Outcomes of Older Adults With Delirium Discharged From the Emergency Department

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Study objective: To compare 30-day mortality and return emergency department (ED) visits among older adults with delirium who are discharged home with those discharged home without delirium and those who are admitted to the hospital with and without delirium.

Methods: Adults aged 75 and older years were assessed for delirium using the Delirium Triage Screen followed by the Brief Confusion Assessment Method. We evaluated outcomes including return visits and 30-day mortality. Models were adjusted by age, sex, dementia, Modified Early Warning Score, and ED length of stay and summarized with adjusted relative risk (aRR) and 95% confidence intervals (CIs).

Results: The study included 22,940 visits. Among them, 202 (0.9%) delirium-positive patients were discharged, and 730 (3.2%) were admitted to the hospital to non-ICU and nonmonitored beds. Discharged patients with delirium had higher 30-day mortality (aRR 2.86, 95% CI 2.04 to 4.00) and were more likely to return to the ED within 30 days (aRR 1.52, 95% CI 1.43 to 1.61) compared with those discharged without delirium. Discharged delirium-positive patients were more likely to return to the ED within 30 days than hospitalized delirium-positive patients (aRR 1.92, 95% CI 1.41 to 1.92), though they experienced lower 30-day mortality (aRR 0.67, 95% CI 0.47 to 0.93). Age, sex, Modified Early Warning Score, dementia, and length of stay were not associated with mortality or ED return.

Conclusion: Patients discharged with delirium experienced a 3-fold increase in mortality within 30 days compared with those discharged without delirium. These findings suggest a need for more precise discharge criteria and enhanced follow-up care for delirious patients to improve safety. Implementing structured screening and tailored postdischarge support could reduce adverse outcomes in this population. [Ann Emerg Med. 2025;86:484-495.]

Please see page 485 for the Editor's Capsule Summary of this article.

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INTRODUCTION

Background

Delirium is a common condition in older adults presenting to the emergency department (ED), with prevalence estimates ranging from 6% to 38%.[1-3] This acute confusional state is a medical emergency associated with significant morbidity and mortality, including increased risks of functional decline, prolonged hospitalization, and mortality.[1-4] Despite its clinical importance, delirium often goes undiagnosed in the ED, delaying appropriate management and worsening outcomes.

Hospital admission is frequently the default management strategy for ED patients with delirium, driven by concerns about their safety and lack of clarity regarding who can be safely discharged. However, admission may not always benefit patients with delirium. The unfamiliar hospital environment can exacerbate confusion and agitation, potentially contributing to poorer outcomes, such as hospital-acquired complications or cognitive decline.[2,5,6] Thus, identifying older adults with delirium who can be safely managed at home by a targeted approach is crucial.

Data on outcomes of older ED patients discharged with delirium remain scarce. In the absence of evidence-based guidelines, clinicians often err on the side of caution, admitting most delirious patients despite the potential harms of hospitalization. To address this knowledge gap,

Editor's Capsule Summary

What is already known on this topic

Delirium is common among older emergency department (ED) patients and often missed.

What question this study addressed

Among ED patients aged 75 years and older, what are the rates of 30-day mortality and ED return stratified by delirium screen result and disposition?

What this study adds to our knowledge

Among 22,940 ED visits, discharged delirium-positive patients had higher mortality (8.4%) than both delirium-negative patients who were discharged (1.5%), or admitted (6.0%). Delirium-positive patients also had a higher rate of ED return than other patients.

How this is relevant to clinical practice

Recognizing delirium during emergency care may inform clinical decisionmaking.

we evaluated 30-day mortality and return ED visits in older ED patients discharged home with delirium. Our findings aim to understand these outcomes to provide critical insight into the safety and feasibility of discharging older adults with delirium and inform future strategies to optimize their care.

Goals of This Investigation

We aim to compare 30-day mortality and return ED visits in older patients with delirium who are discharged home with those discharged home without delirium and those who are admitted to the hospital with and without delirium.

MATERIALS AND METHODS

This manuscript adheres to the STrengthening the Reporting of OBservational studies in Epidemiology guidelines for observational cohort studies.[7] The study was approved by the institutional review board of our institution. All patients included in the study had completed necessary screenings and provided research authorization for the review of their medical records.

Study Design, Setting, and Participants

This is a retrospective cohort study of consecutive older adults aged 75 years and above who presented to a quaternary academic ED in Minnesota from January 1, 2021, to December 31, 2023. Our ED serves 80,000 visits annually, including 30,000 visits from older adults. Screening for delirium focused on patients aged 75 years and above, per our ED practice guidelines.

Nurses were trained in the use of screening tools to assess patients for delirium within the first hour, although assessments occasionally occurred later at the nurse's discretion as part of usual care. We excluded patients admitted to the ICU or monitored unit/Progressive Care Unit, as we wanted to focus on outcomes of less critically ill patients to be comparable with those discharged home.

Variables and Measurements

The ED nursing staff used the Delirium Triage Screen (DTS) with a previously reported sensitivity of 98% and Brief Confusion Assessment Method (bCAM) with a reported sensitivity of 84% and a specificity of 96% to screen patients for delirium.[8,9] The screening process started with the DTS. Patients with a negative result from the DTS were ruled out for delirium. A positive DTS result prompted a bCAM evaluation.[8,9] A negative bCAM result ruled out delirium, whereas a positive result confirmed the diagnosis. We considered patients with a positive DTS and bCAM results to have delirium. Some patients had incomplete records of screening results, due to issues with the recording of the screening results in the electronic health record. We considered the patient to have delirium if at least one screen during the ED stay was positive. If patients underwent multiple screenings during their ED visit, such as in patients who were admitted to the ED observation unit or those whose clinical condition changed during the ED stay, one positive screen was enough to consider them in the positive category.

