Epidemiology and Psychiatric Sciences (2018), **27**, 278–287. © Cambridge University Press 2017
doi:10.1017/S2045796016001098

ORIGINAL ARTICLE

Behavioural and psychological symptoms in general hospital patients with dementia, distress for nursing staff and complications in care: results of the General Hospital Study

J. B. Hessler[1]*, M. Schäufele[2], I. Hendlmeier[2], M. N. Junge[1], S. Leonhardt[2], J. Weber[2] and H. Bickel[1]

[1] *Department of Psychiatry and Psychotherapy, Klinikum rechts der Isar, Technical University of Munich, Germany*
[2] *Faculty of Social Work, Mannheim University of Applied Sciences, Mannheim, Germany*

Aims. Little is known about how behavioural and psychological symptoms of dementia (BPSD) manifest in the general hospital. The aim was to examine the frequency of BPSD in general hospitals and their associations with nursing staff distress and complications in care.

Methods. Cross-sectional representative study with 1469 patients aged ≥65, including 270 patients with dementia, of 33 randomly selected general hospitals in Germany. BPSD and complications were reported by nurses.

Results. Overall frequency of BPSD was higher in patients with dementia (76%) than without (38%). The most frequent symptoms in patients with dementia were nighttime disturbances (38%), depression (29%) and aberrant motor behaviour (28%) and the most distressing symptoms for nursing staff were delusions, aggression and nighttime disturbances. The overall frequency of BPSD increased from 67% in mild dementia, to 76% in moderate dementia and to 88% in severe dementia. The most frequent symptoms in patients without dementia were depression (19%), nighttime disturbances (13%) and irritability (13%). The most distressing symptoms were aggression and delusions, while the same symptoms were consistently rated as less distressing than in patients with dementia. Factor analysis revealed three independent groups of BPSD that explained 45% of the total variance. First, expansive symptoms (aggression, irritability, nighttime disturbances, aberrant motor behaviour and disinhibition) were frequent, distressing for nursing staff and associated with many complications. Second, psychotic symptoms (delusions and hallucinations) were infrequent, distressing and associated with some complications. Third, affective symptoms (apathy, anxiety and depression) were frequent, non-distressing and associated with few complications. The results did not change when cases with delirium were excluded from both groups.

Conclusions. BPSD are common in older hospital patients with dementia and associated with considerable distress in nursing staff, as well as a wide range of special treatments needs and additional behavioural and medical complications. Management strategies are needed to improve the situation for both patients and hospital staff.

Received 6 September 2016; Accepted 4 December 2016; First published online 9 January 2017

Key words: Acute hospital, behavioural and psychological symptoms of dementia, BPSD.

Introduction

Behavioural and psychological symptoms in dementia (BPSD; Finkel, 2000) are common in the community and even more in institutional settings (van der Linde *et al*. 2012). BPSD include a variety of heterogeneous symptoms such as delusions, aggression, irritability, aberrant motor behaviour and impulsivity, but also depression, anxiety and apathy. The symptoms are thought to arise from interactions between dementia severity, environmental factors and other (somatic) diseases (van der Linde *et al.* 2012; Sampson *et al.* 2014). In settings such as nursing homes and private households BPSD were found to inflict strain on both formal and informal caregivers (Ballard *et al*. 2000; Matsumoto *et al*. 2007; Huang *et al.* 2012) and often to be more difficult to manage than the cognitive deficits associated with dementia (Black & Almeida, 2004).

Persons with dementia have a high risk of being hospitalised (Bynum *et al*. 2004; Phelan *et al*. 2012) and BPSD may complicate the treatment resulting in

* Address for correspondence: J. B. Hessler, Department of Psychiatry and Psychotherapy, Klinikum rechts der Isar, Technical University of Munich, Ismaninger Strasse 22, D-81675 München, Germany.
(Email: johannes.hessler@tum.de)

longer stays and increased costs. BPSD have been investigated in specialised acute treatment settings such as psychogeriatric wards (e.g. Edell & Tunis, 2001; Tan *et al.* 2005). However, little is known about BPSD in somatic wards in the general hospital and no representative studies have been conducted. Despite employing differential methods of assessing BPSD, two studies reported that around three-quarters of the older patients with dementia showed at least one behavioural or psychological symptom during their stay (Wancata *et al*. 2004; Sampson *et al.* 2014). In internal patients apathy, aggression, depressive thoughts and delusions were found to be most common (Wancata *et al*. 2004) and in patients admitted via emergency services aggression, sleep disturbances, activity disturbances and anxiety to be the most frequent (Sampson *et al.* 2014). In general medicine, trauma orthopaedic and geriatric patients with a Mini Mental State Examination (Folstein *et al*. 1975) score ≤24 changes in appetite, apathy, anxiety and depression were the most prevalent, but no overall prevalence was calculated (Goldberg *et al.* 2011).

In one study (Sampson *et al*. 2014), a general rating of nursing staff distress was obtained, indicating that in 63% of all cases with BPSD the symptoms were at least mildly troubling or dangerous. However, no investigations on the symptom level were conducted.

Knowledge of the frequency of BPSD in the general hospital and associated complications potentially helps to develop programmes aimed at improving care and reducing distress for both patients and hospital staff. The present study was conducted as part of the General Hospital Study (GHoSt) and aimed to investigate: (1) the frequency of BPSD in a representative sample of older general hospital patients; (2) the distress for nursing staff associated with the individual symptoms; and (3) the association of BPSD with complications during care, special treatment needs and other behavioural problems. As hospital patients with dementia are prone to developing delirium and this comorbidity reflects the clinical reality, we decided not to exclude cases with delirium for statistical analyses.

