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Research Article

Delirium, Dementia, and In-Hospital Mortality: The Results From the Italian Delirium Day 2016, A National Multicenter Study

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Abstract

Background: There is little evidence about the prevalence of cognitive disorders and their effect on in-hospital mortality in large multicenter studies. The objectives of the 2016th edition of the "Italian Delirium Day," a large multicenter study on in-hospital older patients, were to assess (i) the point prevalence of cognitive impairment/no dementia, dementia, delirium, and delirium superimposed on dementia and (ii) the effect of these conditions on in-hospital mortality.

Methods: This multicenter study and included 2,037 older patients (aged ≥65 years) admitted to acute medical and surgical wards across 205 acute hospitals. The four cognitive disorders groups were defined with a structured approach including the four AT and the presence of a documented diagnosis of dementia. The outcome measure was in-hospital mortality, as reported by the researchers involved in the study in each center.

Results: The mean age was 81.17 ± 7.7 years. Overall, 893 patients (43.8%) had neither delirium nor dementia nor cognitive impairment, 483 (23.7%) had cognitive impairment/no dementia, 230 (11.3%) dementia alone, 187 (9.2%) delirium alone, and 244 (12.0%) delirium

superimposed on dementia. Overall, 99 (4.8%) patients died. Participants with delirium alone (odds ratio 2.56; 95% confidence interval: 1.29–5.09) and those with delirium superimposed on dementia (odds ratio 2.60; 95% confidence interval: 1.39–4.85) had higher mortality risk compared with the reference group of patients with "no cognitive impairment."

Conclusions: Delirium and delirium superimposed on dementia were highly prevalent among older hospitalized patients and significantly increased in-hospital mortality. Clinicians should systematically assess these conditions and recognize them as markers of critical conditions and predictors of imminent death.

Keywords: Cognitive impairment, Confusion, Acute hospital, Outcomes

Delirium is a neuropsychiatric disorder, with acute change and fluctuation of cognitive functions, inattention, and impaired awareness (1), that occurs on average in one out of five hospitalized older patients (2). The development of delirium is generally triggered by medical causes, pain, and/or drugs (1,3). Delirium is a costly condition (4), with several prognostic implications, including worsening of cognitive and functional status (5,6), increasing patients' and caregivers' burden (7,8), and elevated mortality in the middle to long term (9,10). A robust association is well appreciated between delirium and in-hospital mortality in the intensive care units (9,11,12), whereas few studies have assessed the association of delirium with in-hospital death in medical and surgical wards (13,14).

Pre-existing dementia is a major risk factor for delirium, implying that many patients with dementia are at risk of developing a condition that is labeled as delirium superimposed on dementia (DSD) (15). The prevalence of DSD in hospital populations ranges from 22% to 89% (16). According to several studies, DSD is associated with higher health care costs and worse functional outcomes compared with dementia alone (6,16,17). As well as for delirium alone, few studies have assessed the association of DSD with in-hospital mortality (13).

In 2015, a working group endorsed by four Italian scientific associations conducted a multicenter study entitled "Delirium Day," with the aim of detecting the point prevalence of delirium over a single day in acute hospital and rehabilitation wards across Italy (2). Among 1,867 patients aged 65 years and older, the prevalence of delirium was 22.9%, with more than half of delirious patients having pre-existing dementia. However, most of the patients were enrolled in geriatric wards, limiting the generalizability of study findings to other wards, and there was no assessment of delirium outcome.

In 2016, a new "Delirium Day" edition was carried out, with the following aims: (i) to provide a real-world figure of the prevalence of four cognitive disorders (ie, cognitive impairment/no dementia, dementia, delirium, and DSD) among older patients admitted to acute hospital wards in Italy and (ii) to assess the impact of these conditions on in-hospital mortality.

Methods

In the 2016 "Delirium Day" edition, the physicians associated with 10 Italian Scientific Associations (ie, the Italian Association of Psychogeriatrics, AIP; Italian Society of Gerontology and Geriatrics, SIGG; Italian Society of Geriatrics Hospital and Territory, SIGOT; Extrahospital Geriatric Association, AGE; Italian Society of Internal Medicine, SIMI; Federazione Associazioni Dirigenti Ospedalieri Internisti, FADOI; Italian Society of Neurology, SIN; Italian Society of Neurology for the Dementia, SINDEM; Italian Society of Surgery, SIC; Italian Society of Palliative Care, SICP) were invited by email to participate in the study. No incentives were offered to participants and Scientific Associations. Data were collected on an index day in acute hospital, rehabilitation and long-term care units, nursing homes, and hospices.