Patients included in the study were divided into 4 categories based on the result of the delirium screening and disposition from the ED: delirium-positive patients who were discharged from the ED, delirium-positive patients who were admitted to hospital (non-ICU or monitored beds), delirium-negative patients who were discharged, and delirium-negative patients who were admitted to hospital to the floor level of care.

A protocol was written a priori, and we used a standardized data abstraction form. The form was pilot-tested and refined. Data abstractors (AH, PT, KC, MB) conducted independent reviews of the electronic medical records while remaining blinded to the DTS/bCAM assessment results from the ED visit to minimize bias. We assessed interrater reliability by having 2 independent abstractors review a random sample of the charts, with

discrepancies resolved by the senior investigator (FB). We manually reviewed each individual medical record of all patients who screened positive for delirium and were subsequently discharged, whether to their independent living residences or residential care facilities, and to evaluate if delirium was documented or suspected by the treating clinicians.[10] A random sample of patients without delirium who were admitted or discharged, as well as delirium-positive admitted to the hospital, were also reviewed using the same procedures. Our primary outcomes focused on return to the ED and mortality within 30 days of the ED visit. Secondary outcomes included 7-day mortality.

To adjust for severity, we collected other variables including Modified Early Warning Score (MEWS) using the first vital signs from the ED, arrival by ambulance, ED occupancy (number of patients in the waiting room at the time each patient arrives and the longest wait at the time each patient arrives), day of the week, most common chief complaints, diagnosis of Alzheimer disease or related dementias, mild cognitive impairment, and new medication prescription after the ED visit. Diagnoses of Alzheimer disease, related dementias, and mild cognitive impairment were extracted using International Classification of Diseases 10 codes and patients' problem lists. Dementia screening and diagnosis occur in primary care, not in our ED.

Potential Confounders

Data regarding potential confounders in the association between delirium and subsequent short-term mortality were extracted and adjusted during model analysis. We considered age, sex, history of dementia, MEWS, and length of stay as potential confounders.

We extracted mortality data from our electronic health record, which captures both inhospital and nonhospital deaths reported within the health system. Our electronic health record provides comprehensive coverage and ensures robust capture of deaths and return ED visits, given the integration of the County hospitals and 21 surrounding EDs and community hospitals into a single medical record system.

Missing Data

Characteristics with missing data were reported as "unknown" in all summaries. Missing vital signs used to determine MEWS were imputed so that MEWS could be used as an adjustment for outcomes analysis. We imputed vital signs in MEWS (systolic blood pressure, pulse rate, respiratory rate, and temperature) using random forest imputation predicted from all other vital measures as well as patient age and sex. The final imputed value for each measure was taken as the mean across 10 imputed data sets. Sensitivity analysis was performed, excluding imputed MEWS data to assess for potential bias. Thirty-day follow-up data were available in 97% of the cohort.

Statistical Analysis

We summarized continuous variables using medians and quartiles and categorical characteristics using frequency counts and percentages. The primary outcomes of interest were patient return to the ED or patient death within 30 days of departure. We compared these between the 4 disposition groups using mixed-effects robust Poisson regression with a random intercept for each patient to account for individual patients who visited the ED multiple times during the study period. Our models were both unadjusted and adjusted for patient age, sex, comorbidity of dementia, Alzheimer disease, mild cognitive impairment, MEWS, and ED length of stay. Model results were reported with adjusted relative risks (aRRs) and 95% confidence intervals (CIs). Subgroup analyses assessed risk of 30-day outcomes among patients with and without comorbidities of dementia, Alzheimer disease, or mild cognitive impairment.

Secondary analysis assessed for risk factors associated with adverse patient outcomes within 30 days among patients who were screened positively for delirium and were discharged from the ED. The association between adverse patient outcomes and potential risk factors was evaluated using robust Poisson regression, and results were reported as RRs with 95% CIs. All analyses were conducted by a biostatistician using R version 4.2.2 (R Core Team 2021. R Foundation for Statistical Computing).

RESULTS

There were 37,903 visits from patients aged 75 years or older identified during the study period. A total of 6,198 patients were admitted to the ICU or monitored Progressive Care Unit, and 8,765 visits with no delirium screening performed were excluded (including those hemodynamically unstable, with acute stroke, ST-elevation myocardial infarction, unresponsive, among others) leaving 22,940 visits included in the analysis (Figure).

A summary of patient demographics, clinical characteristics, and outcomes for each of the 4 disposition groups is described in Table 1. There were 202 (0.9%) patients with a positive screening for delirium who were discharged from the ED; 730 (3.2%) patients with a positive delirium screening who were admitted to the hospital; 13,397 (58.4%) patients with a negative delirium

