to analyse site level data for effectiveness of individual interventions at site, we were able to identify site factors that were predictive of screening and recognition. Specialist delirium teams were associated with improved screening rates, and geriatric medicine teams embedded into admissions units were associated with improved recognition rates. Where sites are seeking to improve screening and recognition rates locally, we suggest that these findings are considered in service development. There was a very strong association (nearly fivefold) between delirium screening and likelihood of delirium recognition. Thus, drivers towards increased delirium screening are likely to prove beneficial.

Conclusions

A collaborative approach to multi-centre quality improvement is feasible; including multiple data collection timepoints, and sharing of guidelines/resources and knowledge across sites. Importantly, screening, recognition and delirium documentation rates are not fixed/unalterable; improved rates across timepoints suggest potential for responsiveness to interventions. Screening for delirium is associated with increased likelihood of delirium recognition. We encourage implementation of interventions to improve recognition through way of increased screening, alongside sustainable culture changes.

Supplementary Data: Supplementary data mentioned in the text are available to subscribers in *Age and Ageing* online.

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