Subjects and Study Protocol

September 28, 2016 was the index day. All patients admitted to the participating centers on the index day were potentially eligible if they were aged 65 years and older, were able to speak Italian, and were provided a written informed consent by themselves or by proxies (when patients were not capable because of severe cognitive impairment or delirium). Exclusion criteria were as follows: coma, aphasia, blindness, deafness, and end-of-life status, as defined by clinical judgment. Those who declined to participate in the study were also excluded. The Ethical Committee of the Monza Brianza Province approved the study protocol.

All patients eligible for the study were evaluated over a 24-hour period according to this protocol:

a. Detection of delirium and cognitive impairment: The presence of delirium and cognitive impairment were assessed by the attending physician at each hospital ward with the 4AT (18). The 4AT is a validated instrument for delirium diagnosis against the *Diagnostic and Statistical Manual for Mental Disorders-IV* (DSM-IV) criteria, showing good sensitivity and specificity in older patients. The 4AT does not require a special training to be administered. A score of 0 indicates the absence of dementia or delirium, a score between 1 and 3 suggests possible cognitive impairment but not delirium, whereas a score greater than or equal to 4 is strongly suggestive of delirium.
b. Detection of dementia: Dementia was defined by the presence of a documented diagnosis in the medical records and/or prescription of acetylcholinesterase inhibitors or memantine prior to admission.
c. Clinical assessment: Functional status prior to admission was assessed using the Activities of Daily Living (ADL) (19). Comorbidities were assessed using the Charlson Index (20), excluding dementia from the total score. The use of specific pharmacological classes (ie, antihypertensives, antiplatelets, antiarrhythmics, statins/lipid-lowering drugs, antidiabetics, antiulcers, antibiotics, benzodiazepines, antipsychotics, antidepressants, antiepileptics, and acetylcholinesterase inhibitor/memantine) taken by each patient on the index day was also recorded, along with the use of feeding tubes (ie, nasogastric tube or percutaneous endoscopic gastrostomy), peripheral venous catheters, urinary catheters, and physical restraints (vests, wrists, inguinal restraints, and bedrails). Demographics and the date of hospital admission were also recorded.

Variables of Exposure and Outcome Measure

The exposure variable was the combination of delirium and dementia/cognitive impairment diagnosis. We examined the overlap between these conditions, by categorizing the patients into five groups: no cognitive impairment, cognitive impairment/no dementia, dementia alone, delirium alone, and DSD. The group "no cognitive

impairment" was composed by patients with 4AT score = 0 and no pre-existing diagnosis of dementia. The group "cognitive impairment/no dementia" included patients without pre-existing diagnosis of dementia who obtained a 4AT score ranging from 1 to 3. The group "dementia alone" included patients with a pre-existing diagnosis of dementia and obtaining a 4AT score less than over equal to 3/12. The group "delirium alone" included patients with a 4AT score greater than or equal to 4/12 and no history of dementia and the group "DSD" included those with a 4AT score greater than or equal to 4/12 and history of dementia.

The outcome of this study was in-hospital mortality, as collected by the researchers involved in the study, including deaths that occurred both in the ward where the patients have been enrolled and death that occurred in other wards during hospital admission.

Data Collection and Ethical Procedures

These data were recorded using a web-based electronic case report form. Each participating center received a username and a password to access the electronic case report form, and it was not possible to submit the data form without the mandatory clinical data. These data were completely anonymous, to make impossible identifying the characteristics of any individual patient.

Statistical Analyses

We analyzed the cohort characteristics according to the cognitive status in the five groups defined above using mean and *SD* (or median and interquartile ranges) if the variable were continuous, or frequencies and percentages if the variables were categorical. Comparison between patient groups was performed using the one-way analysis of variance, or the Kruskal–Wallis test, where appropriate. The categorical variables were compared between groups using the chi-square test, or Fisher exact test, where required.

The effect of group membership on in-hospital mortality was assessed using a multivariate logistic regression model, adjusted for covariates. A stepwise selection procedure was used to select the final model (in this procedure, we considered the cognitive status groups and all variables reported in Table 1 with the exception of feeding tube and acetylcholinesterase inhibitor/memantine due to the low percentage of patients exposed). The cognitive status groups were forced in the model, whereas the other variables were successively added or removed on the basis of their significance levels for entry (set to 0.20) and for stay (set to 0.15).