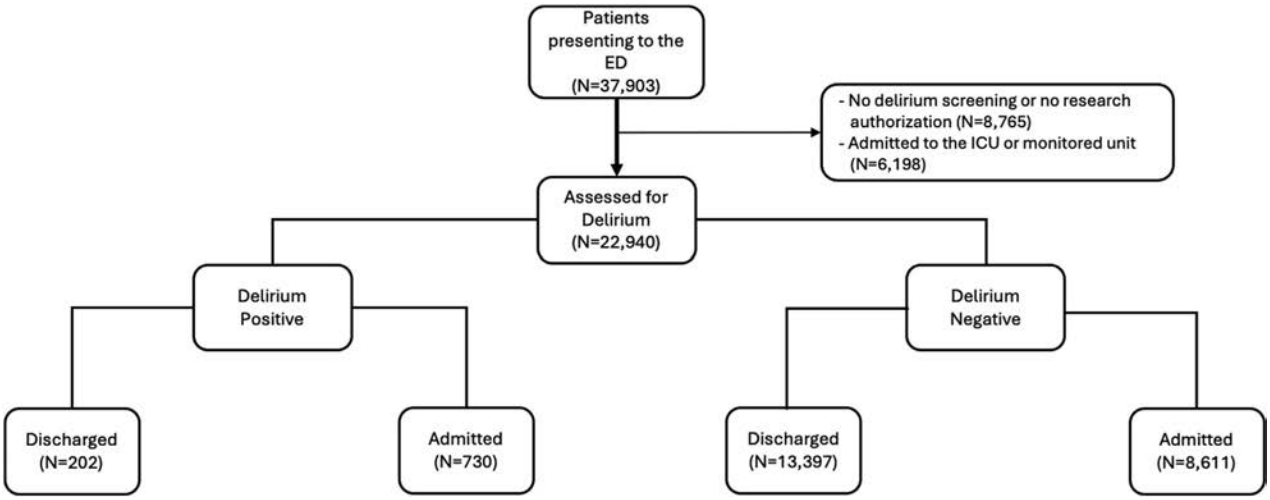

Figure. Study flow chart.

screening who were discharged from the ED; and 8,611 (37.4%) patients with a negative delirium screening who were admitted to the hospital.

Mortality

Mortality within 30 days was highest in the delirium-positive admitted group (13.4%), followed by delirium-positive discharged home (8.4%), delirium-negative admitted (6.0%), and delirium-negative discharged home (1.5%). After accounting for patient age, sex, first MEWS recorded in the ED, presence of dementia, Alzheimer's disease, or mild cognitive impairment, and ED length of stay, patients who were delirium positive and discharged had nearly 3 times greater risk of 30-day mortality compared with delirium-negative discharged patients (aRR 2.86, 95% CI 2.04 to 4.00; Table 2). Delirium-positive patients admitted to the hospital had more than 4 times greater risk of 30-day mortality compared with delirium-negative discharged patients (aRR 4.09, 95% CI 2.80 to 5.99) and 50% greater risk of mortality compared with delirium-positive discharged patients (aRR 1.50, 95% CI 1.07 to 2.11).

Subgroup analyses assessing patients with Alzheimer's disease, dementia, or mild cognitive impairment showed similar results. Among patients with these comorbidities (n=1,299), 30-day mortality was nearly 3 times higher for delirium-positive discharged patients (aRR 2.74, 95% CI 1.31 to 5.77) and delirium-positive admitted patients (aRR 3.19, 95% CI 1.93 to 5.26) compared with delirium-negative patients discharged home (Table 3). Patients without dementia, Alzheimer's disease, or cognitive impairment (n=21,641) had a greater disparity in mortality; compared with delirium-negative patients who were discharged, delirium-positive discharged patients had 4 times greater risk of mortality (aRR 4.16, 95% CI 2.56 to 6.76) and delirium-positive hospitalized patients had 7 times greater risk of mortality (aRR 6.99, 95% CI 5.90 to 8.27; Table 4).

Return ED Visit

Among the subjects discharged after an ED visit, delirium-positive patients had a higher rate of return to the ED within 30 days (32.2%) compared with delirium-negative patients (19.9%). Delirium patients who were discharged had a significantly higher risk of ED return within 30 days than delirium-negative patients discharged (aRR 1.52, 95% CI 1.32 to 1.61; Table 2) as well as delirium-positive patients admitted to hospital (aRR 1.64, 95% CI 1.40 to 1.92).

There was no difference in 30-day ED returns between delirium-positive discharge and delirium-negative discharge patients with a comorbidity of dementia, Alzheimer's disease, or mild cognitive impairment (aRR 0.84, 95% CI 0.55 to 1.28; Table 3). However, among patients without these comorbidities delirium delirium-positive discharge patients had significantly higher rates of ED returns than delirium-negative discharge patients (aRR 1.76, 95% CI 1.55 to 1.99; Table 4).

Predictors of Mortality or ED Return Among Those With Delirium Dismissed Home

Among the 202 patients with positive delirium discharged home from the ED, the predictors of mortality are presented in Table 5. MEWS was the only factor associated with mortality. Age, sex, ED occupancy,

Table 1. Summary of patient demographics and ED visit characteristics.

