The prevalence of mental health problems among older adults admitted as an emergency to a general hospital

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Abstract

Background: a high prevalence of co-morbid mental health problems is reported among older adults admitted to general hospitals.
Setting: an 1,800 bed teaching hospital.
Design: consecutive general medical and trauma orthopaedic admissions aged 70 or older were screened for mental health problems. Those screening positive were invited to undergo further assessment, and were interviewed to complete a battery of health status measurements.
Results: of 1,004 patients screened, 36% had no mental health problems or had anxiety alone. Of those screening positive 250 took part in the full study. Adjusting for the two-stage sampling design, 50% of admitted patients over 70 were cognitively impaired, 27% had delirium and 8–32% were depressed. Six percent had hallucinations, 8% delusions, 21% apathy and 9% agitation/aggression (of at least moderate severity). Of those with mental health problems, 47% were incontinent, 49% needed help with feeding and 44% needed major help to transfer.
Interpretation: we confirm the high prevalence of mental health problems among older adults admitted to general hospitals. These patients have high levels of functional dependency, psychological and behavioural problems which have implications for how they are cared for. Services that identify these problems and offer therapeutic intervention should be evaluated.

Keywords: *prevalence, older person, mental health, general hospital, cognitive impairment, elderly*

Introduction

Sixty percent of patients over 65 in general hospital beds have, or will develop, a mental health problem, including dementia, delirium and depression [1]. Mental health problems are associated with worse outcomes [2, 3], family carers report dissatisfaction with services [4, 5] and many general hospital staff feel ill-equipped to assess or manage these needs [4]. The National Dementia Strategy called for improvements in care for people with dementia admitted to hospital, better leadership and education and provision of psychiatric liaison services [6].

Previous studies have focused on specific mental health diagnoses [1], which general hospital staff struggle to identify accurately. There is little research describing patients with mental health problems in terms of their psychiatric

symptoms, behaviour and functional abilities. This study aimed to describe the current prevalence of these problems among people aged 70 and over admitted to hospital as an emergency, to help inform ward staffing levels and skill mix planning.

Methods

Study population

We recruited participants from two sites of an 1,800-bed teaching hospital providing sole general medical and trauma services for a population of approximately 660,000 (as well as all secondary and tertiary sub-speciality services).

Individuals aged over 70 with unplanned admissions to 1 of 12 wards (two trauma orthopaedic, three acute geriatric medical and seven general medical) were eligible for inclusion. Exclusions were unwillingness to be screened, being unconscious or too ill to be interviewed up to the fifth day of admission, and inability to speak English with no available interpreter. Ward types were similar to each other, and were chosen to be representative of those receiving unselected acute admissions.

Study procedures

Three researchers recruited patients: a geriatrician, nurse and psychologist. Mental health research nurses assisted in collecting screening data. Training and supervision was given by the geriatrician and subsequently the nurse. We used standardised instruments and administration guidelines where these were specified.

Study wards were visited by the researchers in strict rotation. Consecutive admissions were identified from the hospital administration computer system and patients were approached between days two and five of admission.

We used a two-stage assessment procedure. The first stage identified people unlikely to have a mental health problem. The second stage used more detailed assessments to characterise problems.

First-stage assessment used the abbreviated mental test score (AMTS) [7], the four-item geriatric depression score (GDS4) [8], the two-item PRIME-MD anxiety screen [9], the four 'CAGE' questions for alcohol misuse [10] and a question asking ward staff if there was any other reason to believe a mental health diagnosis might be present. Participants screening negative for cognitive impairment (AMTS >7), depression (GDS4 <1), alcohol abuse (CAGE <2) and negative on the mental health diagnosis question, or who only scored on the anxiety questions, were excluded from further study.

We recruited patient-carer pairs from among those screening positive, if a carer could be identified, and was willing to participate. A carer was defined as someone who had contact with the patient for at least an hour a week. If the patient had capacity, they were asked to give written informed consent. If they lacked capacity a carer was asked

to act as a personal consultee under section 32 of the Mental Capacity Act (2005). In addition, carers were asked to give written informed consent for their own participation.

Research ethics committee approval was obtained.

Definitions of mental health problems

At baseline we interviewed patients, carers and ward staff to measure cognitive function (Mini-Mental State Examination, MMSE [11]), delirium (Delirium Rating Scale, DRS [12]) and depression (Cornell Scale for Depression in Dementia, CSDD [13, 14]). We defined problems with standard cut-offs (MMSE <24; DRS >17.75; CSDD >10 for probable, >18 definite depression).