A sensitivity analysis was conducted to check whether the stepwise selection procedure may have changed by using a different approach. We used the algorithm by Furnival and Wilson (21), a method used to find the best subset of variables without examining all possible subsets and computing all possible regressions. The algorithm finds a preordered number of models with the highest likelihood score (chi-square) statistic for all possible regressions. Specifically, we considered only the best models with a number of covariates varying from 5 to 13.

All tests were two sided, and a level of significance was established as 95% ($p < .05$). All analyses were performed using SAS version 9.4 (SAS Institute, Inc., Cary, NC).

Table 1. Cohort Characteristics by Cognitive Status

	No Cognitive Impairment (*N* = 893, 43.8%)	Cognitive Impairment/No Dementia (*N* = 483, 23.7%)	Dementia Alone (*N* = 230, 11.3%)	Delirium Alone (*N* = 187, 9.2%)	DSD (*N* = 244, 12.0%)	*p* Value
Age, y, median score (IQR)	78 (72–84)	83 (77–87)	85 (80–88)	83 (76–88)	86 (82–90)	<.0001
Female gender, *n* (%)	438 (49.05)	277 (57.35)	134 (58.26)	94 (50.27)	140 (57.38)	.0066
ADL score > 4/6, *n* (%)	686 (76.91)	224 (46.67)	67 (29.13)	58 (31.18)	24 (9.88)	<.0001
Charlson Index (excluding dementia), median score (IQR)	2 (1–4)	3 (1–5)	3 (1–4)	3 (2–5)	3 (1–5)	.0362
Drugs, median score (IQR)	4 (3–6)	4 (3–6)	4 (3–5)	4 (3–6)	4 (3–5)	.0026
Diuretics, *n* (%)	432 (48.38)	258 (53.42)	111 (48.26)	100 (53.48)	131 (53.69)	.2533
Antihypertensive drugs, *n* (%)	613 (68.55)	342 (70.81)	131 (56.96)	121 (64.71)	153 (62.70)	.0018
Antiplatelet drugs, *n* (%)	406 (45.46)	219 (45.34)	111 (48.26)	85 (45.45)	99 (40.57	.5559
Antiarrhythmic drugs, *n* (%)	110 (12.32)	57 (11.80)	22 (9.57)	30 (16.04)	15 (6.15)	.0163
Statins/lipid-lowering drugs, *n* (%)	236 (26.43)	116 (24.02)	43 (18.70)	46 (24.60)	29 (11.89)	<.0001
Antidiabetics, *n* (%)	194 (21.72)	111 (22.98)	38 (16.52)	55 (29.41)	53 (21.72)	.0363
Antiulcer drugs, *n* (%)	638 (71.44)	348 (72.05)	173 (75.22)	133 (71.12)	176 (72.13)	.8461
Antibiotics, *n* (%)	352 (39.42)	197 (40.79)	88 (38.26)	86 (45.99)	128 (52.46)	.0027
Benzodiazepines, *n* (%)	228 (25.53)	102 (21.12)	60 (26.09)	54 (28.88)	60 (24.59)	.2269
Antipsychotics, *n* (%)	54 (6.05)	48 (9.94)	70 (30.43)	51 (27.27)	116 (47.54)	<.0001
Antidepressants, *n* (%)	120 (13.44)	104 (21.53)	80 (34.78)	38 (20.32)	80 (32.79)	<.0001
Antiepileptics, *n* (%)	41 (4.59)	26 (5.38)	17 (7.39)	17 (9.09)	19 (7.79)	.0632
AChE-I/memantine, *n* (%)	0 (0.00)	0 (0.00)	20 (8.70)	0 (0.00)	20 (8.20)	<.0001
Feeding tubes (NT/PEG), *n* (%)	6 (0.67)	5 (1.04)	0 (0.00)	6 (3.21)	8 (3.28)	.0009
Venous catheter, *n* (%)	548 (61.37)	338 (69.98)	161 (70.00)	127 (67.91)	175 (71.72)	.0016
Urinary catheter, *n* (%)	156 (17.47)	139 (28.78)	70 (30.43)	97 (51.87)	126 (51.64)	<.0001
Physical restraints, *n* (%)	7 (0.78)	19 (3.93)	21 (9.13)	12 (6.42)	48 (19.67)	<.0001
Length of stay days, median score (IQR)	12 (8–19)	13 (9–21)	14 (9–22)	15 (10–23)	15 (9.5–23)	<.0001
In-hospital death	24 (2.69)	23 (4.76)	13 (5.65)	16 (8.56)	23 (9.43)	<.0001