	Delirium Positive		Delirium Negative	
Variables	**Discharged From ED (N=202)**	**Admitted to Hospital (N=730)**	**Discharged From ED (N=13,397)**	**Admitted to Hospital (N=8,611)**
Patient demographics				
Age, y				
Median (Q1-Q3)	84 (79-89)	83 (78-88)	81 (78-86)	82 (78-87)
Sex, n (%)				
Female	111 (55.0%)	405 (55.5%)	7,101 (53.0%)	4,472 (51.9%)
Male	91 (45.0%)	325 (44.5%)	6,296 (47.0%)	4,139 (48.1%)
Race, n (%)				
American Indian or Alaska Native	0 (0.0%)	0 (0.0%)	16 (0.1%)	11 (0.1%)
Asian	2 (1.0%)	13 (1.8%)	174 (1.3%)	91 (1.1%)
Black or African American	7 (3.5%)	18 (2.5%)	201 (1.5%)	90 (1.0%)
Native Hawaiian or Pacific Islander	0 (0.0%)	0 (0.0%)	5 (0.0%)	7 (0.1%)
White	187 (92.6%)	692 (94.8%)	12,824 (95.7%)	8,325 (96.7%)
Other race	5 (2.5%)	4 (0.5%)	71 (0.5%)	46 (0.5%)
Unknown/did not disclose	1 (0.5%)	3 (0.4%)	106 (0.8%)	41 (0.5%)
Ethnicity, n (%)				
Not Hispanic or Latino	199 (98.5%)	706 (96.7%)	13,000 (97.0%)	8,428 (97.9%)
Hispanic or Latino	3 (1.5%)	9 (1.2%)	180 (1.3%)	78 (0.9%)
Unknown/did not disclose	0 (0.0%)	15 (2.1%)	217 (1.6%)	105 (1.2%)
Clinical characteristics				
Triage ESI, n (%)				
Level 1	1 (0.5%)	4 (0.5%)	5 (0.0%)	20 (0.2%)
Level 2	39 (19.3%)	211 (28.9%)	1,348 (10.1%)	1,247 (14.5%)
Level 3	156 (77.2%)	508 (69.6%)	10,077 (75.2%)	7,003 (81.3%)
Level 4	6 (3.0%)	7 (1.0%)	1946 (14.5%)	336 (3.9%)
Level 5	0 (0.0%)	0 (0.0%)	18 (0.1%)	2 (0.0%)
Unspecified	0 (0.0%)	0 (0.0%)	3 (0.0%)	3 (0.0%)
Means of arrival, n (%)				
Non-EMS transport	71 (35.1%)	189 (25.9%)	9,504 (70.9%)	4,026 (46.8%)
EMS transport	131 (64.9%)	540 (74.0%)	3,893 (29.1%)	4,583 (53.2%)
Unknown	0 (0.0%)	1 (0.1%)	0 (0.0%)	2 (0.0%)
MEWS, 0-14				
Median (Q1-Q3)	1 (1-2)	2 (1-3)	1 (1-1)	1 (2-1)
Data imputed, n (%)	19 (9.4%)	3 (0.4%)	1084 (8.1%)	1 (0.0%)
Arrival day of the week, n (%)				
Monday	39 (19.3%)	96 (13.2%)	2,009 (15.0%)	1,399 (16.2%)
Tuesday	25 (12.4%)	119 (16.3%)	1,893 (14.1%)	1,294 (15.0%)
Wednesday	21 (10.4%)	102 (14.0%)	1,935 (14.4%)	1,255 (14.6%)
Thursday	34 (16.8%)	121 (16.6%)	1,838 (13.7%)	1,181 (13.7%)
Friday	27 (13.4%)	125 (17.1%)	2,010 (15.0%)	1,336 (15.5%)
Saturday	32 (15.8%)	90 (12.3%)	1,820 (13.6%)	1,087 (12.6%)
Sunday	24 (11.9%)	77 (10.5%)	1,892 (14.1%)	1,059 (12.3%)
ED occupancy at arrival, No. of patients				
Median (Q1-Q3)	10 (2-20)	11 (2-19)	9 (1-18)	10 (2-19)

Table 1. Continued.

Variables	Delirium Positive		Delirium Negative	
	Discharged From ED (N=202)	Admitted to Hospital (N=730)	Discharged From ED (N=13,397)	Admitted to Hospital (N=8,611)
Chief complaint (10 most frequent), n (%)				
Fall	19 (9.4%)	66 (9.0%)	1,419 (10.6%)	1,156 (13.4%)
Abdominal pain	7 (3.5%)	25 (3.4%)	792 (5.9%)	887 (10.3%)
Shortness of breath	5 (2.5%)	36 (4.9%)	736 (5.5%)	846 (9.8%)
Chest pain	3 (1.5%)	3 (0.4%)	1,081 (8.1%)	243 (2.8%)
Weakness, generalized	15 (7.4%)	93 (12.7%)	425 (3.2%)	726 (8.4%)
Back pain	2 (1.0%)	8 (1.1%)	440 (3.3%)	283 (3.3%)
Altered mental status	61 (30.2%)	226 (31.0%)	175 (1.3%)	234 (2.7%)
Dizziness	5 (2.5%)	2 (0.3%)	434 (3.2%)	168 (2.0%)
Leg pain	0 (0%)	2 (0.3%)	273 (2.0%)	176 (2.0%)
Fever	6 (3.0%)	36 (4.9%)	163 (1.2%)	239 (2.8%)
Other chief complaint	79 (39.1%)	233 (31.9%)	7,459 (55.7%)	3,653 (42.4%)
ED fall risk, n (%)				
No risk (MEDFRAT 0)	9 (4.5%)	37 (5.1%)	5,696 (42.5%)	2,271 (26.4%)
Low risk (MEDFRAT 1-2)	13 (6.4%)	47 (6.4%)	4,309 (32.2%)	2,721 (31.6%)
Moderate risk (MEDFRAT 3-4)	15 (7.4%)	41 (5.6%)	1,761 (13.1%)	1,765 (20.5%)
High risk (MEDFRAT 5+)	158 (78.2%)	563 (77.1%)	1,403 (10.5%)	1,629 (18.9%)
Not assessed	7 (3.5%)	42 (5.8%)	228 (1.7%)	225 (2.6%)
Comorbidities within 1 y of ED arrival, n (%)				
Dementia or Alzheimer's disease	51 (25.2%)	130 (17.8%)	628 (4.7%)	476 (5.5%)
Mild cognitive impairment	0 (0.0%)	1 (0.1%)	18 (0.1%)	9 (0.1%)
ED length of stay, h				
Median (Q1-Q3)	5.4 (4.4-6.8)	5.6 (4.4-7.0)	5.2 (3.8-7.0)	5.8 (4.4-7.5)
New outpatient prescription, n (%)				
No prescription	122 (60.4%)	715 (97.9%)	8,644 (64.5%)	8,488 (98.6%)
Repeat prescription	39 (19.3%)	5 (0.7%)	1,761 (13.1%)	39 (0.5%)
New prescription	41 (20.3%)	10 (1.4%)	2,992 (22.3%)	84 (1.0%)
Patient outcomes				
Return to the ED, n (%)				
Within 3 d	22 (10.9%)	30 (4.1%)	867 (6.5%)	403 (4.7%)
Within 7 d	33 (16.3%)	57 (7.8%)	1,372 (10.2%)	768 (8.9%)
Within 30 d	65 (32.2%)	144 (19.7%)	2,668 (19.9%)	1,811 (21.0%)
Death, n (%)				
Within 7 d	6 (3.0%)	31 (4.2%)	35 (0.3%)	135 (1.6%)
Within 30 d	17 (8.4%)	98 (13.4%)	196 (1.5%)	517 (6.0%)

EMS, emergency medical services; *ESI*, Emergency Severity Index.

dementia, length of stay, or new outpatient prescriptions were not significant. For the composite outcome of death or ED return within 30 days, none of the analyzed factors were statistically significant, as shown in Table 6.