Method

Study population and participants

The study protocol was approved by the institutional review board of the Faculty of Medicine, Technical University of Munich (approval number 66/14, 21 march 2014). GHoSt was a cross-sectional population-based study conducted in general hospitals in the two southernmost German federal states Bavaria and Baden-Wurttemberg. These states are inhabited by more than 23 million people, which represent nearly 30% of total German population. According to the state hospital directories, which list all hospitals of a given state, there were 209 hospitals with at least 150 beds. The hospitals were contacted by a random order and asked for willingness to participate. For cooperating hospitals, five wards were randomly selected. Geriatric, neurologic and psychiatric wards were excluded, as the study aimed to examine comorbid dementia and on these wards patients are often admitted with dementia as a primary diagnosis. Paediatric wards and intensive care units were also excluded.

All patients who were 65 years or older on the day of examination were identified on the wards from current patient lists. Patients who were isolated due to infectious disease, moribund, not sufficiently proficient in German or for whom the nursing staff expressed other clinical concerns were excluded. If legal guardianship existed for a patient, the guardians were contacted before the patient was seen and informed about the study, either in person in the hospital or by phone. Verbal or written consent was then obtained from the guardians. Patients without legal guardianship were visited in their rooms and informed about the study. All patients gave written consent to participate.

Procedure and materials

Data collection for each patient was conducted by trained junior researchers and followed four phases: bedside patient examination, nursing staff interview, inspection of the medical records and evaluation of the cognitive status with regard to dementia, delirium and degree of cognitive impairment. Additional informant interviews were conducted for all patients with legal guardians and for some patients with unclear cognitive status.

Patient examination

Demographic data were obtained from the patients and a cognitive test battery was administered, including the 6-Item Cognitive Impairment Test (6CIT; Katzman *et al.* 1983; Brooke & Bullock, 1999; Hessler *et al*. 2016), which includes items tapping memory, attention and executive functioning; the word-list learning test from the DemTect (Kalbe *et al*. 2004), affording patients to recall as many as possible of ten words that were read to them twice directly after hearing them and after a short delay; the Serial Sevens Test (calculating five subtractions of 7 from 100), and a verbal fluency test (naming as many animals as possible within 1 min).

https://doi.org/10.1017/S2045796016001098 Published online by Cambridge University Press

Nursing staff interview

For each patient the responsible nurse was interviewed with a standardised and fully structured questionnaire about the timeframe from admission to the day of examination for GHoSt. Behavioural and psychological symptoms were assessed with a modified short form of the Neuropsychiatric Inventory (NPI-Q; Kaufer *et al*. 2000). The nurses were asked whether they had observed the following 11 symptoms during the patient's current stay: delusions, hallucinations, agitation/aggression, dysphoria/depression, anxiety, euphoria/elation, apathy/indifference, disinhibition, irritability/lability, aberrant motor behaviour and nighttime disturbances. When the nurses reported the presence of a symptom, they indicated on a six-point scale how distressing the symptom was for them: 0 = not at all, 1 = minimally, 2 = mildly, 3 = moderately, 4 = severely or 5 = very severely. No rating of severity of the BPSD was obtained. The nurses were also asked to rate the patient's mental status from: (1) 'Memory and mental capacity are normal' to (4) 'The patient appears to be severely mentally impaired' and whether they observed any fluctuations in the patient's consciousness and cognition. Functional ability was assessed with the Barthel Index (Mahoney & Barthel, 1965), which stages the level of independent functioning in areas such as personal hygiene, mobility and ingestion. Also, data on complications in nursing, the need for special measures above routine treatment and the presence of other behavioural problems (e.g., shouting) were collected.

Medical records

The inspected medical records comprised charts of the current stay and previous medical reports that were available in the hospital. Recorded information included somatic diagnoses at admission according to ICD-10, previously known ICD-10 diagnoses of cognitive impairment, medication acting upon the nervous system as defined by the Anatomical Therapeutic Chemical (ATC) Classification System (all medications whose ATC-code starts with 'N'), as well as neurological and psychiatric consults during the current stay.

Informant interview

Guardians, relatives or other persons that knew the patient well were interviewed in person on the ward or by phone. Demographic data were cross-checked, a rating of the patient's cognitive status previous to the admission was obtained, and – if cognitive problems were reported – it was inquired whether a physician had been consulted and whether a respective diagnosis had been assigned.

Diagnoses of cognitive impairment

Based on all available information dementia was diagnosed according to DSM-IV. Delirium was diagnosed with the Confusion Assessment Method (CAM; Inouye *et al*. 1990; Bickel, 2007). The CAM asks for an acute onset of the cognitive deficits, the presence of deficits in attention and/or thinking, altered consciousness and, if present, whether these deficits fluctuated over the period of observation. For the diagnosis of delirium, onset must be acute or deficits fluctuating, attention must be impaired, and either thinking or consciousness altered. The Clinical Dementia Rating Scale (CDR; Hughes *et al*. 1982) was employed to rate the severity of cognitive impairment. The CDR discriminates between five stages of severity: no (0), questionable (0.5), mild (1), moderate (2) and severe (3). After data collection, all cases were reviewed in the respective working groups and two senior researchers (HB and MS) with longstanding experience in the field of dementia then audited the diagnoses of dementia and delirium. Over the course of the study, consensus meetings were held in order to ensure consistent application of diagnostic criteria across study centres. In ambiguous cases the differential diagnosis dementia *v*. delirium was performed considering third-party information about the patients' cognitive status before the current hospital stay. When cognitive deficits appeared to have had a sudden onset, there was no indication of previous deficits and the CAM criteria were met, delirium was diagnosed. When the deficits met the criteria of the CAM but informants reported deficits and impaired activities of daily living before the hospital stay, dementia with delirium was diagnosed.