Notes: AChE-I = acetylcholinesterase inhibitor; ADL = Activities of Daily Living; DSD = delirium superimposed on dementia; IQR = interquartile ranges; NT = nasogastric tube; PEG = percutaneous endoscopic gastrostomy. Data are expressed as median + IQR unless otherwise specified.

Results

Overall, 205 acute hospital wards, 29 rehabilitation facilities, 32 nursing homes, and 10 hospices collected the study data on the index day. The proportion of patients assessed × 1,000 hospital beds as reported in Figure 1, showing a good coverage of the Italian Regions with this study. Figure 2 shows the flow chart of the study. Of 3,107 patients admitted to acute hospital wards and potentially eligible in the study, 2,517 accepted to participate in the study. Of these, 457 were excluded because of missing notes on discharge or on vital status and 23 because of incorrect data reporting on the electronic case report form. Overall, 2,037 patients were included in the current study, of whom 945 (46.4%) from Geriatrics, 693 (34.0%) from Internal Medicine, 144 (7.1%) from Neurology, 104 (5.1) from Orthopedics, 83 (4.1) from General Surgery, and 69 (3.3%) from Cardiology, Neurosurgery, or Infectious Disease wards. The baseline clinical characteristics of patients with missing data on follow-up were not significantly different from those patients with full data, except for the prevalence of delirium and DSD, which was lower among the latter, the functional status, which was better in patients with full data, and the use of urinary catheter, which was more frequent in those with missing data (Supplementary Table 1).

The mean age of the sample was 81.17 (*SD* 7.75) and over half were females (53.2%). Eight hundred and ninety-three patients (43.8%) had neither delirium nor dementia nor cognitive impairment, 483 (23.7%) had cognitive impairment/no dementia, 230 (11.3%) dementia alone, 187 (9.2%) delirium alone, and 244 (12.0%) DSD. Table 1 shows the cohort characteristics of the patients in the five groups. Those in the DSD group were older and more disabled than others. Furthermore, they were more frequently prescribed with antibiotics, antipsychotics, antidepressants, and acetylcholinesterase inhibitor/memantine and had more frequently physical restraints. Along with the patients in the delirium group, they also had more frequently nasogastric tube/percutaneous endoscopic gastrostomy tube and peripheral venous catheters. In comparison to others, patients with delirium alone were more frequently prescribed antiarrhythmics, and antiepileptics, whereas in those with neither delirium nor dementia and those with cognitive impairment/no dementia, there was a higher prevalence of statins/lipid-lowering drugs. Both patients with delirium alone and DSD had significantly higher use of urinary catheters than others. At discharge, the length of hospital stay was significantly longer and the in-hospital mortality rate higher in patients with delirium alone and in those with DSD in comparison to their counterparts.

Eight hundred and ninety-three patients (43.8%; 95% confidence interval [CI]: 41.7–46.0) had neither delirium nor dementia nor cognitive impairment, 483 (23.7%; 95% CI: 21.9–25.6) had cognitive impairment/no dementia, 230 (11.3%; 95% CI: 9.9–12.7) dementia alone, 187 (9.2%; 95% CI: 7.9–10.4) delirium alone, and 244 (12.0%, 95% CI: 10.6–13.4) DSD. In Figure 3, the prevalence of cognitive disorders is reported for each hospital ward. Neurology had the highest prevalence of delirium alone (15.3%), Geriatrics the highest prevalence of DSD (16.2%) and dementia alone (14.8%), whereas Orthopedics the highest prevalence of cognitive impairment/no dementia (33.7%).