Qualitative data from medical record reviews indicated that delirium was often not documented or acknowledged by clinicians. The most common scenarios involved patients presenting with altered mental status who screened positive for delirium but were described as not confused during clinical evaluation. Other frequent scenarios included patients with a history of cognitive impairment or dementia without a caregiver to confirm

Table 2. Comparison of patient outcomes among disposition groups at 7 and 30 days following discharge from the ED.

Disposition Group	N (%)	Unadjusted Relative Risk (95% CI)	Adjusted* Adj. Relative Risk (95% CI)
ED return within 30 d			
Delirium negative, discharged	2,668 (19.9%)	Reference	Reference
Delirium negative, admitted to hospital	1,811 (21.0%)	1.04 (0.99-1.10)	1.02 (0.97-1.08)
Delirium positive, discharged	65 (32.2%)	1.61 (1.52-1.69)	1.52 (1.43-1.61)
Delirium positive, admitted to hospital	144 (19.7%)	0.99 (0.85-1.15)	0.92 (0.79-1.07)
Death within 30 d			
Delirium negative, discharged	196 (1.5%)	Reference	Reference
Delirium negative, admitted to hospital	517 (6.0%)	2.77 (2.28-3.38)	2.56 (2.04-3.22)
Delirium positive, discharged	17 (8.4%)	3.58 (2.52-5.09)	2.86 (2.04-4.00)
Delirium positive, admitted to hospital	98 (13.4%)	5.76 (4.13-8.04)	4.09 (2.80-5.99)

*Models were adjusted for patient age, sex, first MEWS in the ED, presence of dementia, and length of stay.

changes in mental status and patients with a history of schizophrenia, schizoaffective disorder, or bipolar disorder presenting with delusions, hallucinations, or agitation. In a few cases, clinicians documented that they believed the symptoms were due to dementia rather than delirium. In the minority, there was acknowledged delirium and documentation of shared decision making with the family, resulting in the patient being dismissed to continue care at home based on prior bad experiences with inhospital delirium.

LIMITATIONS

This study has several limitations. First, the generalizability of our findings may be limited to academic EDs and may not reflect the patient populations seen in rural or community hospitals. Our population was predominantly non-Hispanic White, mirroring the demographics of rural Midwestern communities; results may be different in other populations. Second, delirium screening was performed at the discretion of bedside nurses, introducing selection bias, including for patients who do not exhibit overt symptoms of delirium; however, we have consistent rates of 80% screening every month. Third, the reliance on medical records carries the risk of relying on information that has been collected for clinical practice and not research purposes and could lead to the underestimation of certain variables. Fourth, we did not measure or adjust for variables such as comorbid illness burden and frailty, and these are sources of potential confounding. However, we adjusted for ED vital signs using the MEWS and by

Table 3. Comparison of patient outcomes among patients with Alzheimer's disease, dementia, or mild cognitive impairment based on delirium screen results and ED disposition.

Disposition Group	N (%)	Unadjusted Relative Risk (95% CI)	Adjusted* Adj. Relative Risk (95% CI)
ED return within 30 d			
Delirium negative, discharged	179/637 (28.1%)	Reference	Reference
Delirium negative, admitted to hospital	108/481 (22.5%)	0.80 (0.72-0.89)	0.79 (0.70-0.88)
Delirium positive, discharged	12/51 (23.5%)	0.84 (0.55-1.26)	0.84 (0.55-1.28)
Delirium positive, admitted to hospital	17/130 (13.1%)	0.47 (0.32-0.67)	0.45 (0.31-0.65)
Death within 30 d			
Delirium negative, discharged	25/637 (3.9%)	Reference	Reference
Delirium negative, admitted to hospital	43/481 (8.9%)	2.28 (1.56-3.33)	2.09 (1.41-3.09)
Delirium positive, discharged	6/51 (11.8%)	2.99 (1.42-6.32)	2.74 (1.31-5.77)
Delirium positive, admitted to hospital	20/130 (15.4%)	3.92 (2.48-6.20)	3.19 (1.93-5.26)

*Models were adjusted for patient age, sex, first MEWS in the ED, and length of stay.

Table 4. Comparison of patient outcomes among patients without Alzheimer's disease, dementia, or mild cognitive impairment based on delirium screen results and ED disposition.

