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Short communication

National study of emergency department disposition for high suicide risk geriatric patients

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ABSTRACT

Objective: To examine predictors of hospitalization among older adults at high risk for suicide treated in emergency departments (EDs).
Methods: This retrospective cohort analysis used national 2015 Medicare claims for adults ≥65 years with ED visits for suicide ideation or deliberate self-harm (N = 50,472) merged with data from the Area Health Resource File. Rates and adjusted risk ratios (ARR) of hospital admission were assessed.
Results: A majority of ED episodes resulted in hospital admission (81.9%) with most being admitted to a psychiatric unit (62.8%). Visits for self-harm with suicide ideation were most likely to result in hospitalization (94.7%) compared to suicide ideation alone (84.0%) or self-harm alone (73.1%). Current diagnosis of depression, bipolar, anxiety, cognitive, and personality disorder were associated with hospitalization. Co-occurring mental and substance use disorders were the most predictive mental health condition of admission. Overall, severity of current medical comorbidity was the strongest predictor of hospital admission.
Conclusions: Most older adults treated in EDs for suicide ideation or self-harm are hospitalized. Medical morbidity plays a more prominent role than other patient factors in admission status.

The rapidly growing U.S. geriatric population [1] and greater risk of suicide in later life [2,3] underscore the importance of understanding health care delivery patterns to older adults at high risk for suicide. Emergency departments (EDs) have on opportunity to play an important role in suicide prevention by identifying high risk patients and determining who requires hospitalization [4,5]. Approximately 1.4 million annual ED visits in the U.S. are for suicide ideation (SI) or deliberate self-harm (DSH) [6,7], which includes intentional self-injury and self-poisoning irrespective of suicidal intent. DSH is the most powerful known risk factor for suicide mortality [8,9], particularly in older adults [10–12]. Most geriatric DSH events (75%–85%) are suicide attempts, as opposed to non-suicidal self-injury which is more prevalent in younger age groups [13–16].

Major risk factors for late-life suicide include demographic characteristics (i.e., white race, male gender, increasing age) [3], depression and other mental health conditions, and physical morbidity [17–21]. Geriatric suicide risk is also associated with regional shortages in healthcare providers [22,23]. Although recent annual increases in ED visits for suicide ideation are highest in geriatric patients [7] and age-related disparities in ED care for suicide risk have been observed [24–26], limited information exists for ED outcomes of suicide-related visits in older adults. To address this gap, we examined predictors of hospitalization in a national cohort of Medicare beneficiaries aged 65 + years who received ED care for DSH or SI.

1. Method

1.1. Data sources

The cohort was extracted from 2015 national Medicare claims (i.e., Medicare Provider Analysis and Review file and institutional outpatient files) merged with county-level service provider characteristics from Area Health Resource File [27].

1.2. Sample selection

ED visits were selected for a diagnosis of suicide ideation (ICD-9 code V62.84; ICD-10 code R45.851) or deliberate self-harm (ICD-9

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Table 1
Percent of patients hospitalized in 50,472 emergency department visits for suicide ideation or deliberate self-harm in older adult medicare beneficiaries, stratified by admission status and patient characteristics.