Statistical analysis

For each symptom, the frequency as reported by the nursing staff was calculated. These frequencies pertain to the whole stay of the respective patients up to the day of the examination. The 95% confidence intervals according to the Wilson score method were calculated with the epidemiologic statistics program OpenEpi (Dean *et al*. 2013). To assess whether a particular symptom was experienced as more or less distressing, a quotient was calculated. For each symptom the number of cases for which the nurses rated the distress between 3 and 5 (moderately to very severely distressing) was divided by the number of cases with a rating between 0 and 2 (not at all to mildly distressing). Symptoms with a distress quotient larger than 1

https://doi.org/10.1017/S2045796016001098 Published online by Cambridge University Press

Table 1. *Descriptive statistics for patients with and without dementia*

Descriptive variable	Dementia $N = 270$	No dementia $N = 1199$	Significance p*
Age; *M* (S.D.)	83.25 (7.13)	77.60 (7.08)	<0.001
Female; *N* (%)	146 (54.1)	644 (53.7)	n.s.
Discipline; *N* (%)			<0.01
Internal medicine	157 (58.1)	580 (48.4)	
Trauma surgery	58 (21.5)	237 (19.8)	
General surgery	32 (11.9)	208 (17.3)	
Others	23 (8.5)	174 (14.5)	
Days admission to examination; *M* (S.D.)	7.06 (7.25)	7.30 (9.33)	n.s.
Delirium; *N* (%)	48 (17.8)	27 (2.3)	<0.001
Modified NPI-Q; *M* (S.D.)			
Number of symptoms	2.11 (1.98)	0.71 (1.20)	<0.001
Sum of distress ratings	6.62 (6.15)	3.28 (4.54)	<0.001

M, mean; S.D., standard deviation; NPI-Q, Neuropsychiatric Inventory; n.s. = $p > 0.05$.
*χ^2 tests for categorical and independent t tests for continuous variables.

were predominantly experienced as distressing while quotients lower than 1 indicate a symptom that was mostly perceived as little distressing. Differences in the frequency of the symptoms between patients with and without dementia were compared with χ^2-tests. Frequency and distress quotient were plotted against each other to demonstrate their relationship.

Further analyses were conducted considering only patients with dementia, including those with comorbid delirium. The association between dementia severity according to CDR and the frequency of the individual symptoms was assessed with χ^2 tests. Factor analysis employing a principal components method and varimax rotation was carried out to identify clusters in the BPSD. The patients' factor scores were saved and entered in binary logistic regression models as predictors for complications in care. Separate models were calculated with dichotomised (reported *v*. not reported) outcome variables related to three groups of complications in care: (1) nursing: basic nursing (e.g. fends off bedding, bathing and help with excretion), treatment nursing (e.g. fends off medication, wound care or pulls out catheters and needles), ingestion (e.g. food untouched, fends off feeding and throws food) and generally increased expenditure of time compared with patients with the same somatic problems. (2) Medical treatment: medical measures (e.g. disobeys bed rest, fends off examinations and blood withdrawal), physical restraint in bed or chair, attachment of bed rails, transfer to single or special room or hall, need for neurologic or psychiatric consult and medication acting upon the nervous system (antipsychotics, anxiolytics, antidepressants, hypnotics or sedatives, anti-dementia drugs, antiepileptics and analgetics). (3) Behavioural problems: verbal or physical aggression (e.g. shouts, insults others, hits and kicks), ringing the bell very often or without identifiable reason, getting lost on the ward or attempts to leave ward or hospital and falls.

The associations of the factor scores with age, the number of days since admission, and the Barthel-Index total score (higher values indicated better functionality in daily activities) were investigated with Pearson's correlation coefficients. Multivariate analysis of variance (MANOVA) was employed to examine the relationship of sex and medical discipline with the factor scores. Only main effects for sex and medical discipline were calculated.

These analyses were followed by a range of further binary logistic regression analyses, with the BPSD as predictors and more detailed dichotomous care-relevant variables as outcomes. Euphoria was not examined due to the low number of cases. The results are presented as online Supplementary material.

To test whether the associations remained unchanged, we repeated the above analyses with excluding patients with delirium superimposed on dementia. Data analysis was performed with SPSS 23.

Results

Of the 55 randomly selected hospitals 33 (60%) cooperated. On the day of examination 2801 patients were 65 or older. Six-hundred forty-seven fulfilled the exclusion criteria as they were isolated due to infectious disease (133), insufficiently proficient in German (86), too sick for participation (53), discharged on the day of examination (267), repeatedly not met on the ward (75) or for other reasons, for example, deafness (33),

https://doi.org/10.1017/S2045796016001098 Published online by Cambridge University Press

resulting in a sample of 2154 eligible patients. Six-hundred eighty-five (31.8%) refused participation or their legal guardians refused or could not be reached, resulting in a study sample of 1469 patients (68.2%).

Two-hundred seventy (18.4%) patients were diagnosed with dementia, of which 100 were rated as mild, 97 as moderate and 73 as severely impaired on the CDR. Mean age of the whole sample was 78.64 (S.D. = 7.42). Table 1 shows the descriptive statistics for patients with and without dementia.

Table 2 displays the frequencies of the individual symptoms and the distress quotients as reported by the nursing staff for patients with and without dementia.