Behavioural and psychiatric problems were ascertained using the Neuropsychiatric Inventory (NPI [15]). We also measured activities of daily living at admission, and prior to the current illness (Barthel index [16]), and nutritional status (Mini Nutritional Assessment [17]).

We recorded demographic details, drug history and severity of acute illness (Modified Early Warning Score [18]) from case notes.

Sample size

If prevalence is 30%, a sample size of 1,000 will estimate this within ±3%, and a sample size of 250 within ±6% (using confidence intervals for a single proportion).

Data management and analysis

Data were collected on paper forms and entered onto a database by researchers and students. Data were extensively checked for accuracy before analysis.

Descriptive statistics were calculated, stratified by ward type and presence of cognitive impairment. Prevalence estimates were calculated under the assumption that those screening negative had no mental health problems and that recruited patients were representative of all patients screening positive. Ninety-five percent confidence intervals were calculated using bootstrap methods (to take account of the two-stage assessment procedure).

Results

Screening

Over 6 months between April and November 2009 there were 3,680 unplanned admissions of people over 70 to the study wards lasting more than 2 days. Of these admissions 2,102 (57%) patients were not screened due to researcher unavailability. We tried to approach 1,578 patients. Of these 66 (4%) had already been discharged, 285 (18%) were repeatedly unavailable (off ward, receiving medical or nursing care or asleep), 66 (4%) were too ill, 36 (2%) were in another study, 79 (5%) declined, 12 (1%) spoke no English, 30 (2%) were

too deaf, had died, or lived out of area. We screened 1,004 patients (see Appendix 1, Supplementary data available in *Age and Aging* online). Those approached, but not screened, were similar to those screened with respect to age (84.6 versus 84.7 years), gender (60 versus 63% female) and ward type (geriatric 35 versus 39%, general medical 48 versus 41%, orthopaedics 18 versus 20%).

On the basis of screening, 300 patients (30%; 95% CI: 27–33) were unlikely to have a mental health diagnosis, or 361 (36%; 95% CI: 33–39) including those with anxiety alone. Three hundred and eighty-eight patients (43%) had an AMTS ≤7, 320 (36%) a GDS4 ≥1, 259 (29%) a PRIME-MD anxiety score of ≥2, nine (1%) likely alcohol problems and 97 (10%) scored positive for 'other reasons'. Some patients (37%) screened positive on more than one scale (Table 1).

Of the 643 with a likely mental health diagnosis, 147 (23%) declined to participate further, and 48 (7%) carers declined consultee agreement. Sixty-one (9%) had no carer identified. The research team was unable to contact carers to get consultee agreement prior to discharge for 108 (17%). Eight (1%) were too ill to be interviewed, and 21 (3%) had another reason for non-inclusion. Two hundred and fifty participants had full assessments (39%).

Characteristics of the population who had full assessments

Median age was 84 years (IQR: 79–89), 166 (66%) were female and 117 (47%) lived alone. Those not recruited were similar to those who took part with respect to mean age (84.1 versus 84.1 years), gender (63 versus 66% female), cognition (AMTS ≤7; 70 versus 71%) and depression (GDS4 ≥1; 57 versus 63%).

One patient withdrew from the study before completion of baseline data. One profoundly deaf patient was unable to complete an MMSE, and was excluded from analyses.

Prevalence of physical health problems

Patients with mental health problems were functionally dependent, with 66 (27%) having a Barthel index of ≤5/20. One hundred and sixteen (47%) were incontinent, 110 (44%) needed major help transferring and 120 (49%) needed help feeding. Functional abilities had deteriorated substantially and significantly from prior to current illness when only 14 (6%) had a Barthel index ≤5, 47 (19%) were incontinent, 26 (11%) needed major help transferring and 49 (20%) needed help feeding ($P < 0.05$ in each case).

One hundred and ninety-four patients (80%) were at risk of malnutrition. At admission, 14 (6%) scored four or more on the modified early warning score (medical review required within 30 min) and 75 (30%) were on more than nine medications (Table 2).