		Unadjusted	Adjusted*
Disposition Group	**N (%)**	**Relative Risk (95% CI)**	**Adj. Relative Risk (95% CI)**
ED return within 30 d			
Delirium negative, discharged	2,489/12,760 (19.5%)	Reference	Reference
Delirium negative, admitted to hospital	1,703/8,130 (20.9%)	1.07 (1.03-1.12)	1.06 (1.01-1.10)
Delirium positive, discharged	53/151 (35.1%)	1.80 (1.59-2.03)	1.76 (1.55-1.99)
Delirium positive, admitted to hospital	127/600 (21.2%)	1.09 (1.02-1.15)	1.04 (0.98-1.11)
Death within 30 d			
Delirium negative, discharged	171/12,760 (1.3%)	Reference	Reference
Delirium negative, admitted to hospital	474/8,130 (5.8%)	4.35 (4.04-4.69)	3.83 (3.54-4.15)
Delirium positive, discharged	11/151 (7.3%)	5.44 (3.32-8.87)	4.16 (2.56-6.76)
Delirium positive, admitted to hospital	78/600 (13.0%)	9.70 (8.29-11.35)	6.99 (5.90-8.27)

*Models were adjusted for patient age, sex, first MEWS in the ED, and length of stay.

dementia.[11-13] Fifth, we did not assess clinicians' understanding of delirium's natural history or ability to recognize delirium.[14-16] Sixth, we used delirium screening performed as usual care, and current practice does not include the patient/care partner's preferred language or health literacy.[17] Seventh, patient and care partner priorities may have been reflected in discharge decisions for delirium-positive patients, particularly those who experienced inhospital delirium in the past. However, given this was not consistently documented in the medical notes, we were unable to include this as a potential factor. Eighth, the potential for

Table 5. Predictors of patient mortality among patients with delirium who were discharged from the ED (n=202).

Risk Factor	**Alive at 30 D (N=185)**	**Deceased at 30 D (N=17)**	**Relative Risk (95% CI)**
Age, y			Per 5 y:
Median (Q1-Q3)	84 (79-90)	85 (80-89)	1.04 (0.75-1.45)
Sex			
Female	104 (56%)	7 (41%)	Reference
Male	81 (44%)	10 (59%)	1.74 (0.69-4.40)
ED occupancy at arrival, #			Per 5 patients:
Median (Q1-Q3)	10 (3-20)	6 (0-12)	0.79 (0.59-1.04)
ED fall risk			
No risk or low risk	21 (12%)	1 (6%)	Reference
Moderate risk	15 (8%)	0 (0%)	—
High risk	143 (80%)	15 (94%)	2.09 (0.29-15.0)
Comorbidities			
Alzheimer's disease	29 (16%)	2 (12%)	0.74 (0.18-3.06)
Dementia	41 (22%)	6 (35%)	1.80 (0.70-4.60)
Alzheimer's disease or dementia	45 (24%)	6 (35%)	1.61 (0.63-4.15)
MEWS, 0-14			Per 1 point:
Median (Q1-Q3)	1 (1-2)	1 (1-3)	1.29 (1.06-1.57)
ED length of stay, h			Per hour:
Median (Q1-Q3)	5.4 (4.4-6.9)	5.5 (3.3-6.2)	1.01 (0.87-1.19)
Outpatient medications			
No prescription	112 (61%)	10 (59%)	Reference
Repeat prescription	38 (21%)	1 (6%)	0.31 (0.04-2.37)
New prescription	35 (19%)	6 (35%)	1.79 (0.69-4.61)

Table 6. Predictors of adverse patient outcomes among patients with delirium who were discharged from the ED.

Risk Factor	No Outcomes at 30 D (N=129)	Death or ED Return at 30 D (N=73)	Relative Risk (95% CI)
Age, y			Per 5 y:
Median (Q1-Q3)	83 (79-89)	85 (80-90)	1.07 (0.93-1.22)
Sex			
Female	72 (56%)	39 (53%)	Reference
Male	57 (44%)	34 (47%)	1.06 (0.74-1.53)
ED occupancy at arrival, #			Per 5 patients:
Median (Q1-Q3)	9 (1-19)	11 (6-20)	1.03 (0.95-1.12)
ED fall risk			
No risk or low risk	14 (11%)	8 (11%)	Reference
Moderate risk	8 (6%)	7 (10%)	1.28 (0.59-2.78)
High risk	102 (82%)	56 (79%)	0.97 (0.54-1.76)
Comorbidities			
Alzheimer's disease	23 (18%)	8 (11%)	0.68 (0.36-1.27)
Dementia	33 (26%)	14 (19%)	0.78 (0.48-1.27)
Alzheimer's disease or dementia	36 (28%)	15 (21%)	0.77 (0.48-1.23)
MEWS, 0-14			Per 1 point:
Median (Q1-Q3)	1 (1-2)	1 (1-2)	1.06 (0.92-1.21)
ED length of stay, h			Per hour:
Median (Q1-Q3)	5.5 (4.3-6.9)	5.2 (4.4-6.2)	1.00 (0.94-1.06)
Outpatient medications			
No prescription	75 (58%)	47 (64%)	Reference
Repeat prescription	29 (22%)	10 (14%)	0.67 (0.37-1.19)
New prescription	25 (19%)	16 (22%)	1.01 (0.65-1.58)

misclassification, as the bCAM has only moderate sensitivity, and diagnostic accuracy may decrease when used by bedside clinicians as compared with research studies. Lastly, this is an observational cohort study, and we aim to generate new hypotheses and report associations, but we do not aim to establish causality.

DISCUSSION

This study provides an evaluation of outcomes and health care utilization among older adults with delirium discharged from the ED without hospital admission. We found that patients with delirium discharged home from the ED had a 3-fold increase in mortality and higher rates of return within 30 days than those without delirium who were either admitted or discharged. Overall, 1 in 12 patients with delirium will die within 30 days as compared with 1 in 67 without delirium. After the exclusion of patients admitted to monitored beds and critical care units, we found that 4.1% of patients experienced delirium while in the ED, consistent with other studies with a prevalence between 6% and 38%.[3,18] Delirium-positive patients who were discharged had a 32.2% ED return rate within 30 days versus 19.9% for those without delirium.