Among patients with dementia, nighttime disturbances, depression and aberrant motor behaviour were the most frequent symptoms and delusions, aggression and nighttime disturbances caused the greatest distress. At least 1 symptom was reported for 76% and the overall distress quotient across all symptoms was 1.2, indicating that the symptoms were predominantly distressing. For patients without dementia, depression, irritability and nighttime disturbances were most frequently reported and aggression and delusions were experienced as most distressing. All other symptoms had a distress quotient <1. For about 38% one or more symptoms were reported and the overall distress quotient was 0.5. Comparisons with χ^2 tests suggested that all symptoms were statistically significantly more often reported for patients with dementia except for euphoria. The same symptoms were consistently rated as more distressing in people with dementia.

Subsequent results were obtained considering only data from patients with dementia. Aberrant motor behaviour, anxiety, aggression and at least one BPSD were statistically significantly associated with dementia severity (Table 3). For 67.0% of the patients with mild dementia at least one symptom was reported, with nighttime disturbances (33.0%), depression (25.0%) and irritability (23.0%) being the most common. For 76.3% of the moderate dementia group at least one symptom was reported, with nighttime disturbances (38.1%), depression (35.1%) and aberrant motor behaviour (32.0%) being the most frequent. In the severe dementia group, the nursing staff reported at least one symptom for 87.7%, with aggression (46.6%), nighttime disturbances (45.2%) and aberrant motor behaviour (37.0%) being the most common.

Figure 1 visualises the data from Table 2 by plotting the frequency *v.* the distress quotient. The Scatterplot was divided into four quadrants by separating the symptoms at 20% frequency and a distress quotient of 1.

The first quadrant in Fig. 1 is occupied by the less frequent but more distressing psychotic symptoms. The second quadrant includes the frequent and distressing expansive symptoms (i.e. symptoms that describe outwards oriented behaviour that may directly affect other persons) and the third the frequent but less distressing affective symptoms. The fourth quadrant includes only the very infrequent symptom euphoria.

Factor analysis revealed three independent groups of symptoms that accounted for 45.0% of the variance in BPSD and were largely congruent with the pattern from Fig. 1. Aggression, disinhibition, irritability, aberrant motor behaviour and nighttime disturbances comprised group 1 and explained 19.8% of the variance. Delusions and hallucinations comprised group 2 (12.7% variance explained), and depression, anxiety, euphoria and apathy comprised group 3 (12.5% variance explained). These factors suggest a grouping of BPSD into expansive, affective and psychotic symptoms. Table 4 displays the associations of the factor scores with care-relevant variables.

Higher scores on the expansive factor were associated with a range of complications during care, special treatment needs and other behaviours. Psychotic symptoms were associated with complicated basic care, increased utilisation of psychiatric or neurologic consults and antipsychotic medication. Affective symptoms showed no statistically significant association. The results of extended analyses on the symptom level and with more detailed care variables are presented in Supplementary Table 1. The most complications were associated with aggression, nighttime disturbances and aberrant motor behaviour. As for the psychotic symptoms, delusions were related to more complications than hallucinations, and among the affective symptoms, anxiety showed the most associations, while depression was only related to antidepressive and hypnotic/sedative medication.

The factor scores showed no statistically significant correlations with age and days since admission. The Barthel Index showed very small but statistically significant negative correlations with expansive symptoms ($r = -0.20$, $p = 0.004$) and affective symptoms ($r = -0.18$, $p = 0.007$).

MANOVA revealed no significant main effect of medical discipline but a significant main effect of sex. Tests of between-subjects effects indicated that male and female patients with dementia did not differ on mean factor scores for affective and psychotic symptoms but that men had higher mean factor scores for expansive symptoms with 1.11 (S.D. = 0.11) compared with women with 0.85 (S.D. = 0.07), $F = 12.68$, $p < 0.001$.

The associations between BPSD and care and demographic variables as well as the distress quotients remained unchanged when patients with delirium superimposed on dementia were excluded. Except for depression, whose frequency slightly increased,

https://doi.org/10.1017/S2045796016001098 Published online by Cambridge University Press

Table 2. *Frequency of behavioural and psychological symptoms in patients with and without dementia and associated distress as reported by nursing staff*

	Dementia $N = 270$			No dementia $N = 1199$		
Symptom	*N*	% (95% CI)	Distress quotient†	*N*	% (95% CI)$^{+}$	Distress quotient†
Delusions***	15	5.6 (3.4–8.8)	2.8	17	1.4 (0.9–2.3)	1.4
Hallucinations***	9	3.3 (1.8–6.2)	1.3	10	0.8 (0.5–1.5)	0.8
Aggression***	67	24.8 (20.4–30.3)	2.4	49	4.1 (3.1–5.4)	2.1
Depression***	**78**	**28.9 (23.8–34.5)**	0.5	**222**	**18.5 (16.4–20.8)**	0.3
Anxiety***	69	25.6 (20.7–31.1)	0.7	129	10.8 (9.1–12.6)	0.5
Euphoria	2	0.7 (0.2–2.7)	0	19	1.6 (1.0–2.5)	0.3
Apathy***	57	21.1 (16.7–26.4)	0.5	39	3.3 (2.4–4.4)	0.4
Disinhibition***	26	9.6 (6.7–13.7)	1	27	2.3 (1.6–3.3)	0.8
Irritability***	67	24.8 (20.4–30.3)	1.6	**151**	**12.6 (10.8–14.6)**	0.7
Aberrant motor behaviour***	**75**	**27.8 (22.8–33.4)**	1.5	35	2.9 (2.1–4.0)	0.8
Nighttime disturbances***	**103**	**38.1 (32.6–44.1)**	2	**153**	**12.8 (11.0–14.8)**	0.5
≥1 symptom***	205	75.9 (70.5–80.6)	1.2	452	37.7 (35.0–40.5)	0.5