Characteristics of cognitively impaired participants

One hundred and ninety-five participants (79%) were cognitively impaired. Seventy-eight (31%) had a MMSE of 0–11 and 51 (21%) a MMSE of 12–17. There was no significant difference between patients with cognitive impairment and those without ($n = 53$) in terms of sex, severity of illness or number of medications. However, participants with cognitive impairment were older (median 86 versus 79), more likely to live in a care home (27 versus 0%), less likely to live alone (39 versus 75%), more disabled (31 versus 9% with Barthel index of ≤5), more often incontinent (53 versus 23%), needing major help to transfer (48

Table 1. Characteristics of screened population *n* (%)

	Trauma (*n* = 197)	Medical (*n* = 414)	Geriatric (*n* = 393)	Total (*n* = 1,004)	95% Confidence intervals
Age					
70–79	67 (34)	174 (42)	85 (22)	326 (33)**	30–35
80–89	94 (48)	193 (47)	217 (55)	504 (50)	47–53
≥90	36 (18)	46 (11)	91 (23)	173 (17)	15–20
Median age (range)	83 (70–105)	81 (70–99)	85 (70–101)	83 (70–105)	
Sex female	188 (95)[b]	223 (54)	220 (56)	631 (63)**	59–66
Cognitive impairment (AMT ≤7)	57/175 (33)	119/391 (30)	212/346 (61)	388/912 (43)**	39–46
Depressed (GDS4 ≥1)	55/169 (33)	130/388 (34)	135/328 (41)	320/885 (36)	33–39
Anxiety (PRIME-MD ≥2)	48/168 (29)	116/387 (30)	95/325 (29)	259/880 (29)	26–32
Alcohol problem (CAGE ≥2)	3/167 (2)	3/386 (1)	3/332 (1)	9/885 (1)	0–2
Anxiety alone	16 (10)	32 (8)	13 (4)	61/880 (7)	5–9
Other[a]	22 (11)	27 (7)	48 (12)	97 (10)	8–12
2 positive	47 (24)	111 (27)	131 (33)	289 (29)*	26–32
3 positive	11 (6)	27 (7)	38 (10)	76 (8)	6–9
No mental health problems or anxiety only	86 (44)	191 (46)	84 (22)	361 (36)**	33–39
No mental health problems	70 (36)	159 (38)	71 (18)	300 (30)**	27–33

[a]If other scales not completed or negative.
[b]One trauma ward was entirely female, one was both sexes.
*$P < 0.05$.
**$P < 0.01$.

Table 2. Demographic and functional characteristics on admission among participants with mental health problems

	Cognitive impairment, n (%)	Mental health problem without cognitive impairment, n (%)	Total	95% Confidence intervals
Age (median and IQR)	86 (80–90)	79 (75–84)	84 (79–89)**	
Residence				
Alone	77 (39)	40 (75)	117 (47)**	41–53
With another	65 (33)	13 (25)	78 (31)	25–37
Care home	53 (27)	0 (0)	53 (21)	16–26
Barthel index categories				
0–5	61 (31)	5 (9)	66 (27)**	21–32
6–10	62 (32)	12 (23)	74 (30)	24–35
11–15	53 (27)	15 (28)	68 (27)	22–33
16–20	19 (10)	21 (40)	40 (16)	12–21
Barthel index prior to illness				
0–5	14 (7)	0 (0)	14 (6)**	3–9
6–10	33 (17)	0 (0)	33 (14)	9–18
11–15	50 (26)	8 (15)	58 (24)	18–29
16–20	93 (49)	45 (85)	138 (57)	51–63
Incontinence	104 (53)	12 (23)	116 (47)**	41–53
Incontinence prior to admission illness	45 (23)	2 (4)	47 (19)**	14–24
Major help needed with transfer	93 (48)	17 (32)	110 (44)*	38–50
Major help needed to transfer prior to admission illness	26 (13)	0 (0)	26 (11)*	7–14
Needs help with feeding	113 (58)	7 (13)	120 (49)**	42–55
Needed help with feeding prior to admission illness	45 (23)	4 (8)	49 (20)*	15–25
Nutrition				
Malnourished	82 (43)	8 (15)	90 (37)*	31–43
At risk	79 (42)	25 (48)	104 (43)	37–49
Satisfactory	28 (15)	19 (37)	47 (20)	15–25
Acute illness severity (MEWS)				
0–1	132 (68)	34 (65)	166 (67)	61–73
2 or 3	54 (28)	13 (25)	67 (27)	22–33
4	9 (5)	5 (10)	14 (6)	3–9
Number of medications				
0–4	53 (27)	14 (26)	67 (27)	21–32
5–8	89 (46)	17 (32)	106 (43)	37–49
9–20	53 (27)	22 (41)	75 (30)	25–36

Based on MMSE ≤24; *$P < 0.05$; **$P < 0.001$; MEWS, modified early warning score.

versus 32%), help feeding (58 versus 13%) and at greater risk of malnutrition (85 versus 63%).

