

# Outcomes of emergency admission of older patients: impact of cognitive impairment

*Many older patients admitted to hospital as an emergency present with cognitive impairment. This review examines whether this is detected reliably by health-care professionals, and considers how it has an impact on outcome for the patient.*

It is recognized that many elderly patients admitted to an acute medical ward have a degree of cognitive impairment. This may be long-standing in those with dementia, or can be secondary to an acute confusional state or delirium as a consequence of acute illness. Delirium is defined as a mental disorder characterized by acute onset, altered level of consciousness, fluctuating course and disturbances in orientation, memory, thought, perception and behaviour (Iseli et al, 2007). Delirium can also be superimposed on a background of dementia. In addition, cognitive impairment can be associated with depression or psychosis.

For many older people, hospitalization results in functional decline (Creditor, 1993). This has an impact on the length of hospital stay and the type of care required on discharge. A low level of function at discharge is a key risk factor for nursing home admission (Fortinsky et al, 1999). As cognitive impairment is known to be prevalent and detectable on admission it would be useful to know whether there is a relationship between this and functional status and hence length of hospital stay and discharge destination. Since acute confusional states can potentially be corrected by treatment of the underlying medical problem it is also important to try to distinguish between an acute confusional state and dementia (Seymour et al, 1980).

As the number of elderly people in the population increases and demand on hospital beds rises, it is ever more important that adequate plans for discharge are made. Patients may be discharged home independently or may go home with social support. They may undergo a period of rehabilitation in a post-acute facility. Some patients who were previously living independently require residential or nursing home care after discharge. If cognitive impairment can be detected early in the admission and appropriate management strategies adopted, is it possible for disability to be reduced in older inpatients, length of hospital stay shortened, costs reduced and discharge planning more easily achieved? This review explores the evidence available to answer this question.

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## Prevalence of delirium and dementia

There is extensive evidence that a substantial proportion of older people admitted to hospital with an acute medical illness have cognitive impairment on admission. Studies have indicated that the prevalence ranges from 15–35% (Pinholt et al, 1987; Hickey et al, 1997; Joray et al, 2004). As early as 1980, Seymour et al reported that of 71 patients aged over 70 years who were admitted as emergencies to a general medical unit, one in six had an acute confusional state on admission and one in four patients had evidence of dementia. They found that a patient's mental score was a much better guide to prognosis than age (Seymour et al, 1980).

Delirium is frequently under-detected on admission despite having a prevalence of 10–16% (Francis, 1992; Levkoff et al, 1992; Elie et al, 2000). In a sample of 447 patients presenting to the emergency department in a primary acute care, university-affiliated hospital who were triaged to the observation room on a stretcher because of the severity of their illness, the prevalence of delirium was 9.6% (95% confidence interval 6.9–12.4%). The sensitivity of the detection of delirium by the emergency department doctor was 35.3% and the specificity 98.5% (Elie et al, 2000). It was concluded that recognition of delirium could be improved by routine cognitive assessment in older medical patients. The low detection rates highlighted in some surveys may be the result of lack of assessment for delirium and also lack of awareness of hypoactive delirium (Iseli et al, 2007). In hypoactive delirium (sometimes known as 'quiet' delirium) the patient may be lethargic and withdrawn with a reduced state of arousal.

In a study of 401 medical inpatients aged 75 years and older, 129 (32.3%) had cognitive impairment on admission (scored <24 on the Mini Mental State Examination (MMSE)). This is a reflection of the high prevalence of impaired cognition in contemporary acute medical admissions in hospitals in the UK. Only 48 (37.2%) were detected – these had more severe impairment than the undetected cases (Joray et al, 2004). This clearly indicates that the identification of cognitive impairment needs to be performed more reliably.

## Cognition and functional status

Many tools are used for identifying cognitive impairment on admission, for example, the MMSE (Folstein et

al, 1975), the Clinical Dementia Rating Scale (CDR; Alzheimer's Disease Research Center, 2008), the Confusion Assessment Method (CAM; Inouye et al, 1990), and the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE – for use by relatives of patients with cognitive impairment; Jorm, 2004). Patients with severe cognitive impairment are usually recognized but cognitive status tests are particularly useful for identifying the cases of mild to moderate cognitive impairment that often go undetected in hospital (Harwood et al, 1997; Sands et al, 2003). Measures of functional status include the Barthel Activities of Daily Living (ADL) Index (which includes bathing, dressing, toileting, transferring from bed to chair and eating), and Instrumental Activities of Daily Living (IADL) (which includes shopping, cooking, managing medications, managing money, performing household chores, using transportation and using the telephone).

