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Delirium in care homes

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Summary

Delirium is a distressing but preventable condition associated with increased morbidity and mortality, and significant financial costs. Most research on delirium has focused on high-risk patients in hospitals. Another group also at high risk are residents in care homes for older people. This report reviews the literature on the occurrence, aetiology, outcomes, prevention and treatment of delirium in long-term care. Delirium appears to be common in this setting, with a median point prevalence estimate of 14.2% in studies comparable to the UK. However, there is a paucity of high-quality studies, likely to reflect the difficulty in conducting research in this population and the particular challenges of investigating delirium. Addressing delirium successfully in care homes presents an opportunity to improve care standards and to reduce inequalities in health and social care. Well-designed prospective cohort studies and robust evaluations of interventions to prevent and treat delirium are needed.

Keywords: Delirium, acute confusion, long-term care, older people, age.

Introduction

Delirium is a distressing but preventable condition that is common throughout the health and social care system. It is associated with increased morbidity and mortality, functional decline, and significant additional financial costs.[1,2] Despite its high prevalence and associated poor outcomes, it is well recognized that delirium is often missed by clinicians.[3]

Most research on delirium has focused on high-risk patients in hospitals, but another group also at high risk are residents in care homes for older people. Long-term care facilities have expanded over the last few decades in response to an increasingly older demographic profile in developed countries.[4] Data from the 2001 Census of England and Wales reveal that 4.5% of people aged 65 years and over, and 20.4% of people aged 85 years and over, were living in long-term care facilities.[5] The burden of delirium in these settings is likely to be considerable given the clustering of known delirium risk factors,[6,7] especially the high prevalence of dementia, the major risk factor. Moreover, the environment and systems of care in care homes share many features with hospitals that are likely to increase the risk of delirium. This is borne out by evidence that individuals being admitted to hospital from institutional care settings have higher rates of delirium than people admitted from their own home.[8,9] Investigating delirium in long-term care, therefore, is important, particularly as delirium prevention and treatment are closely linked to quality of care.

There are several types of residential institutions for older people in the UK. Commonly used terms to describe these institutions include long-term care (LTC) facilities, residential homes, nursing homes, post-acute care, intermediate care and Elderly Mentally Infirm (EMI) homes. LTC is the broad, umbrella term. Residential care homes (including residential homes providing dementia care) provide personal care, supervision of medication and meals, and some assistance with activities of daily living. They do not usually have nursing staff, and rely on primary and secondary health care services to provide for any health care needs. Nursing homes, including EMI homes, additionally provide 24-hour nursing care and have staff with specialist skills in nursing particular physical or mental health conditions.[10,11] In England, the Care Standards Act 2000 saw the terms 'nursing homes' and 'residential homes' replaced by 'care homes' for institutions that provide accommodation together with nursing or personal care, respectively. A proportion of LTC facilities are dual registered, with the provision of both residential care and nursing care, enabling residents to transit between the two levels of care without a

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consequent change to their permanent residence. Residential and nursing homes are considered to be the 'usual place of residence' (although a small number of places in these homes may be used for short-term 'respite' care).

In addition, there are a growing number of 'intermediate care' and 'continuing care' beds in care homes. Admissions to these are relatively short-term, and serve as intermediary placements as alternatives to hospital beds. There are also 'post-acute facilities', common in the US, which function as rehabilitation and skilled nursing units after discharge from hospital; these are not considered to be the usual place of residence. Post-acute facilities generally have a higher proportion of skilled nursing staff, allowing care of more frail and ill older people than would be expected in most nursing and residential homes in the UK.

This report provides a review of the literature on the occurrence, aetiology, outcomes, prevention and treatment of delirium in LTC facilities. The main focus of the review is on nursing and residential homes for older people in the UK; specialist care homes (apart from those providing dementia care) are not included. Given the paucity of delirium research in general, we judged that too narrow a focus on UK studies would be inappropriately restrictive. Thus although the focus is on homes in the UK, the review is not limited to UK research but draws on studies in any setting that is sufficiently similar to a typical UK nursing or residential home. However, intermediate care, continuing care, and post-acute care settings are not the main focus of this review, and studies in these populations have been appraised and presented separately.