Delirium is associated with increased mortality due to underlying serious medical conditions and heightened risk of falls, accidents, and cognitive impairment.[2,19,20] Our study found that 30-day mortality was higher for patients with delirium who were admitted, followed by those with delirium discharged, likely due to the severity of illness leading to hospital admission. Notably, delirium-positive patients discharged home had significantly higher 30-day mortality than their delirium-negative counterparts. This may have included patients discharged home due to their or their family's preferences despite knowing they were at risk for poor outcomes. However, these findings are consistent with those reported by Han et al[21] and Arneson et al,[22] who also found elevated mortality rates of 37% at 6 months and 16.8% at 30 days in delirium-positive patients, not stratified by admission. Israni et al[23] reported that delirium was consistently associated with increased mortality for 12 months following an ED visit, with the strongest association between delirium and mortality at 30 days after the ED visit.

Two studies from over 20 years ago provide information on delirium-discharged patients. Kakuma et al,[24] in a prospective study of 2 EDs in Canada, reported a cohort of 107 patients dismissed from the ED, including 30 patients with delirium. The mortality rate was 20% for patients dismissed with delirium versus 3.9% for those without delirium at 6 months (hazard ratio 5.47, 95% CI 1.4 to 21.9). Hustey et al[25] reported that 3 of the 5 (60%) patients with delirium who were discharged from the ED returned within 3 days. A more recent study by Lee et al[26] prospectively assessed delirium among 1,493 adults aged 65 years and older, and 5.3% (n=79) had delirium. Among those with delirium, 15 patients were dismissed home, with 1 patient (6.7%) dying within 1 week. The small samples of these studies demonstrate the lack of information regarding patients dismissed from the ED with delirium and the importance of recognition to improve their short-term mortality. Our observed differences in mortality rates compared with these previous studies may be attributed to factors such as age (our sample was $\geq$ 75 years), timeframe of mortality, and severity of acute illness. Nevertheless, these comparisons highlight the critical need for comprehensive care to manage the severe consequences of delirium, as observed in both our study and others.[21-23]

Our findings that patients with delirium return to the ED at a higher rate than patients discharged without delirium is not surprising. Current ED discharge processes may not adequately address the needs of patients with delirium, leading to higher readmission rates and mortality. Delirium's acute confusion, inattention, and cognitive impairment can severely compromise a patient's ability to comprehend and adhere to discharge instructions, leading to adverse outcomes.[2,27] Carpenter et al[28] identified correlations between cognitive impairment and poor comprehension of ED diagnosis and follow-up instructions, emphasizing the importance of effective communication and robust postdischarge support systems for these patients. Likewise, Marr et al[29] reported that retention of ED discharge instruction knowledge decreased to 66% for persons living with dementia. The lack of significant predictors for safe discharge among delirium patients in our study indicates that further research is needed to develop reliable risk stratification tools and postdischarge care strategies.[30]

Delirium-positive patients discharged from the ED also had a higher rate of return within 30 days. This suggests that despite being deemed stable for discharge, these patients may continue to experience unresolved or worsening health issues requiring further medical attention. Furthermore, hospital admissions typically involve more intensive monitoring and tailored interventions to address the underlying causes of delirium, which can reduce the incidence, severity, and duration of delirium.[3] Ideally, there are innovative ways to prevent ED revisits. One option is hospital-level care at a patient's home rather than in the setting of an acute care hospital; such hospital-at-home care interventions have been shown to reduce the rate of incident delirium, but we do not know the effect on prevalent delirium.[31]

The findings of this study support the emphasis on delirium screening from current guidelines, such as those from the Geriatric Emergency Department Guidelines, American College of Emergency Physicians, and Geriatric Emergency Department Accreditation.[32,33] For delirium-positive patients discharged home, it is crucial to establish robust postdischarge support, including scheduled follow-up visits, regular nurse check-ins, and clear communication channels for patients and their caregivers. In our ED, we have dedicated nurses who follow up with patients the next day, if requested by the clinical team, providing an additional layer of safety for patients and their families. Although hospital admission may be necessary to ensure patient safety and well-being, it is important to recognize that admission can also exacerbate delirium and contribute to increased morbidity and mortality, potentially leading to further cognitive and physical decline.

Future research should aim to identify services and interventions that improve outcomes for certain groups of patients with delirium. In addition, further studies should aim to develop and validate risk stratification tools that can accurately predict which delirium-positive patients can be safely discharged and which require hospital admission. Current delirium screening tools, although valuable for diagnosis, may not capture the full complexity of delirium in the context of an older adult's overall health status and social circumstances. Therefore, research that integrates multifactorial risk assessments—encompassing comorbidities, cognitive function, and social support networks—is essential to enhance decisionmaking processes in the ED. Interventions could include structured follow-up protocols, telehealth monitoring, home health services, and enhanced communication strategies involving patients' care partners.

In conclusion, older patients discharged with delirium experience an elevated risk of ED return and mortality within 30 days. Delirium patients, whether discharged or admitted, exhibited higher adverse outcomes compared with delirium-negative patients. Screening, effective management, and appropriate disposition of patients with

delirium are essential to reducing adverse outcomes and improving patient safety. By prioritizing tailored interventions, we can facilitate better care transitions and reduce readmissions and mortality rates among these patients.