Older patients often lose functional ability during an illness and may fail to regain function to their previous level. It is known that cognitive impairment has an impact on functional status (Knight, 2000). Performance on a brief cognitive screen on admission has been shown to be strongly related to subsequent change in function. Among patients who needed help performing one or more ADL at the time of admission in one study, 23% of patients showed moderate to severely impaired cognitive performance, 49% showed mildly impaired cognitive performance, and 67% of patients with little to no impairment in cognitive performance recovered their ability to execute independently an additional ADL by discharge ( $P < 0.001$ ) (Sands et al, 2003). Severity of disability in hospitalized older patients is significantly higher in patients with dementia than those with mild cognitive impairment and patients without cognitive impairment (Orsitto et al, 2005). Delirium contributes to worsening functional status, loss of independence, and poorer outcomes among patients with dementia (Inouye, 2006).

### Length of stay and discharge destination

Analysis from the ACMEplus (Admission Case Mix system for Elderly patients) project (a multicentre European study of factors affecting the discharge destination of older people admitted to hospital) demonstrated that physical function and cognition were the predictors most often correlated with mortality, discharge destination and length of hospital stay (Campbell et al, 2005).

Cognitive impairment in those in whom it is detected is associated with nursing home admission (Joray et al, 2004). Patients with impaired cognition are more likely to be admitted to a nursing home for the first time by 90 days after discharge (Sands et al, 2003). It is associated with longer hospital stays, increased mortality and health-care costs, and an increased rate of institutional care (Cole and Primeau, 1993; Inouye, 1994; Pompei et al, 1994; O'Keefe and Lavan, 1997; Elie et al, 2000; Seli et al, 2007). The effect of cognition on the ability to

return to completely independent living after medical rehabilitation in geriatric patients is also recognized (MacNeill and Lichtenberg, 1997).

Non-cognitive symptoms including depression, agitation and delusions occur frequently among dementia sufferers and contribute to prognosis. Of 372 elderly inpatients admitted to four internal medical departments in Austria, 27.4% had dementia and, of those, 27.8% had moderate or severe non-cognitive symptoms. Both cognitive and non-cognitive symptoms were significant predictors of nursing home placement and prolonged length of stay even when controlling for other independent variables, suggesting that since non-cognitive symptoms are treatable they should receive attention from medical staff (Wancata et al, 2003).

Delirium symptoms are also prevalent in post-acute care facilities, with a 23% prevalence in one study, and are associated with poor functional recovery. Educational efforts are required to help staff recognize and manage delirium. Patients whose delirium does not clear while in hospital are more likely to be discharged to post-acute facilities. However, it has been suggested that being discharged to familiar surroundings may actually be of more benefit to these patients (Marcantonio et al, 2003).

### Effects on morbidity and mortality

McCusker et al (2001) completed a study of older medical inpatients to determine the prognostic significance of delirium, with or without dementia, for cognitive and functional status during the 12 months after hospital admission, independent of premorbid function, comorbidity, severity of illness and other potential confounding variables. They found that delirium is an independent predictor of sustained poor cognitive and functional status during the year after medical admission to hospital. Delirium in patients with dementia increases the likelihood of transfer to a long-term care institution. Symptoms of delirium persist for up to 12 months after diagnosis among patients with and without dementia. Quicker in-hospital recovery is associated with better outcome (McCusker et al, 2003).

Delirium appears to be an important marker of risk for dementia, even in older people without prior cognitive or functional impairment. In a study following 38 inpatients diagnosed with delirium (22 with delirium and dementia, 16 with delirium alone) and 148 patients with no delirium or dementia for a median of 32.5 months, the incidence of dementia was 5.6% per year over 3 years for those without delirium and 18.1% per year for those with delirium. The unadjusted relative risk of dementia for those with delirium was 3.23 (95% confidence interval 1.86–5.63) (Rockwood et al, 1999).