Definition and detection of delirium

The reliable detection of delirium is a prerequisite for research. Yet this is by no means straightforward. The paucity of delirium research, and its under-recognition in clinical practice, are in part a reflection of the difficulties inherent in defining and diagnosing the condition. Operationalized diagnostic criteria for delirium have been formulated in the Diagnostic and Statistical Manual of Mental Disorders[12–14] (DSM III, DSM III-R and DSM IV), and in the International Classification of Diseases (10th edition)[15] (ICD-10). Although generally good agreement is found between these criteria, there are important disparities between rates of delirium detected using the DSM criteria compared with ICD-10, with DSM IV being the most, and ICD-10 the least, inclusive in hospitalized patients. A study of delirium detection in a mixed population of hospital patients and nursing home residents found the various criteria performed differently in the two settings, with DSMIII-R proving the most inclusive in nursing home residents.[16] Most research studies have adopted DSM rather than ICD-10 criteria for delirium.

There are a number of validated instruments available for detection of delirium in hospitalized patients for use in clinical practice and research. None, however, has been validated in LTC settings. The Confusion Assessment Method[17] (CAM) and the Delirium Rating Scale[18] are the most commonly used. There are other non-validated methods, which do not distinguish between, for example, delirium and dementia. The Minimum Data Set (MDS) (part of the Resident Assessment Instrument (RAI)) is a tool that is mandated in the US and is also widely used in Canadian LTC facilities.[19] The MDS captures information about the health status of an individual. Domains of the MDS can be used to provide information about changes in behaviour and cognition and hence can give information that can support a diagnosis of delirium. The MDS, however, has not been validated as a method of delirium detection and relies on secondary analysis of data, with the likely risk of under-reporting.

Methods

Given the broad focus of the objectives, we carried out a structured review of the literature. We identified original studies and review articles relating to the occurrence, aetiology, outcomes, prevention and treatment of delirium (excluding delirium tremens) in LTC settings for older people. To ensure relevance, only studies after 1990 were included as both the definitions of delirium, and the nature of care homes, might differ substantially in earlier studies. As a preliminary examination of the care home delirium literature revealed a paucity of research, it was decided to include all study designs, except for single-case studies. Including poor quality designs, of course, threatens the reliability of conclusions. However, where there is

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limited research, more rigorous and robust review criteria risk excluding all available evidence.[20]

The following electronic medical databases were searched from 1990 up to mid-October 2008: MEDLINE; EMBASE; PsychINFO; CINAHL; Cochrane Database of Systematic Reviews (CDSR); ACP Journal Club; Cochrane Controlled Trials Register. A search strategy that included synonyms for delirium and for care homes for older people was used. Reference lists of retrieved articles and bibliographies of relevant chapters in major texts and review articles were also examined.

A bespoke, pragmatic, non-validated study grading tool, based on the validated Newcastle-Ottawa Scale,[21] was used to assess the quality of epidemiological cohort studies. Studies that used an operationalized definition of delirium (DSM III, III-R, IV or ICD-10), or a diagnostic tool validated against these, were given a higher quality rating. We summarized key findings in the context of the strength of the evidence available.

Delirium occurrence

We identified 14 studies of delirium occurrence in various LTC settings. Findings from studies using a validated method for delirium diagnosis are presented first, followed by those using non-validated methods. As outlined in the introduction, post-acute care facilities, common in the US, receive people discharged early from acute care, and can offer continuing treatment; they have no direct UK comparison model. Findings from post-acute care cannot be easily generalized to care homes in the UK; the two studies from these settings have therefore been grouped and discussed separately. Furthermore, one study assessed delirium rates in residents of LTC when admitted to hospital. This study is also presented separately.