Mental health problems

Adjusting for the two-stage assessment design, we estimate that among all patients over 70, 50% (95% CI: 46–54) had cognitive impairment, 27% (95% CI: 24–31) delirium (with or without concurrent dementia), 27% (95% CI: 23–31) previously diagnosed dementia, 24% (95% CI: 20–28) possible major depression and 8% (95% CI: 5–11) definite major depression (on CSDD).

Similarly, we estimate the overall prevalence of behavioural and psychiatric problems, rated moderate or severe on the NPI, were: apathy 21% (95% CI: 17–25); poor appetite 29% (95% CI: 25–33); anxiety 22% (95% CI: 18–26); sleep problems 21% (95% CI: 17–25); agitation/aggression 9% (95% CI: 6–12), hallucinations 6% (95% CI: 4–9), delusions 8% (95% CI: 5–11); disinhibition 5% (95% CI: 3–7); psychomotor behaviour 11% (95% CI: 8–14); irritability 11% (95% CI: 8–14) and depression 22% (95% CI: 18–26).

Patients with cognitive impairment were more likely to be agitated or aggressive (17 versus 2%), apathetic (38 versus 15%), show motor behaviour problems (wandering, repetitive activities; 21 versus 4%), disinhibition (10 versus 0%) and to be delirious (53 versus 6%, Table 3).

Including patients with mild symptoms occurring at least once a week increased the prevalence of apathy to 31% (95% CI: 27–35); appetite problems 37% (95% CI: 32–41); anxiety 36% (95% CI: 31–40); sleep problems 30% (95% CI: 26–34); agitation/aggression 11% (95% CI: 8–14), hallucinations 10% (95% CI: 7–13), delusions 17% (95% CI: 14–21); disinhibition 7% (95% CI: 4–9); psychomotor behaviour 15% (95% CI: 12–19) irritability 25% (95% CI: 21–29) and depression to 26% (95% CI: 24–28).

Discussion

This paper describes the high prevalence of mental health problems among older patients admitted as an emergency to a general hospital, and has characterised their functional ability, behavioural problems and psychiatric symptoms. Patients with mental health problems are frequently managed in settings which are unlikely to have mental health expertise (such as trauma orthopaedics and acute medicine). Prevalence is so

Table 3. Mental health problems

	Mental health problems	Cognitive impairment, *n* (%)	Mental health problem without cognitive impairment, *n* (%)	Total	Estimated prevalence among all admitted patients over 70 (95% CI)
NPI domains moderate to severe	Delusions	28 (14)	3 (6)	31 (12)	8% (5–11)
	Hallucinations	20 (10)	4 (8)	24 (10)	6% (4–9)
	Agitation or aggressive	34 (17)	1 (2)	35 (14)*	9% (6–12)
	Depression	67 (34)	17 (32)	84 (34)	22% (18–26)
	Anxiety	67 (34)	17 (32)	84 (34)	22% (18–26)
	Elation	3 (2)	0 (0)	3 (1)	n/a
	Apathy	75 (38)	8 (15)	83 (33)*	21% (17–25)
	Disinhibition	19 (10)	0 (0)	19 (8)*	5% (3–7)
	Irritability	39 (20)	5 (9)	44 (18)	11% (8–14)
	Motor behaviour	40 (21)	2 (4)	42 (17)*	11% (8–14)
	Difficulty sleeping	65 (33)	18 (34)	83 (33)	21% (17–25)
	Appetite	93 (48)	20 (38)	113 (46)	29% (25–33)
CSDD	No depression	89 (49)	24 (47)	113 (49)	
	Possible major depression	67 (37)	22 (43)	89 (39)	24% (20–28)
	Definite major depression	24 (13)	5 (10)	29 (13)	8% (5–11)
DRS	Delirium	104 (53)	3 (6)	107 (43)**	27% (24–31)
Diagnosed dementia		105 (54)	1 (2)	106 (43)**	27% (23–31)

MMSE, mini-mental state examination; NPI, neuropsychiatric inventory; CSDD, Cornell scale for depression in dementia; DRS, delirium rating scale.
*$P < 0.05$.
**$P < 0.001$.

high that specific provision seems required to manage the combined impact of acute illness, physical dependency and behavioural and psychiatric symptoms if we are to minimise the risk of poor outcomes, and dissatisfaction with care.