In the multivariable logistic regression analysis (Figure 4), participants with delirium alone (odds ratio [OR] 2.56, 95% CI: 1.29–5.09) and those with DSD (OR 2.60, 95% CI: 1.39–4.85) had a higher mortality risk compared with participants with no cognitive symptoms. Patients with dementia alone and those with cognitive impairment alone did not show a significantly increased risk with respect to patients without. The following variables were also significantly associated with in-hospital death: Charlson Index (OR 1.10, 95% CI: 1.02–1.17), urinary catheter (OR 1.78, 95% CI: 1.15–2.76), number of drugs (OR 1.15, 95% CI: 1.02–1.30), and, with a protective effect, the use of statin/lipid-lowering drugs (OR 0.21, 95% CI: 0.09–0.50) and antiplatelet drugs (OR 0.50, 95% CI: 0.31–0.80).

The sensitivity analysis, performed according to Furnival's method (21), showed negligible improvement in the likelihood score statistic when adding a further covariate to those selected by the stepwise algorithm.

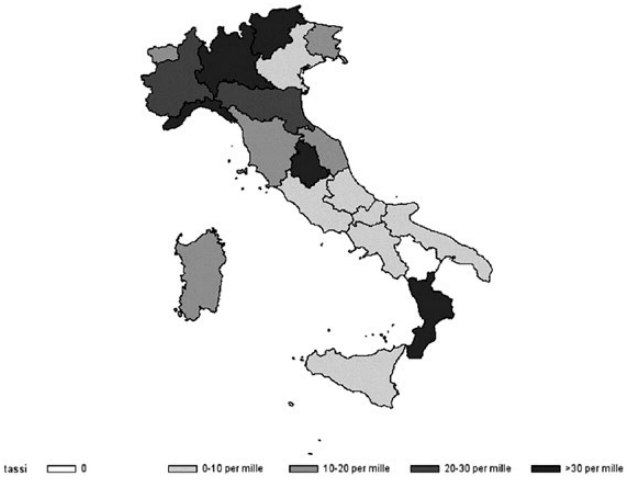

Figure 1. Proportion of patients assessed (× 1,000 hospital beds) in each Italian Region.

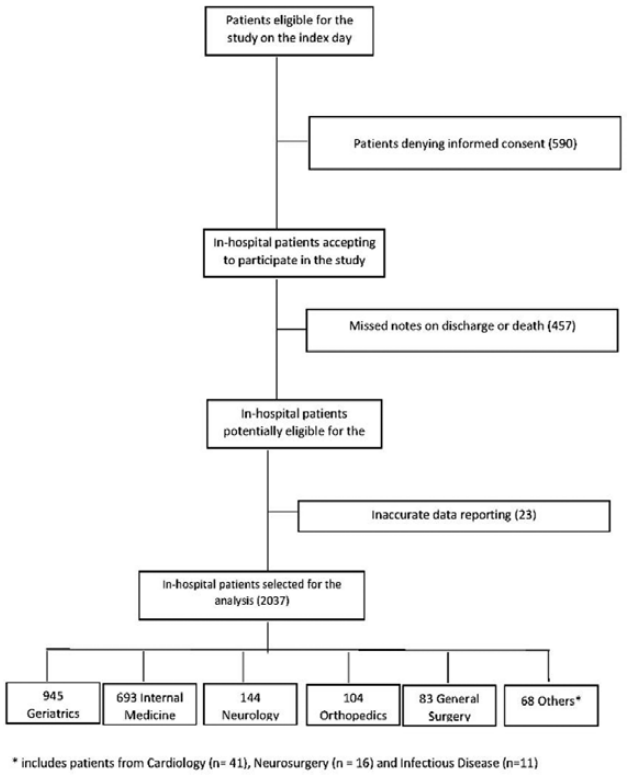

Figure 2. Study flowchart. *The group "Others" include patients from Cardiology (n = 41), Neurosurgery (n = 16), or Infectious Disease (n = 11).

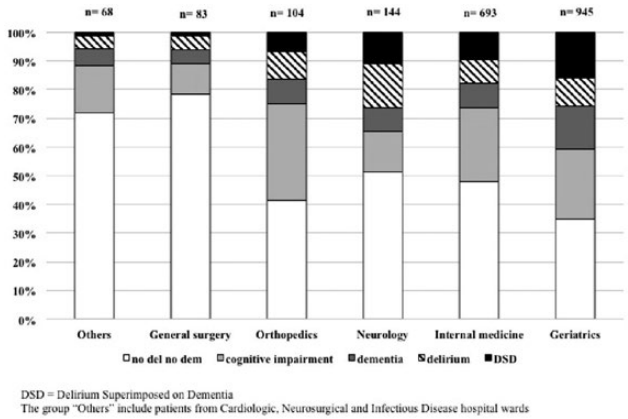

Figure 3. Prevalence (%) of delirium superimposed on dementia (DSM), delirium alone, dementia alone, cognitive impairment/no dementia or neither in hospital ward. The group "Others" include patients from Cardiology, Neurosurgery, and Infectious Disease hospital wards.