(1) Studies using a validated diagnostic definition of delirium

Five studies examined delirium prevalence in care home settings comparable to the UK, using validated diagnostic criteria.[16,22–25] Sandberg *et al.*[22] used a robust consensus diagnosis based on DSM III-R criteria, to investigate delirium in various care settings in Sweden. They reported a high point prevalence of 57.9% in three nursing homes (202 residents) and 35.2% in five older people's homes (196 residents). The high prevalence of dementia, particularly in nursing homes (66.3%), and co-morbidity, may explain these high estimates.

Pitkala *et al.*[23] assessed 195 LTC residents using DSM IV criteria and reported a point prevalence of delirium of 15.9%. Laurila and colleagues examined the impact of different diagnostic criteria and reported a delirium point prevalence of 14.4% using DSM III-R in 195 nursing home residents.[16] Rovner[24] assessed 454 admissions to nursing homes owned by a private corporation in the US. Using DSM III criteria, a delirium point prevalence of 7% was reported. In another cross-sectional point prevalence US study, 39.2% of 74 LTC residents had DSM IV defined delirium.[25]

Point prevalence of delirium ranged from 7 to 57.9% in these studies, with a median estimate of 35.2%. The wide variation is likely to be attributable to differences in case mix and diverse methods and diagnostic tools used to ascertain delirium.

(2) Studies using a non-validated method of delirium diagnosis

Six further studies investigated delirium in settings comparable to UK care homes, but did not use validated methods to detect delirium. Caccione intensively assessed 114 residents in LTC for 28 days and found an incidence of 17.5% for acute confusion.[26] In a cross-sectional study, limited by using data from the MDS, Mentes *et al.*[19] reported a 14.0% point prevalence of probable acute confusion in a sample of 2318 nursing home residents. Probable confusion was defined as at least one of the five delirium indicators from the MDS, present over the previous 7-day period, and different from the resident's usual functioning. Fries *et al.* investigated delirium in US nursing homes using Resident Status Measure (RSM) data (a precursor of the MDS).[27] Using a definition of at least two of six symptoms of delirium, the prevalence was 12% overall, and 21% in dementia units. However, the authors acknowledge that the RSM lacks the detailed information necessary to make a clinical diagnosis.

Dosa *et al.*[28] aimed to develop a Nursing Home Confusion Assessment Method (NH-CAM) for diagnosing delirium, based on rearrangement of the MDS variables to mimic the well-validated

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Table 1. *Occurrence of delirium in settings consistent with a UK model of long-term care*

Study	Year	Country	Sample size	Delirium point prevalence (%)	Delirium incidence (%, period)	Study quality
Sandberg *et al.*[22]	1998	Sweden	202	57.9	No data available	Moderate
Cacchione[25]	2002	US	74	39.2	No data available	Low
Sandberg *et al.*[22]	1998	Sweden	196	35.2	No data available	Moderate
Pitkala *et al.*[23]	2005	Finland	195	15.9	No data available	Moderate
Laurila *et al.*[16]	2003	Finland	195	14.4	No data available	Moderate
Mentes *et al.*[19]	1999	US	324	14.0	No data available	Low
Fries *et al.*[27]	1993	US	6683	12	No data available	Low
Rovner *et al.*[24]	1990	US	454	7	No data available	Moderate
Dosa *et al.*[28]	2007	US	35,721	1.4	No data available	Low
Andrew *et al.*[29]	2006	Canada	1672	0.5	No data available	PB
Culp *et al.*[31]	1997	US	37	No data available	40.5 (14 days)	PB
Cacchione *et al.*[26]	2003	US	114	No data available	17.5 (28 days)	Low

PB, potentially biased.