Characteristics	Admitted patient visits, % (n = 41,335)	Discharged patient visits, % (n = 9137)	Admission rate (%)	Unadjusted risk ratio (99% CI)	Adjusted risk ratio (99% CI)
Total (n = 50,472)	81.9	18.1			
Age (years)					
65–69 (n = 19,652)	38.2	42.5	80.3	0.97(0.94,1.00)	0.97(0.94,1.01)
70–74 (n = 11,806)	23.7	22.1	82.9	1.00(0.96,1.04)	1.00(0.96,1.04)
75–79 (n = 7813)	15.7	14.4	83.1	1.00(0.96,1.04)	1.00(0.96,1.05)
80 + (n = 11,201)	22.4	21.0	82.9	–	–
Sex					
Male (n = 23,248)	45.5	48.5	81.0	0.98(0.95,1.00)	0.98(0.96,1.01)
Female (n = 27,224)	54.5	51.5	82.7	–	–
Race/ethnicity					
African American (n = 4215)	8.0	10.2	77.9	0.95(0.90,0.99)	0.95(0.91,0.97)
Hispanic (n = 869)	1.8	1.6	83.2	1.01(0.92,1.11)	1.01(0.92,1.11)
Other (n = 1770)	3.2	4.3	77.9	0.94(0.88,1.01)	0.94(0.88,1.02)
White (n = 43,618)	87.0	83.9	82.4	–	–
Any current mental disorder diagnosis (n = 42,989)[a]	90.7	60.25	85.2	**1.69(1.62,1.77)**	**1.70(1.62,1.77)**
Depression (n = 32,869)	70.1	42.5	88.2	**1.25(1.22,1.29)**	**1.25(1.22,1.29)**
Bipolar (n = 6911)	15.4	5.8	92.3	**1.15(1.11,1.19)**	**1.16(1.12,1.20)**
Anxiety (n = 19,358)	41.9	19.4	90.7	**1.18(1.15,1.22)**	**1.19(1.16,1.22)**
Psychosis (n = 7558)	16.5	7.9	90.5	1.13(1.09,1.16)	1.13(1.09,1.17)
Cognitive (n = 7760)	17.7	4.7	94.5	**1.19(1.15,1.23)**	**1.19(1.15,1.23)**
Adjustment (n = 4605)	9.9	5.7	88.8	1.09(1.05,1.14)	1.10(1.05,1.14)
Personality (n = 2541)	5.8	1.5	94.8	**1.17(1.11,1.23)**	**1.17(1.11,1.23)**
Any current substance use disorder (n = 17,702)[a]	36.4	28.9	85.1	1.06(1.03,1.09)	1.08(1.05,1.11)
Co-occurring substance use and mental disorder (n = 45,247)	94.0	70.2	85.8	**1.79(1.70,1.89)**	**1.81(1.72,1.91)**
Self-harm or suicide ideation					
Suicide ideation only (n = 34,912)	71.0	61.1	84.0	**1.14(1.11,1.18)**	**1.15(1.11,1.19)**
Self-harm with suicide ideation (n = 2898)	6.6	1.7	94.7	**1.29(1.22,1.37)**	**1.29(1.22,1.37)**
Self-harm only (n = 12,662)	22.4	37.2	73.1	–	–
Recent hospital treatment[b]					
Emergency medical (n = 11,337)	21.4	27.3	78.0	0.94(0.91,0.97)	0.94(0.91,0.97)
Emergency mental health (n = 9949)	19.5	20.6	81.1	0.99(0.96,1.02)	0.99(0.96,1.02)
Inpatient medical (n = 1538)	3.1	2.6	84.5	1.03(0.96,1.11)	1.03(0.96,1.11)
Inpatient mental health (n = 5874)	12.4	8.0	87.5	1.08(1.04,1.12)	1.08(1.04,1.12)
Number of current medical comorbidities[c]					
0 (n = 1317)	0.4	12.6	12.8	**0.13(0.11,0.16)**	**0.13(0.11,0.16)**
1 (n = 3979)	4.1	25.0	42.5	**0.44(0.41,0.47)**	**0.44(0.41,0.47)**
2–3 (n = 16,648)	30.4	42.6	76.3	**0.79(0.76,0.81)**	**0.79(0.76,0.81)**
4–5 (n = 16,648)	36.8	15.7	91.4	0.94(0.91,0.97)	0.94(0.91,0.97)
6 or more (n = 12,052)	28.3	4.1	96.9	–	–
Lethality of current self-harm method[d]					
Low lethality (n = 14,279)	91.8	91.7	77.1	–	–
High lethality (n = 507)	3.4	2.7	80.9	1.05(0.92,1.19)	1.06(0.93,1.21)
Other/unknown (n = 774)	4.8	5.4	74.5	0.97(0.87,1.08)	0.97(0.87,1.08)
County-level characteristics					
Mental health coverage					
No shortage (n = 4084)	8.2	8.0	82.4	–	–
Partial county shortage (n = 12,861)	24.9	28.3	79.9	0.97(0.92,1.02)	0.97(0.96,1.02)
Whole county shortage (n = 33,470)	66.9	63.7	82.6	1.00(0.97,1.05)	1.01(0.96,1.06)
Primary care coverage					
No shortage (n = 694)	8.9	8.6	82.3	–	–
Partial county shortage (n = 6788)	4.2	4.8	80.5	0.98(0.97,1.05)	0.98(0.91,1.06)
Whole county shortage (n = 371)	86.9	86.6	81.9	1.00(0.95,1.04)	100(0.96,1.04)

Adjusted models controlled for age, sex, and race/ethnicity.
Values in bold indicate significant risks ratios at $p \leq .01$.

[a] For mental and substance use disorder variables, the reference group consists of treatment episodes without the mental, substance use, or co-occurring disorders diagnosis coded during the emergency department visit.

[b] Based on 30 days before the emergency department visit with the reference group being treatment episodes with no prior 30-day healthcare visit.

[c] Number of current medical comorbidities coded during the index emergency department visit as determined by the Elixhauser Comorbidity Scale.

[d] High lethality methods include firearms, drowning, suffocation, fall, fire, and motor vehicle; low lethality methods include cutting and poisoning; unknown includes unspecified or poorly specified.

codes E950–958; ICD-10 codes; T36*X2A - T65*X2A; T71*2A and T14.91; X71 - X83) in any position on the claim.