The study has limitations. It was conducted in a single NHS hospital trust, although this provided the sole emergency medical services for its local population and is likely to be representative. For logistical reasons, we only recruited from three of five geriatric medical, seven of eleven general medical and two of three trauma orthopaedic wards. We did not recruit from specialist stroke, renal, neurology, cardiology, haematology, oncology or infectious diseases wards. The particular local configuration of these services will have influenced case mix, and may limit generalisability, although we attempted to make the study as representative of 'unselected' general medical, geriatric and trauma cases as is possible in a modern health service.

We screened only 27% of patients admitted to study wards but we believe this effectively represented a random sample. We aimed to reduce bias by following a strict protocol for approaching patients for inclusion, attempting to avoid systematic selection of any particular patient type and carefully recorded reasons for non-inclusion. We found no direct evidence of bias using available data, but acknowledge that there may be differences between the patients screened and those not screened which may change the prevalence estimates.

This is a difficult population to study. Recruiting patients lacking capacity to consent to participation in a study introduces the practical problems of obtaining consultee agreement from a carer, and a reliable informant to ascertain factual information, at a time of great uncertainty and stress for carers and in a fast-moving acute service.

The study sample disproportionately included patients who had carers who lived locally and visited regularly, and patients with longer hospital stays. In the second stage, we recruited only 39% of patients screening positive for mental health problems, but again we did not identify any differences between included and excluded participants from the data we had available. Patients discharged quickly may or may not have had fewer problems (for example, they may have been less ill, or returned quickly to a care home). Participant selection/recruitment issues may have biased prevalence estimates, but the direction of these biases is uncertain. We suspect that the influence of subspecialisation of wards will have had more impact on prevalence estimates than selection bias and sampling issues.

A strength of the study is that we had an informant for all patient participants who lacked capacity to consent for themselves. This allowed us to gain reliable information on the patients' behavioural and psychological problems and functional abilities prior to admission.

The prevalence of mental health problems identified in this study is consistent with previous studies [1–3, 19–21], despite the increasing availability of non-hospital treatment options, and increasingly elderly and complex patients being admitted to hospital. In keeping with previous reports, only half of those with cognitive impairment had a recorded history of dementia [3], although we were unable to separate delirium and dementia in our study.

One notable finding is the severity of the decline in functional ability from pre-illness to admission. The new onset of severe disability explains why management in community settings is so difficult, and suggests patients may have potential for rehabilitation once the acute illness is treated.

There are important implications for staffing levels and skills needed on general hospital wards. Patients with cognitive impairment were significantly more likely to be incontinent, unable to feed themselves and had behavioural problems ward staff find difficult to cope with (agitation, aggression, wandering), than those with depression or other mental illnesses (a group which is likely to be more disabled than those with no mental health problems). The levels of functional dependency, combined with behavioural and psychiatric problems can make the task of delivering care difficult and time consuming. Caring for a patient who is incontinent and aggressive or delusional will take longer than caring for a patient who is just incontinent. Similarly where a patient suffers apathy, motivating that patient to wash or feed herself will take longer even if the patient is physically able. This represents a skilled nursing job, but many nurses report they lack the experience or training to be confident doing this [4, 22].

Services, which optimise detection and management of older patients with mental health problems, need to be developed and evaluated. There is a body of knowledge on what constitutes good care, but the best way to deliver this within the constraints of acute medical services is far from clear [5, 23–27]. Approaches include improving the ward environment, providing opportunities for purposeful activity, improving the understanding and management of distress behaviour through staff training, integrating mental health expertise with general nursing and by developing partnerships with family carers [28, 29]. However, rigorous evaluations of services are lacking [30].

Key points

- Fifty percent of people over 70 admitted to general hospitals as an emergency are cognitively impaired.
- Psychopathological symptoms are common, including 8% having delusions and 6% hallucinations, 21% being apathetic and 9% agitated or aggressive.
- Physical dependency is also very high, and mostly of recent onset prior to the hospital admission.

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Conflicts of interest

None declared.

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Supplementary data

Supplementary data mentioned in the text is available to subscribers in *Age and Ageing* online.

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Incidence rates of fragility hip fracture in middle-aged and elderly men and women in southern Norway

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Abstract

Background: hip fracture contributes to increased morbidity and mortality in the elderly population. As the average age of the population is increasing, the burden of hip fracture on the health-care system is a growing challenge. The highest incidence of hip fracture worldwide has been reported from Scandinavia in fact from Oslo the capital of Norway. During the last decades, efforts have been undertaken to reduce hip fracture risk.