Three most frequent symptoms in each group are in boldface.
95% CI = 95% confidence interval according to the Wilson score method.
†Number of patients with moderately, severely, or very severely distressing symptoms divided by number of patients with non-, minimally or mildly distressing symptoms.
Comparisons with χ^2 tests: *** $p < 0.001$.

all frequencies only minimally decreased. The largest difference was observed for aberrant motor behaviour, which dropped from 27.8 to 21.9% in the dementia group. Supplementary Table 2 displays the frequencies of behavioural and psychological symptoms for patients with and without dementia with the delirium cases excluded. The most frequent symptoms in patients with dementia and delirium were nighttime

Table 3. *Association of behavioural and psychological symptoms with dementia severity according to Clinical Dementia Rating Scale (CDR)*

	Dementia severity according to CDR					
	Mild, $N = 100$		Moderate, $N = 97$		Severe, $N = 73$	
Symptom	*N*	% (95% CI)	*N*	% (95% CI)	*N*	% (95% CI)
Delusions	6	6.0 (2.8–1257)	4	4.1 (1.6–10.1)	5	6.8 (3.0–15.1)
Hallucinations	4	4.0 (1.6–9.8)	4	4.1 (1.6–10.1)	1	1.4 (0.2–7.4)
Aggression***	14	14.0 (8.5–22.1)	19	19.6 (12.9–28.6)	**34**	**46.6 (35.6–55.9)**
Depression	**25**	**25.0 (17.6–34.3)**	**34**	**35.1 (26.3–45.0)**	19	26.0 (17.3–37.1)
Anxiety*	17	17.0 (10.9–25.6)	27	27.8 (19.9–37.5)	25	34.2 (24.4–45.7)
Euphoria	0	0.0	1	1.0 (0.2–5.6)	1	1.4 (0.2–7.4)
Apathy	14	14.0 (8.5–21.1)	23	23.7 (16.4–33.1)	20	27.4 (18.5–38.6)
Disinhibition	5	5.0 (2.2–11.2)	10	10.3 (5.7–18.0)	11	15.1 (8.6–25.0)
Irritability	**23**	**23.0 (15.8–32.2)**	24	24.7 (17.2–34.2)	20	27.4 (18.5–38.6)
Aberrant motor behaviour**	17	17.0 (10.9–25.6)	**31**	**32.0 (23.5–41.8)**	**27**	**37.0 (26.8–48.5)**
Nighttime disturbances	**33**	**33.0 (24.6–42.7)**	**37**	**38.1 (29.1–48.1)**	**33**	**45.2 (34.3–56.6)**
≥1 symptom**	67	67.0 (57.3–75.4)	74	76.3 (66.9–83.6)	64	87.7 (78.2–93.4)

The three most frequent symptoms in each group are in boldface.
95% CI = 95% confidence interval according to the Wilson score method.
Comparisons with χ^2 tests: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

https://doi.org/10.1017/S2045796016001098 Published online by Cambridge University Press

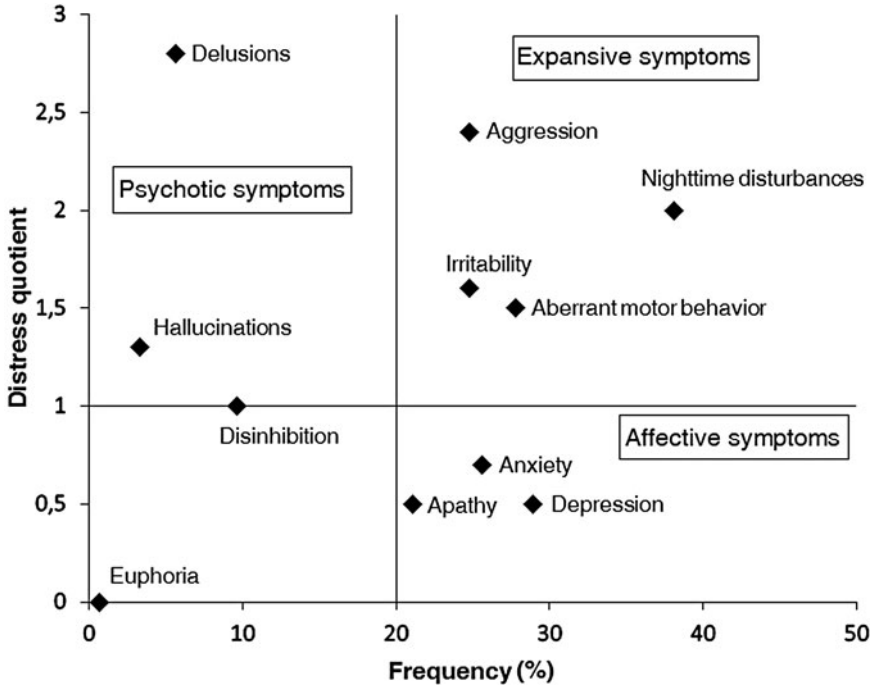

Fig. 1. Relationship between frequency of the behavioural and psychological symptoms in patients with dementia and the associated distress for nursing staff. *Note.* Distress quotient = number of patients with moderately, severely or very severely distressing symptoms divided by number of patients with non-, minimally or mildly distressing symptoms.

disturbances, which were reported for 25/48 (52.1%) cases and aberrant motor behaviour, which was reported for 24 (50.0%) cases.