Delirium is also an independent marker for increased mortality among older medical inpatients during the 12 months after hospital admission, particularly among patients without dementia. A prospective, observational study of two cohorts of medical inpatients was conducted

with patients 65 years or older; 243 patients had prevalent or incident delirium and 118 controls had no delirium. The unadjusted hazard ratio of delirium with mortality was 3.44 (95% confidence interval 2.05–5.75); the adjusted hazard ratio was 2.11 (95% confidence interval 1.18–3.77) (McCusker et al, 2002). Similar findings were made in another study where the 3-year mortality in hospitalized subjects was 75% for delirium patients *vs* 51% for control patients (risk ratio = 2.24). Patients who developed delirium did not differ on pre-hospitalization levels of depression, global cognitive performance, physical functioning or medical comorbidity (Curyto et al, 2001).

It has also been suggested that acute illness is accompanied by a high rate of recoverable cognitive dysfunction (defined as reduction in the admission MMSE score that improved by at least three points by the time of hospital discharge) that is characteristic of neither delirium nor dementia, and which shows continued improvement over the ensuing year. It occurred in 39% of the older hospitalized patients in one study. Recoverable cognitive dysfunction was independently predictive of 1-year mortality with an adjusted odds ratio of 1.82 (95% confidence interval 1.03–3.2) (Inouye et al, 2006).

### Interventions to prevent or treat delirium

Since it has been proven that cognitive impairment is associated with poorer outcomes in hospitalized older patients, it would appear that interventions to ensure it is recognized and to prevent or treat delirium would be beneficial. In a study implementing an educational programme aiming to increase knowledge and recognition of delirium there was a significant rise in recognition of delirium and acute confusion found after educational intervention (Rockwood et al, 1994).

Another study addressed six risk factors for delirium – cognitive impairment, sleep deprivation, immobility, visual impairment, hearing impairment and dehydration. In 852 patients aged 70 years or older admitted to the general medicine service in a teaching hospital, delirium developed in 9.9% of the intervention group compared with 15% of the group receiving usual care (matched odds ratio 0.6; 95% confidence interval 0.39–0.92). The total number of days of delirium and

the total number of episodes were significantly lower in the intervention group. However, among cases of delirium, severity scores and recurrence rates did not differ significantly between the two study groups, suggesting that primary prevention of delirium is probably the most effective strategy (Inouye et al, 1999).

Marengoni et al (2004) investigated the relationship between depressive symptoms, cognition and somatic diseases on functional status of geriatric patients at discharge. They found that depressive symptoms, comorbidity and cognitive impairment often coexist, interact, and correlate with disability in the elderly, but with different patterns depending on age. In relatively young elderly patients, poor cognition and depressive symptoms have an independent effect on disability and their combined effect is additive, suggesting that these two conditions are two independent problems in this age group. In contrast, in very old subjects depressive symptoms and cognitive impairment are highly correlated, but their combined effect did not further increase disability, suggesting that in this age group, these two conditions may be an expression of the same disease. Since depressive symptoms are a modifiable problem, their detection in hospital may help clinicians in targeting patients at high risk of functional disability.

### Conclusions

Cognitive impairment is highly prevalent among older patients admitted to acute medical wards but has historically been under-detected at admission. It is clear from the literature that cognitive impairment impacts on the functional status of a patient. The combined effect of poor cognition and reduced functional status contributes to morbidity, mortality, increased length of hospital stay and increased necessity for institutional care on discharge.

It has been shown that better education of medical staff can lead to improved recognition of cognitive impairment. Delirium and non-cognitive symptoms of dementia, such as depression, have been identified as being potentially modifiable with prompt recognition and treatment. Identification and adjustment of risk factors may also aid in the primary prevention of delirium.

Detection of cognitive impairment at the time of hospital admission can aid in discharge planning. Knowledge that a patient has cognitive impairment is important for planning discharge and the earlier it is recognized the sooner discharge arrangements can be commenced, minimizing the likelihood of delayed discharge. In addition to this, the earlier cognitive impairment is identified the sooner treatment of modifiable factors can be addressed, potentially improving functional status, shortening the length of hospital stay, decreasing medical expenditure and reducing the proportion of patients discharged to institutional care. More research needs to be done into the effect of intervention on patient outcome. **BJHM**

*Conflict of interest: none.*

### KEY POINTS

- Cognitive impairment, as a result of dementia, delirium or both, has a high prevalence among elderly inpatients.
- Cognitive impairment can be overlooked if health-care professionals do not search for it.
- Elderly patients with cognitive impairment have less good outcomes from hospital admission.
- Detection of cognitive impairment early in the admission allows timely intervention for those with a reversible cause and aids discharge planning for those with dementia.

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