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REFERENCES

1. Nagaraj G, Burkett E, Hullick C, et al. Is delirium the medical emergency we know least about? *Emerg Med Australas*. 2016;28:456-458.
2. Lee S, Howard MA 3rd, Han JH. Delirium and delirium prevention in the emergency department. *Clin Geriatr Med*. 2023;39:535-551.
3. Carpenter CR, Hammouda N, Linton EA, et al. Delirium prevention, detection, and treatment in emergency medicine settings: a Geriatric Emergency Care Applied Research (GEAR) network scoping review and consensus statement. *Acad Emerg Med*. 2021;28:19-35.
4. Carpenter CR, Shah MN, Hustey FM, et al. High yield research opportunities in geriatric emergency medicine: prehospital care, delirium, adverse drug events, and falls. *J Gerontol A Biol Sci Med Sci*. 2011;66:775-783.
5. Lee S, Chen H, Hibino S, et al. Can we improve delirium prevention and treatment in the emergency department? A systematic review. *J Am Geriatr Soc*. 2022;70:1838-1849.
6. Kennedy M, Enander RA, Tadiri SP, et al. Delirium risk prediction, healthcare use and mortality of elderly adults in the emergency department. *J Am Geriatr Soc*. 2014;62:462-469.
7. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol*. 2008;61:344-349.
8. Baten V, Busch HJ, Busche C, et al. Validation of the brief confusion assessment method for screening delirium in elderly medical patients in a German emergency department. *Acad Emerg Med*. 2018;25:1251-1262.
9. Han JH, Wilson A, Vasilevskis EE, et al. Diagnosing delirium in older emergency department patients: validity and reliability of the delirium triage screen and the brief confusion assessment method. *Ann Emerg Med*. 2013;62:457-465.
10. Kaji AH, Schriger D, Green S. Looking through the retrospectoscope: reducing bias in emergency medicine chart review studies. *Ann Emerg Med*. 2014;64:292-298.
11. Sirois MJ, Émond M, Ouellet MC, et al. Cumulative incidence of functional decline after minor injuries in previously independent older Canadian individuals in the emergency department. *J Am Geriatr Soc*. 2013;61:1661-1668.
12. Rueegg M, Nissen SK, Brabrand M, et al. The clinical frailty scale predicts 1-year mortality in emergency department patients aged 65 years and older. *Acad Emerg Med*. 2022;29:572-580.
13. Kabell Nissen S, Rueegg M, Carpenter CR, et al. Prognosis for older people at presentation to emergency department based on frailty and aggregated vital signs. *J Am Geriatr Soc*. 2023;71:1250-1258.
14. Chary AN, Castilla-Ojo N, Joshi C, et al. Evaluating older adults with cognitive dysfunction: a qualitative study with emergency clinicians. *J Am Geriatr Soc*. 2022;70:341-351.
15. Chary AN, Lesser A, Inouye SK, et al. A survey of delirium self-reported knowledge and practices among emergency physicians in the United States. *J Geriatr Emerg Med*. 2021;2:5.
16. Chary A, Liu SW, Santangelo I, et al. A qualitative study of emergency department delirium prevention initiatives. *Delirium Commun*. 2022;2022. https://doi.org/10.56392/001c.55690

17. Chary AN, Suh M, Ordoñez E, et al. A scoping review of geriatric emergency medicine research transparency in diversity, equity, and inclusion reporting. *J Am Geriatr Soc*. 2024;72:3551-3566.
18. Pérez-Ros P, Martínez-Arnau FM. Delirium assessment in older people in emergency departments. a literature review. *Diseases*. 2019;7:14.
19. Oliveira JESL, Stanich JA, Jeffery MM, et al. Association between emergency department modifiable risk factors and subsequent delirium among hospitalized older adults. *Am J Emerg Med*. 2022;53:201-207.
20. McCusker J, Cole M, Abrahamowicz M, et al. Delirium predicts 12-month mortality. *Arch Intern Med*. 2002;162:457-463.
21. Han JH, Shintani A, Eden S, et al. Delirium in the emergency department: an independent predictor of death within 6 months. *Ann Emerg Med*. 2010;56:244-252.e1.
22. Arneson ML, Oliveira JESL, Stanich JA, et al. Association of delirium with increased short-term mortality among older emergency department patients: a cohort study. *Am J Emerg Med*. 2023;66:105-110.
23. Israni J, Lesser A, Kent T, et al. Delirium as a predictor of mortality in US Medicare beneficiaries discharged from the emergency department: a national claims-level analysis up to 12 months. *BMJ Open*. 2018;8:e021258.
24. Kakuma R, du Fort GG, Arsenault L, et al. Delirium in older emergency department patients discharged home: effect on survival. *J Am Geriatr Soc*. 2003;51:443-450.
25. Hustey FM, Meldon SW, Smith MD, et al. The effect of mental status screening on the care of elderly emergency department patients. *Ann Emerg Med*. 2003;41:678-684.
26. Lee JS, Tong T, Chignell M, et al. Prevalence, management and outcomes of unrecognized delirium in a National Sample of 1, 493 older emergency department patients: how many were sent home and what happened to them? *Age Ageing*. 2022;51: afab214.
27. Han JH, Bryce SN, Ely EW, et al. The effect of cognitive impairment on the accuracy of the presenting complaint and discharge instruction comprehension in older emergency department patients. *Ann Emerg Med*. 2011;57:662-671.e2.
28. Carpenter CR, Leggett J, Bellolio F, et al. Emergency department communication in persons living with dementia and care partners: a scoping review. *J Am Med Dir Assoc*. 2022;23:1313.e15-46.
29. Marr S, Hillier LM, Simpson D, et al. Factors for self-managing care following older adults' discharge from the emergency department: a qualitative study. *Can J Aging*. 2019;38:76-89.
30. Hwang U, Carpenter C. Assessing geriatric vulnerability for post emergency department adverse outcomes: challenges abound while progress is slow. *Emerg Med J*. 2016;33:2-3.
31. Leff B, Burton L, Mader SL, et al. Hospital at home: feasibility and outcomes of a program to provide hospital-level care at home for acutely ill older patients. *Ann Intern Med*. 2005;143:798-808.
32. American College of Emergency Physicians, The American Geriatrics Society, Emergency Nurses Association, and the Society for Academic Emergency Medicine. Geriatric emergency department guidelines. *Ann Emerg Med*. 2014;63:e7-e25.
33. Kennedy M, Lesser A, Israni J, et al. Reach and adoption of a Geriatric Emergency Department Accreditation program in the United States. *Ann Emerg Med*. 2022;79:367-373.