Discussion

Behavioural and psychological symptoms were reported for 76% of patients with dementia compared to 38% of patients without dementia. The nursing staff consistently rated the same symptoms as more distressing in patients with dementia compared with patients without dementia, and the overall distress was more than twice as large. While 67% of the patients with mild dementia showed BPSD, the rate increased to 88% in the severely impaired. These results suggest that behavioural and psychological symptoms are not a general phenomenon in older hospital patients, but co-occur with dementia and are especially present in patients in advanced stages of cognitive deterioration. The BPSD were best described by three groups that were congruent with other studies using the NPI-Q (van der Linde *et al*. 2013) and had differential impact on the treatment in the hospital.

The expansive symptoms included nighttime disturbances, aberrant motor behaviour, irritability, aggression and disinhibition. Except for disinhibition, these symptoms were reported for more than 20% of the patients with dementia and were only exceeded by delusions with regard to the distress for the nurses. Nighttime disturbances were the most common of all BPSD with 38%. The symptoms showed strong associations with complications during routine nursing tasks and medical treatment, including severe problems such as pulling out catheters and throwing food. Higher rates of physical restraint, neurologic or psychiatric consults, and multiple neurotropic drugs might reflect the struggle to control these behaviours.

The psychotic symptoms included delusions and hallucinations, which were infrequent but co-occurred with behavioural problems, such as physical aggression, insulting others, shouting, getting lost on the ward, attempts to leave the hospital and falls. Delusions caused the highest distress of all BPSD.

Affective symptoms comprised depression, anxiety, apathy and euphoria. All symptoms were experienced as little distressing and had frequencies above 20%, except for euphoria, which was only reported for two cases. Anxiety was associated with some complications in care and behavioural problems, while apathy and depression were mostly regarded as unproblematic by hospital staff.

Previous studies reported BPSD in more than three-quarters of older general hospital patients (Wancata *et al*. 2004; Sampson *et al*. 2014), which is confirmed by the present study. Despite different methods to assess BPSD in the three studies, the results indicate

https://doi.org/10.1017/S2045796016001098 Published online by Cambridge University Press

Table 4. *Association of factor scores with complications in nursing, special treatment needs and behavioural problems. Results of the binary logistic regression analyses*

	Factor score		
Care relevant outcome	Expansive OR (95% CI)	Psychotic OR (95% CI)	Affective OR (95% CI)
Nursing			
Complications in basic care	**3.76 (2.56–5.51)**	**1.38 (1.05–1.80)**	1.25 (0.95–1.64)
Complications in treatment care	**2.02 (1.41–2.90)**	1.02 (0.76–1.36)	1.01 (0.77–1.34)
Complications in ingestion	**1.78 (1.09–2.92)**	1.32 (0.85–2.04)	1.56 (0.96–2.53)
Increased expenditure of time	**2.85 (1.97–4.12)**	1.24 (0.93–1.64)	1.28 (0.98–1.67)
Medical treatment			
Complications in medical measures	**2.61 (1.82–3.75)**	1.23 (0.90–1.68)	1.16 (0.81–1.65)
Physical restraint in bed or chair	**2.94 (2.00–4.39)**	1.14 (0.80–1.63)	1.00 (0.65–1.52)
Application of bed rails	**1.48 (1.11–1.97)**	1.10 (0.84–1.44)	1.24 (0.95–1.63)
Transfer to special room or hall	**2.77 (1.97–3.88)**	0.94 (0.68–1.31)	0.99 (0.72–1.35)
Neurological/psychiatric consult	**1.74 (1.24–2.43)**	**1.35 (1.01–1.81)**	1.04 (0.72–1.51)
Medication			
Antipsychotics	**1.57 (1.19–2.06)**	**1.43 (1.09–1.89)**	1.04 (0.79–1.38)
Anxiolytics	**1.95 (1.32–2.87)**	1.17 (0.81–1.70)	1.19 (0.78–1.80)
Antidepressants	0.86 (0.62–1.18)	0.76 (0.51–1.14)	1.20 (0.90–1.61)
Hypnotics and sedatives	**1.55 (1.07–2.25)**	0.78 (0.44–1.36)	1.31 (0.90–1.91)
Anti-dementia drugs	1.23 (0.81–1.87)	1.10 (0.74–1.65)	0.83 (0.50–1.39)
Antiepileptics	0.88 (0.60–1.29)	1.11 (0.80–1.53)	1.20 (0.86–1.68)
Analgetics	0.80 (0.62–1.03)	0.95 (0.7–1.22)	1.11 (0.86–1.43)
Behaviours			
Verbal or physical aggression	**8.05 (4.64–13.96)**	**1.64 (1.21–2.22)**	1.30 (0.99–1.71)
Rings bell very often	**1.73 (1.26–2.36)**	1.12 (0.82–1.52)	1.16 (0.84–1.60)
Gets lost or leaves hospital	**2.46 (1.41–4.29)**	1.73 (0.95–3.17)	1.19 (0.69–2.06)
Experienced fall	1.25 (0.86–1.80)	1.33 (0.98–1.80)	1.14 (0.78–1.66)

OR, odds ratio.
95% CI = 95% confidence interval of the odds ratio.
Statistically significant associations in boldface.

that nighttime disturbances, aggression, aberrant motor behaviour and depression are the most common BPSD in older general hospital patients.