CAM. Data were examined for 35,721 residents returning to nursing homes after acute hospitalization between April and September 2000. Delirium symptoms were present in 11,375 residents (31.8% of the total cohort), with 1.4% identified as having full delirium using the NH-CAM. They did not, however, attempt to estimate sensitivity or specificity of this method for delirium detection.

In contrast to the high rates reported by many studies, the Canadian Study of Health and Aging (CSHA) reported a low (less than 0.5%) point prevalence for delirium outside acute care.[29] 1672 LTC facility residents were included in the survey; prevalence in these individuals did not differ significantly from that in community-dwelling subjects. Although careful sampling and assessment methods were used, these findings need to be interpreted with some caution, and possibly underestimate the true prevalence for a number of reasons. Assessments at a single point in time may miss cases of delirium given its fluctuating nature. Moreover, delirium was only diagnosed in the absence of dementia (if dementia was present, this diagnosis took precedence). Dementia is the most important risk factor for delirium; another study found that 13.3% of community-dwelling older adults with dementia had superimposed delirium.[30] Applying these findings to the CSHA study, where 64% of subjects had dementia, would suggest a delirium prevalence of at least 9.1%.

One US study[31] in two large Veteran Affairs LTC facilities using a non-validated method of delirium diagnosis ('probable acute confusion') in a cohort of 37 residents reported a 2-week incidence of 40.5%. Residents were assessed daily in the first week and on alternate days in the second week using a behavioural symptom instrument.

Quality grading and summary. Table 1 summarizes studies conducted in LTC settings comparable to nursing and residential care homes for older people in the UK. The majority of studies reported delirium point prevalence. Where delirium incidence was recorded, the period of time over which rates were determined is shown in brackets. Point prevalence of delirium ranged from 0.5 to 57.9%, with a median of 14.2%.

Studies consistent with a UK model of LTC were quality assessed using a grading tool[21] for: representativeness of study cohort, prospective study design, sample size, and use of a validated diagnostic tool. Studies with unrepresentative samples were considered to have potential for bias. Those with a sample size of <100 were downgraded and studies including >500 participants were rated as higher quality. A sensitivity analysis, excluding potentially biased or low-quality studies, gave a median point prevalence estimate for delirium in LTC facilities of 15.9% (range 7–57.9%).

(3) Studies in post-acute care

Kiely *et al.*[32] assessed 2158 patients admitted from hospital to seven post-acute care facilities in the US

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using robust methods to determine delirium. The prevalence of delirium at admission to post-acute care (using the CAM) was 15.6%, and 39.5% of patients had at least one delirium symptom. These patients had just been discharged from acute care and results cannot, therefore, be generalized to the more medically stable population in UK care homes.

Previous work on delirium by this group used the Minimum Data Set (MDS) collected by care staff in a prospective cohort study in 85 post-acute care facilities (55 rehabilitation hospitals and 30 skilled nursing facilities).[33] They reported that in residents newly admitted from acute care hospitals, 22.8% (126/551) had at least one of six delirium symptoms at admission using MDS definitions (easily distracted, altered perception, disorganized speech, restlessness, lethargy, fluctuations in mental function). Persistent delirium symptoms remained significantly associated with worse activities of daily living after adjusting for age, co-morbidity, dementia, and baseline functional status. This study was limited by the use of secondary data, and by its reliance on delirium assessments performed by facility staff not specifically trained to detect delirium. Results are also not comparable with the later study because different criteria for delirium were used.

(4) Delirium in LTC residents admitted to hospital

Kelly *et al.* followed 214 patients transferred to hospital from a nursing home; 28.5% had delirium within 48 hours of admission (DSM III-R criteria).[34] Of those patients with delirium who returned to the nursing home,[50] 72.0% still had delirium at time of hospital discharge, and 55.0% of the survivors had delirium at one month; most of these were persistent cases but 7.4% had developed new delirium.

Aetiology

We found no studies with a prospective cohort design (which could establish a causal relationship) in a LTC setting.