1.3. Independent variables

Patient-level independent variables included patient age, sex, and race/ethnicity. Based on claims from the 30 days prior to the index ED visit, recent health care was defined as inpatient and ED episodes that contained mental disorder diagnoses (see Appendix for ICD-9 and ICD-10 codes) as well as inpatient and ED visits without mental health codes. Current mental disorders were defined by the presence of a mental disorder diagnosis in any position on the claim during the index

ED visit for depression, bipolar, anxiety, psychosis, cognitive, or personality disorder. Similar steps were used to identify substance use disorder and co-occurring mental and substance use disorder diagnoses. Current medical comorbidity severity was determined by the Elixhauser Comorbidity Scale based on ICD codes from the index ED episode [28]. Suicide-related behaviors were defined as either: 1) suicide ideation alone, 2) self-harm with suicide ideation, or 3) self-harm alone. Lethality of DSH method was classified based on method into high, low, or unknown lethality [29]. Geographic accessibility of primary care and mental health providers was determined by Health Professional Shortage Area (HPSA) scores [27].

1.4. Outcomes

The outcome variable was discharge disposition (hospital admission vs. discharge to community or another residential facility). Admissions were categorized as either psychiatric or non-psychiatric.

1.5. Analytic plan

Adjusted risk ratios (ARR) were calculated for discharge disposition controlling for patient age, sex, and race/ethnicity using the SAS GENMOD procedure with the log-link function. Because approximately 10% of patients contributed more than one treatment episode, the observations are non-independent. Accordingly, generalized estimating equations were used to adjust the confidence intervals to accommodate clustering of observations with the individual subject as a random effects variable. To compensate for the large number of comparisons, results are presented as risk ratios (RR) with associated 99% confidence intervals with significance set at $p < .01$. Group differences with an adjusted risk ratio of ≥ 1.15 or ≤ 0.85 were considered potentially substantial from a clinical and policy perspective.

2. Results

Of the 50,472 treatment episodes for DSH or SI, 81.9% resulted in hospitalization (Table 1) with more admissions being to psychiatric care (62.8%) than non-psychiatric units (37.2%). Admission rates were highest for DSH with SI (94.7%) followed by SI alone (84.0%) and DSH alone (73.1%). Predictors of hospitalization included any current mental disorder (compared to no mental disorder) and a diagnosis of depressive, bipolar, anxiety, cognitive, or personality disorder. Of the mental health conditions, co-occurring mental and substance use disorders was the predictive of hospitalization. Overall, the strongest predictor of hospital admission was increasing severity of medical comorbidity.

3. Discussion

To our knowledge, this is the first national study focused on the emergency management of suicide ideation and deliberate self-harm in the U.S. geriatric population. The admission rate in this high suicide risk cohort (81.9%) is roughly comparable to the base rate of hospitalization for all ED visits related to suicide ideation (71.8%) [7]. Conversely, admission rates for self-harm (73.1%) where higher than national studies of pediatric and younger adult ED visits for self-harm (27.1%–56.1%) [30–34]. These results suggest that ED staff may be more responsive to the greater risk of suicide following self-harm in older adults compared to younger patients [12,35].

The strongest associations with hospitalization were increased medical comorbidity and co-occurring mental and substance use disorders. ED staff may be aware of the independent association between several common physical illnesses and suicide risk among older adults [19]. This finding is also consistent with the general observation that physical frailty plays a prominent role in disposition decisions and the tendency for “complex” geriatric patients with multiple treatment and social service needs to be hospitalized [35–37].

To date, no U.S. studies have examined the short-term risk of self-harm and mortality following geriatric ED visits for suicide-related concerns. However, results from a U.K. prospective cohort study of ED patients treated for self-harm suggest that admission to inpatient psychiatric care lowers 12-month suicide and all-cause mortality risk in older adults [38].

Limitations to the this study include unavailability of data for suicidal intent among self-harm intent [15], which may influence discharge disposition. Without more detailed information on whether the self-harm occurred with or without a suicidal intent, it is possible that some of the discharged patients with self-harm codes were at relatively low suicide risk. Second, the claims data contains aggregated information for individual hospital stays, therefore transfers to different units during hospitalizations in unavailable. Third, concerns exist over the validity and completeness of ICD codes to measure self-harm [39,40]. Third, mental health diagnoses were based on clinician judgment rather than structured assessments. Fourth, the mental status and medication regimens of patients were unknown. Fifth, the present analyses are restricted to a 30-day look-back period, which reduced the sensitivity of the counts of recent health care visits.

These limitations notwithstanding, the results provide data concerning the ED management of high suicide risk in older adults. Our findings that emergency physicians appear to reserve the most intensive level of treatment for patients at the highest suicide risk is reassuring. Future research is needed to examine short-term outcomes for geriatric ED patients treated for suicide risk, including receipt of timely follow-up outpatient mental health care, linkage to community-based services, and mortality outcomes.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.genhosppsych.2019.03.005.

Potential conflicts of interest

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