The rates of BPSD observed in our study partly differ from what was reported for other settings. These differences may result from interplay of setting-specific factors and the methods used to assess BPSD. In a large population-based study of community-dwelling persons with dementia, apathy, sleep problems and irritability were the most common symptoms (Savva *et al*. 2009), compared with nighttime disturbances, depression and aberrant motor behaviour in our study. Agitation, delusions and disinhibition were found to be the most distressing for family carers in the community setting (Tan *et al*. 2005), compared with delusions, aggression and irritability in our sample. Exceeding the 75% found in general hospitals, the prevalence of BPSD in nursing homes lies between 80 and 85%, with irritability, apathy, and aberrant motor behaviour or agitation being among the most common symptoms (Margallo-Lana *et al*. 2001; Zuidema *et al*. 2007). Partly corresponding to our study, agitation and aggression as well as disinhibition and aberrant motor behaviour seemed to impose the most distress on carers in this setting (Song & Oh, 2015). In patients of an acute psychogeriatric ward, agitation, irritability, delusions and depression were the most frequent symptoms, while agitation, irritability and disinhibition were reported as most distressing (Tan *et al*. 2005). In conclusion, while frequencies of the individual symptoms differ, expansive symptoms appear to be common across all settings and were consistently rated as causing the most distress in caregivers.

Clinical implications

Behavioural and psychological symptoms are frequent in older general hospital patients with dementia and associated with distress nursing staff. No strategies for the prevention of BPSD in the hospital have been

https://doi.org/10.1017/S2045796016001098 Published online by Cambridge University Press

proposed so far. The psychopharmacological treatment options for BPSD seem to be limited with antipsychotics showing moderate effects in the short-term reduction of expansive symptoms (Ballard *et al.* 2009). Due to the general absence of side effects and since they can be more readily individualised, caregiver education programmes and symptom management strategies that address the interaction between patient and caregiver might have longer lasting effects in reducing BPSD (Ballard *et al.* 2009; Olazarán *et al.* 2010). Educating hospital staff that their patients with dementia are very likely to exhibit expansive or other BPSD during their stay and that appropriate non-pharmacological interventions can be more effective than drugs and physical restraint might be a first step to reducing BPSD and improving the situation for all persons involved. While non-pharmacological interventions for dementia patients have proved to be effective in other settings (private households, nursing homes), the transferability of these methods to hospital care, however, remains to be investigated. An additional contribution might be to improve the pain management in patients with dementia, as they might be unable to express their pain verbally and consequently be undermedicated and become agitated and aggressive (Sampson *et al.* 2015).

Strengths and limitations

The present study was the first to examine BPSD in a representative sample of general hospital patients. The results possess high external validity and mirror the current situation in German general hospitals. Dementia diagnoses were based on information from multiple sources and the impact of delirium could be examined. BPSD were not directly observed in the patients, but recorded from nursing staff reports, which might be subject to recall biases. This method, however, allowed us to examine the detailed associations of BPSD with nursing staff distress and a range of complications in care. The observation times for BPSD differed between patients depending on the length of stay previous to the examination for GHoSt. However, BPSD were not associated with the time since admission. Even though 60% represent a fairly high response rate among the hospitals, the possibility of a response bias can never be fully excluded.

Conclusions

Three-quarter of the patients with dementia showed at least one behavioural or psychological symptom. Especially expansive symptoms were associated with nursing staff distress and complications in care, highlighting the need for management strategies to improve the situation for both patients and hospital staff.

Supplementary Material

The supplementary material for this article can be found at https://doi.org/10.1017/S2045796016001098

Acknowledgements

The authors are indebted to the nursing, medical and administrative staff of the cooperating hospitals.

Financial Support

The study was funded by the Robert Bosch Stiftung (grant number 11.5.1365.0092.0). Additional support was provided by the Deutsche Alzheimer Gesellschaft. The Robert Bosch Stiftung and the Deutsche Alzheimer Gesellschaft had no role in the conduct of the study and the preparation of the manuscript. The content is solely the responsibility of the authors.

Conflict of Interest

None.

Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Availability of Data and Materials

Data is held by Dr Horst Bickel (Fon +49 89 4140 4246, horst.bickel@tum.de) and will not be shared as they contain sensitive patient information.

References

Ballard C, Lowery K, Powell I, O'Brien J, James I (2000). Impact of behavioral and psychological symptoms of dementia on caregivers. *International Psychogeriatrics* **12**, 93–105.

Ballard CG, Gauthier S, Cummings JL, Brodaty H, Grossberg GT, Robert P, Lyketsos CG (2009). Management of agitation and aggression associated with Alzheimer disease. *Nature Reviews Neurology* **5**, 245–255.

Bickel H (2007). German version of the Confusion Assessment Method (CAM) for detection of delirium (article in German). *Psychosomatik und Konsiliarpsychiatrie* **1**, 224–228.

Black W, Almeida OP (2004). A systematic review of the association between the behavioral and psychological

symptoms of dementia and burden of care. *International Psychogeriatrics* **16**, 295–315.

Brooke P, Bullock R (1999). Validation of a 6 item cognitive impairment test with a view to primary care usage. *International Journal of Geriatric Psychiatry* **14**, 936–940.

Bynum JPW, Rabins PV, Weller W, Niefeld M, Anderson GF, Wu AW (2004). The relationship between a dementia diagnosis, chronic illness, medicare expenditures, and hospital use. *Journal of the American Geriatrics Society* **52**, 187–194.

Dean AG, Sullivan KM, Soe MM. (updated 2013). OpenEpi: Open Source Epidemiologic Statistics for Public Health. Retrieved 25 November 2016 from http://www.OpenEpi.com

Edell WS, Tunis SL (2001). Antipsychotic treatment of behavioral and psychological symptoms of dementia in geropsychiatric inpatients. *American Journal of Geriatric Psychiatry* **9**, 289–297.

Finkel S (2000). Introduction to behavioural and psychological symptoms of dementia (BPSD). *International Journal of Geriatric Psychiatry* **15**, S2–S4.

Folstein MF, Folstein SE, McHugh PR (1975). "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research* **12**, 189–198.