Cacchione[35] examined 29 LTC residents with delirium, 25 with dementia, and 20 with no cognitive impairment in a cross-sectional study. Factors found to be associated with acute confusion by chi-squared analysis of the whole sample included pulmonary disorder, electrolyte disturbance, and hearing deficit. During the 3 months follow-up, 14 participants died, and 10 of these were from the group with delirium ($P < 0.01$). In another study investigating acute confusion in sensory-impaired older people, Cacchione *et al.*[25] found that the development of acute confusion was significantly associated with vision impairment (odds ratio (OR) = 3.7; 95% CI: 1.1–11.9), and dual sensory impairment (OR = 2.9; 95% CI: 1.0–8.3) but not hearing impairment.

Culp *et al.* identified probable causes of delirium in 15 residents.[31] More than one condition was thought to be responsible in 13 residents. A urinary tract infection was implicated in seven, medication in seven, hypoxia in six, pain in three, and hypotension and low sodium in two. Mentes *et al.*, analysing case-control study data from the MDS for 2318 nursing home residents, found that men and women were equally likely to develop delirium.[19] Dementia (OR = 1.4; 95% CI: 1.2–1.7), fall in last 30 days (OR = 1.6; 95% CI: 1.3–2.0), and inadequate fluid intake (OR = 3.4; 95% CI: 3.0–3.8) were associated with delirium in logistic regression analysis. Sensory impairment, age, polypharmacy and co-morbidity were not identified as significant risk factors in this study.

The CSHA study described above reported a high prevalence of urinary incontinence amongst those with delirium (70.0%; 95% CI: 48.0–92.0%).[29] In the large NH-CAM study, prevalence of delirium was higher in Caucasians and increased with age.[28] Delirium was more likely in residents with mild to moderate cognitive impairment than in those with no cognitive impairment or severe impairment.

In summary, there is a paucity of reliable studies describing the aetiological factors for delirium in care homes. Based on the evidence available, potential factors are dementia, increased age, dehydration, intercurrent infection, falls, sensory impairment, and metabolic disturbance.

Outcomes

Dosa *et al.*[28] reported that delirium in LTC identified using the NH-CAM was associated with increased mortality and re-hospitalization. Mortality for the delirium group was 26.2% at 30 days (95% CI: 22.3–39.6) and 42.3% at 90 days (95% CI: 37.9–46.6), compared with

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8.7% (95% CI: 8.4–9.1) at 30 days and 21.1% (95% CI: 20.7–21.8) at 90 days for the group without delirium. Estimates using the Cox model showed that the odds of mortality for delirium, relative to no delirium were 1.96 (95% CI: 1.71–2.26). At 30 days, the rate of re-hospitalization was 19.6% (95% CI: 19.0–20.1) with no delirium and 27.1% (95% CI: 22.9–32.5) with delirium. At 90 days, the rate was 32.8% (95% CI: 32.2–33.5) and 40.1% (95% CI: 34.8–45.3) without and with delirium, respectively.

The prognosis of delirium in a mixed cohort of 230 hospital and 195 nursing home subjects was found to be poor:[36] mortality at 1 year was 34.9 *versus* 21.6% in non-delirious subjects ($P = 0.006$), and at 2 years was 58.5 *versus* 42.6% ($P = 0.005$). In logistic regression analysis, delirium was an independent predictor for mortality at one year (OR = 1.9; 95% CI: 1.1–3.1), at two years (OR = 1.8; 95% CI: 1.1–2.8), and for new LTC places (OR = 2.5; 95% CI: 1.2–4.9).

The CSHA study also reported a notably poor outcome for delirium.[29] Five-year survival was lower for those with delirium than for the rest of the cohort (18 *versus* 70%, $P < 0.001$). Even in the absence of dementia, delirium was associated with a high mortality, at levels comparable with advanced dementia.