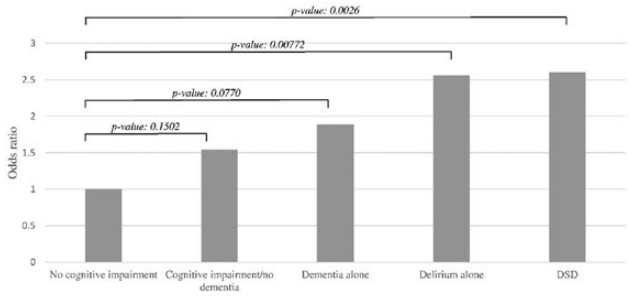

Figure 4. Multivariable logistic regression for in-hospital mortality, selected by stepwise algorithm. A stepwise algorithm was used to select the final model (we included all the variables reported in Table 1 with the exception of feeding tube and acetylcholinesterase inhibitor/memantine due to the low percentage of patients exposed). In the final model, in addition to delirium alone and DSD, the other variables resulting independently associated with in-hospital mortality were as follows: Charlson Index, urinary catheter, number of drugs, and use of statin/lipid-lowering drugs and antiplatelet drugs. DSD = delirium superimposed on dementia; cognitive impairment/no dementia includes patients with 4AT score = 1–3; dementia alone includes patients with 4AT score < 4/12 and pre-existing diagnosis of dementia; delirium alone includes patients without pre-existing diagnosis of dementia and 4AT score ≥ 4/12 and pre-existing diagnosis of dementia.

Discussion

This multicenter nationwide study examined the point prevalence of four cognitive disorders and their related risk of mortality in a large cohort of medical and surgical older inpatients from 205 acute hospital wards in Italy. The results show that delirium and DSD were highly prevalent and that both conditions were significantly associated with an increased risk of in-hospital death. Furthermore, an additional 11.2% of patients had dementia alone and 23.7% cognitive impairment; none of these two conditions were independently associated with in-hospital mortality.

The global prevalence of delirium is very similar to the findings of 2015 "Delirium Day" and other studies (2,22). Overall, delirium alone was present in nearly 1 in 10 patients and DSD in 1 in 8 patients. The mean prevalence of DSD is within the expected range, although recent studies found even higher proportion (13,23). Neurology and Geriatrics wards had the highest delirium prevalence, with delirium alone more common in Neurology and DSD in Geriatrics wards, consistently with the highest prevalence of dementia in the latter setting. An alternative interpretation is that higher attention toward cognitive disorders and greater diagnostic skills are present in these wards compared with others. Delirium prevalence was only slightly lower in Internal Medicine and Orthopedics wards. However, we cannot exclude that data from Neurology and Orthopedic wards might be biased by the low number of patients assessed.

The prevalence of cognitive impairment/no dementia and dementia alone are in agreement with other studies (17,24–27). The real nature of cognitive impairment/no dementia can only be hypothesized. It might be possible that this disorder may reflect an undiagnosed and initial dementia, as it is well known that dementia is frequently under-recognized in hospitals (17). It may also reflect a condition of attenuated delirium (1) or even the combination of frailty and physical illnesses that may affect cognition. Future studies are needed to clarify this point.

Current evidence of the association between delirium and in-hospital mortality in medical and surgical wards is not univocal. Inouye and colleagues (28) and Adamis and colleagues (29) found no association between delirium and in-hospital mortality in acute medical inpatients. Similar results were found in cohorts of patients who underwent surgery for hip fracture (30,31). Other studies found a significant association between delirium and in-hospital mortality but did not control for covariates (32,33). More recently, in a systematic review and meta-analysis, of the 11 studies that assessed the relationship between postsurgical delirium and in-hospital mortality, 7 did not find a significant association (34). However, other studies indicate the opposite. In two separate studies on about 500 patients admitted to acute medical wards, Pendlebury and colleagues (22) and Dharmarajan and colleagues (14) found that delirium was common and increased in-hospital and 3-month mortality, respectively. Recently, in a single-center cohort of 1,409 patients aged 80 years and older, Avelino-Silva and colleagues reported that both delirium and DSD were associated with in-hospital mortality (13). Our work is thus in agreement with these latter studies, supporting an independent harmful effect of delirium and DSD on patient's survival. Importantly, we found that delirium and DSD had similar odds of mortality, suggesting that the excess of mortality seen in our patients was actually related to delirium rather than to the additional effect of delirium on pre-existing dementia. This finding is in agreement with some studies (13,35), but not with others showing an excess of mortality in patients with DSD compared with patients with delirium alone (6,36).