Goldberg SE, Whittamore KH, Harwood RH, Bradshaw LE, Gladman JRF, Jones RG (2011). The prevalence of mental health problems among older adults admitted as an emergency to a general hospital. *Age and Ageing* **41**, 80–86.

Hessler JB, Schäufele M, Hendlmeier I, Junge MN, Leonhardt S, Weber J, Bickel H (2016). The 6-Item Cognitive Impairment Test as a bedside screening for dementia in general hospital patients: results of the General Hospital Study (GHoSt). *International Journal of Geriatric Psychiatry* online first.

Huang S-S, Lee M-C, Liao Y-C, Wang W-F, Lai T-J (2012). Caregiver burden associated with behavioral and psychological symptoms of dementia (BPSD) in Taiwanese elderly. *Archives of Gerontology and Geriatrics* **55**, 55–59.

Hughes CP, Berg L, Danziger WL, Coben LA, Martin RL (1982). A new clinical scale for the staging of dementia. *The British Journal of Psychiatry* **140**, 566–572.

Inouye SK, van Dyck CH, Alessi CA, Balkin S, Siegal AP, Horwitz RI (1990). Clarifying confusion: the confusion assessment method: a new method for detection of delirium. *Annals of Internal Medicine* **113**, 941–948.

Kalbe E, Kessler J, Calabrese P, Smith R, Passmore AP, Brand M, Bullock R (2004). DemTect: a new, sensitive cognitive screening test to support the diagnosis of mild cognitive impairment and early dementia. *International Journal of Geriatric Psychiatry* **19**, 136–143.

Katzman R, Brown T, Fuld P, Peck A, Schechter R, Schimmel H (1983). Validation of a short orientation-memory-concentration test of cognitive impairment. *American Journal of Psychiatry* **140**, 734–739.

Kaufer DI, Cummings JL, Ketchel P (2000). Validation of the NPI-Q, a brief clinical form of the neuropsychiatric inventory. *Journal of Neuropsychiatry and Clinical Neurosciences* **12**, 233–239.

Mahoney FI, Barthel DW (1965). Functional evaluation: the Barthel Index. *Maryland State Medical Journal* **14**, 61–65.

Margallo-Lana M, Swann A, O'Brian J, Fairbarin A, Reichelt K, Potkins D, Mynt P, Ballard C (2001). Prevalence and pharmacological management of behavioural and psychological symptoms amongst dementia sufferers living in care environments. *International Journal of Geriatric Psychiatry* **16**, 39–44.

Matsumoto N, Ikeda M, Fukuhara R, Shinagawa S, Ishikawa T, Mori T, Toyota Y, Matsumoto T, Adachi H, Hirono N, Tanabe H (2007). Caregiver burden associated with behavioral and psychological symptoms of dementia in elderly people in the local community. *Dementia and Geriatric Cognitive Disorders* **23**, 219–224.

Olazarán J, Reisberg B, Clare L, Cruz I, Peña-Casanova J, del Ser T, Woods B, Beck C, Auer S, Lai C, Spector A, Fazio S, Bond J, Kivipelto M, Brodaty H, Rojo JM, Collins H, Teri L, Mittelman M, Orrell M, Feldman HH, Muñiz R (2010). Nonpharmacological therapies in Alzheimer's disease: a systematic review of efficacy. *Dementia and Geriatric Cognitive Disorders* **30**, 161–178.

Phelan EA, Borson S, Grothaus L, Balch S, Larson EB (2012). Association of incident dementia with hospitalizations. *Journal of the American Medical Association* **307**, 165–172.

Sampson EL, White N, Leurent B, Scott S, Lord K, Round J, Jones L (2014). Behavioural and psychiatric symptoms in people with dementia admitted to the acute hospital: prospective cohort study. *The British Journal of Psychiatry* **205**, 189–196.

Sampson EL, White N, Lord K, Leurent B, Vickerstaff V, Scott S, Jones L (2015). Pain, agitation, and behavioural problems in people with dementia admitted to general hospital wards. *Pain* **156**, 675–683.

Savva GM, Zaccai J, Matthews FE, Davidson JE, McKeith I, Brayne C (2009). Prevalence, correlates, and course of behavioural and psychological symptoms of dementia in the population. *British Journal of Psychiatry* **194**, 212–219.

Song J-A, Oh Y (2015). The association between the burden on formal caregivers and behavioral and psychological symptoms of dementia (BPSD) in Korean elderly in nursing homes. *Archives of Psychiatric Nursing* **29**, 346–354.

Tan LL, Wong HB, Allen H (2005). The impact of neuropsychiatric symptoms of dementia on distress in family and professional caregivers in Singapore. *International Psychogeriatrics* **17**, 253–263.

van der Linde RM, Stephan BC, Savva GM, Dening T, Brayne C (2012). Systematic reviews on behavioural and psychological symptoms in the older or demented population. *Alzheimer's Research & Therapy* **4**, 28.

van der Linde RM, Dening T, Matthews FE, Brayne C (2013). Grouping of behavioural and psychological symptoms of dementia. *International Journal of Geriatric Psychiatry* **29**, 562–568.

Wancata J, Benda N, Meise U (2004). Non-cognitive symptoms of dementia – prevalence and consequences: a general hospital and nursing home study (article in German). *Psychiatrische Praxis* **31**, 346–351.

Zuidema SU, Derksen E, Verhey FRJ, Koopmans RTCM (2007). Prevalence of neuropsychiatric symptoms in a large sample of Dutch nursing home patients with dementia. *International Journal of Geriatric Psychiatry* **22**, 632–638.