Marcantonio *et al.*[37] investigated outcomes of older people admitted to post-acute facilities. Subjects with delirium were more than twice as likely to be re-hospitalized as those without delirium symptoms (30.3 *versus* 12.8%), and less than half as likely to be discharged to the community (29.7 *versus* 72.9%). Six-month mortality rate was considerably higher: 25.0% compared with 5.7% in subjects without delirium. Delirium clearly has an impact on morbidity and mortality and affects outcomes beyond the immediate illness period.

Delirium interventions

There is a particular paucity of studies of interventions to prevent or treat delirium in LTC. Bergmann *et al.* described the development and implementation of a nurse-led, multi-factorial model for the management of delirium in post-acute care – the Delirium Abatement Program (DAP).[38] However, its effectiveness has not yet been investigated. The DAP focused on four key care processes, of particular relevance to the post-acute setting:

(i) standardized screening for symptoms and signs of delirium at admission to the unit;
(ii) assessment and treatment of possible causes of, and contributors to, delirium;
(iii) prevention and management of common delirium complications, and
(iv) restoration of patient cognitive and self-care function.

A number of challenges to implementation were identified including the need for standardized written materials for assessment and documentation of delirium; systems to develop care plans; the need to improve nurses' knowledge and abilities to assess mental status; detection of delirium superimposed on dementia; and the need for a 'delirium resource nurse' to facilitate implementation.

Hydration interventions have been investigated,[39,40] and have not been shown to be effective in reducing delirium in LTC. However, this may have been because the interventions in these studies did not result in improved fluid intake for residents.

Siddiqi *et al.*[41] described a complex intervention targeting delirium prevention in residential and nursing homes. This essentially comprised an enhanced educational intervention delivered by a 'Delirium Practitioner' to care home staff. The intervention specifically took account of the barriers to change practice, and engaged care home staff, drawing on their expert knowledge of residents and of the care home environment to identify tailored solutions to improve delirium care through staff 'working groups'. In a before and after study, feasibility of the intervention was demonstrated in terms of successful implementation, acceptability to care home staff, and improvements in staff self-reported confidence in delirium recognition and management. Moreover, there was evidence of potential effectiveness in increasing cognitive screening of residents, in increasing delirium recognition and recording by staff, and in reducing hospital admissions.

Conclusion

Delirium appears to be common in the LTC facilities with a median point prevalence estimate of 14.2% in studies that reflect the UK model of

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LTC provision. However, there is a paucity of high-quality epidemiological studies of delirium in LTC facilities and the available data must, therefore, be interpreted with a degree of caution. Much of the limited delirium research outside the hospital setting has been conducted in North American post-acute care facilities; these have important differences from usual UK nursing and residential care that limit between-systems comparisons.

There are no prospective cohort studies available that give reliable information on the aetiology of delirium in a LTC setting. Cross-sectional study data suggest that dementia, older age, urinary tract infection, dehydration, medication, hypoxia, pain, hypotension, electrolyte disturbance and visual impairment may all be associated with the development of delirium in LTC. These high prevalence risk factors would account for the observed frequency of delirium occurrence in LTC. The presence of dementia and advancing age may be fixed risk factors that increase the propensity of LTC residents to develop delirium. However, many of the reported risk factors are potentially modifiable, suggesting more might be done to prevent delirium in these high-risk people. This is eminently desirable as delirium appears to be an independent risk factor for mortality in LTC. Indeed, delirium may increase risk of mortality to the degree seen in individuals with advanced dementia. Hospitalization rates of LTC residents with delirium appear to be increased when compared with those residents without delirium.

The paucity of high-quality studies identified by this review is likely to be a reflection of a general difficulty in conducting research in LTC facilities,[42] and the particular challenges of investigating delirium. However, addressing delirium more successfully in LTC presents an opportunity to improve care standards and to reduce inequalities in health and social care.[41] Further research in LTC settings, with well-designed prospective cohort studies and robust evaluations of interventions to prevent and treat delirium, is clearly needed.

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