As in previous studies (13,37), we did not observe a statistically significant association between cognitive impairment/no dementia—dementia alone and in-hospital mortality. Conversely, Sampson and colleagues found a significant association between dementia and mortality, but the adjusted multivariate model to assess this association included only few variables (ie, age and APACHE score) as confounders (17). This may have influenced their results. Indeed, in a subsequent study, the same authors found that dementia was not an independent predictor of in-hospital mortality when adjusted for a larger group of variables, including a score of frailty (38).

Some strengths of the study need to be highlighted. First, this is a real-world study including patients from various medical and surgical hospital wards and the largest multicenter study that assessed the point prevalence and the effect of delirium and DSD on in-hospital mortality. Second, the diagnosis of delirium was obtained using a tool (ie, the 4AT), which is simple to administer and does not require specific training. This peculiarity makes our study unique because a similar sample size and such a large number of acute medical and surgical wards involved in a study are probably not achievable by using tools to detect delirium and DSD that require specific training.

However, our study has several limitations. First, participation in our study was on a voluntary basis, which means that centers involved may be not fully representative of the world of the acute hospitals in Italy. Second, we did not collect data regarding the reason for hospital admission nor the causes of death, preventing us from assessing the role of precipitating factors of delirium, such as acute diseases. Indeed, it can be hypothesized that the detrimental effect of delirium was due to its underlying causes. Alternatively, additional noxious insults and hospital-acquired conditions might have also played a key role (14). Whatever the case, delirium can be regarded as a marker of extreme vulnerability and thus managed as an urgent condition. Third, we did not assess the delirium duration, which may have influenced the outcome, as in previous study (7,39). Fourth, the diagnosis of cognitive impairment/no dementia was based on the results of a tool (ie, the 4AT), which has not been validated for this aim. However, prevalence of cognitive impairment/no dementia in this study was similar to previous studies (17,24–27) indirectly suggesting that our approach was reliable. In detail, in our study, we found a 23.3% prevalence of dementia if we consider only those patients with dementia diagnosis found in the medical records. If we also consider the 4AT score 1–3 indicative of possible cognitive impairment, then the dementia prevalence could range between 23.3% and 47%. Fifth, there was a relatively high rate of missing data for the outcome, rising the potential for a selection bias. However, the comparison of baseline clinical characteristics between patients with full and missing data suggests that, if all data on participants would have been collected, we would probably have observed an even greater effect of DSD on in-hospital mortality because the proportion of these patients was significantly higher among those with missing data. Sixth, some hospital wards had no death events, so we did not include the hospital ward as covariate in the model. We believe this might not create a bias. In fact, an analysis performed by restricting the patients' cohort only to the ward types in which there were at least five deaths showed results similar to those obtained in the study analyses. Indeed, the best model selected by the stepwise approach is unchanged with an OR of 2.22 (95% CI: 1.08–4.55) for delirium alone and an OR of 2.15 (95% CI: 1.14–4.06) for DSD. Seventh, a single assessment of delirium with the 4AT might have led to an underestimation of delirium prevalence due to the possible fluctuation of delirium itself; however, the item 4 of the 4AT specifically considers the presence of an acute change or fluctuation in alertness, cognition, and other mental functions.

In conclusion, in this large multicenter nationwide point-prevalence study, delirium and DSD were highly prevalent among older hospitalized patients and significantly affected in-hospital mortality. Clinicians should systematically assess delirium in older hospitalized patients because it is a marker of critical conditions. The "Delirium Day" study may represent a pragmatic model to investigate delirium and DSD prevalence and outcomes related to hospitalized persons.

Supplementary Material

Supplementary data is available at *The Journals of Gerontology, Series A: Biological Sciences and Medical Sciences* online.

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Conflict of Interest

None reported.

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