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Posttraumatic stress symptoms in older adults hospitalized for fall injury[☆]

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Abstract

Objective—Although unintentional falls may pose a threat of death or injury, few studies have investigated their psychological impact on older adults. This study sought to gather data on early posttraumatic stress symptoms in older adults in the hospital setting after a fall.

Method—Participants in this study were 100 adults age 65 years or older admitted to a large urban hospital in New York City because of a fall. Men and women were represented approximately equally in the sample; most were interviewed within days of the fall event. The study's bedside interview included the Posttraumatic Stress Symptom Scale, which inquires about the presence and severity of 17 trauma-related symptoms.

Results—Twenty-seven participants reported substantial posttraumatic stress symptoms (moderate or higher severity). Exploratory bivariate analyses suggested an association between posttraumatic stress symptom severity and female gender, lower level of education, unemployment, number of medical conditions, and back/chest injury.

Conclusions—A significant percentage of older patients hospitalized after a fall suffer substantial posttraumatic stress. Future investigations are needed to assess the association between the psychiatric impact of a fall and short-term inpatient outcomes as well as longer-term functional outcomes.

Keywords

Traumatic injury; Acute stress; Posttraumatic stress; Fall accidents; Older adults

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Psychological trauma was initially described in relation to events outside the range of normal human experience [1]. Although some scholars are reluctant to extend the boundaries of what qualifies as a traumatic stressor, others argue that commonplace medical events may fulfill posttraumatic stress disorder (PTSD) criterion A1 [1–3]. Following the latter line of reasoning, we hypothesized that older adults might experience unintentional falls as traumatic because these events pose the threat of death or injury. If this were to turn out to be the case, falls would be among the most common potentially traumatic events of late life. One in three adults over the age of 65 years falls each year, and falls are a leading cause of injury-related death in older adults [4]. In addition, approximately 20% of non-fatal falls in this age group result in an injury, making falls the leading cause of injury-related hospital admission [5]. Fall accidents result in greater loss of function and independence in older adults than do other medical events [6]. Falls and fall-related morbidity will likely continue to rise as the population of adults older than age 65 is projected to double in the next 40 years [7,8].

Although physical injury [9], and falls specifically [10], have been linked to posttraumatic stress, many studies of traumatic injury survivors exclude adults over the age of 65 or fail to provide information on inclusion criteria with respect to any upper limit on age. Some important studies that include older adults do not offer a breakdown of symptoms across age groups [11], and only a few focus on older populations [12]. One possible reason for the lack of attention to older adults is that epidemiological studies find a much lower PTSD prevalence in older adults than in younger adult cohorts [13]. Diverse factors associated with aging, such as wisdom and resilience, reluctance to endorse psychiatric symptoms, or dampening of physiological responding [14], might account for this pattern. However, a significant number of older adults report clinically meaningful posttraumatic stress symptoms after natural disasters [15–17]. Moreover, the lower prevalence of PTSD is not inconsequential given the increasing size of the aging population.

Documenting for inpatient and outpatient medical providers whether posttraumatic stress symptoms emerge in the early course of hospitalization is important for two reasons. First, the presence of such symptoms could potentially complicate hospital care, and addressing them early could have a positive impact on outcomes [18]. Second, symptoms in the acute phase of hospitalization might later develop into chronic PTSD, which could contribute to poor long-term functional outcomes and add a considerable burden of disability [19]. Approximately 10% of older British adults hospitalized for fall injury reported symptoms consistent with PTSD at 3 months post-discharge, as did 4% at 6 months [20]. More recently, a small study of French elders also demonstrated that anxiety during hospitalization predicted subsequent PTSD [21]. But cumulative evidence is needed to document the consistency of posttraumatic stress symptoms in this patient population.

This is a documentary study, focused on the prevalence and associates of symptoms in an acute medical setting in an American sample. The goal was to assess posttraumatic stress symptoms rather than PTSD because formal diagnosis requires a 1-month symptom duration [2]. The alternative would have been to focus on acute stress disorder (ASD), which was rejected because dissociation as a feature of ASD is easily confounded with head trauma and with the effects of analgesics frequently used in the treatment of injury survivors [22].

We predicted that early posttraumatic stress symptoms would be prevalent among older patients hospitalized because of a fall. We also sought to explore, in a preliminary manner, the relation of these symptoms to demographic, clinical, and fall event characteristics. We placed emphasis on factors that could be easily identified by providers in the hospital setting without specialized assessment tools. Based on the literature, we hypothesized that early symptoms in hospitalized older patients would be associated with female gender [13] and injury severity [23].

1. Methods

1.1. Participants

We recruited a convenience sample of individuals admitted for falls to a large urban hospital between February 2, 2011, and June 20, 2014. Inclusion criteria were age ≥ 65 years, English-speaking, local community-dwelling residents, and sufficiently medically stable to provide written informed consent and tolerate a brief interview. Exclusion criteria were: Mini-Mental State Exam score < 23 (MMSE [24]), delirium (detected by staff report or Confusion Assessment Method [25]), and diagnosis of dementia, schizophrenia, bipolar disorder, substance abuse/dependence, and aphasia (determined by staff/participant report).

1.2. Procedure

Screenings were conducted as part of recruitment for a home-based intervention for anxiety after fall injury. Research clinicians approached potential participants at bedside to describe the purpose and nature of the treatment study. All measures were administered during an interview lasting approximately 20 minutes to participants who provided written informed consent. Of 252 potential subjects approached, 108 (43%) agreed to participate. Eight were excluded due to MMSE score, leaving a final sample of 100. The study was approved by the Committee on Human Rights in Research of the relevant institution (institutional review board).

1.3. Measures

1.3.1. Posttraumatic stress—The Post-Traumatic Stress Symptom Scale (PSS [26]) inquires about the presence and severity of 17 symptoms across three symptom clusters (re-experiencing the trauma, avoidance/numbing, and hyperarousal) consistent with DSM-IV diagnostic criteria. Items are scored on a scale from 0 (“not at all”) to 3 (“a lot”), with total scores ranging from 0 to 51. Interpretation of total scores was made as follows: 0=“none”, 1–10=“mild”, 11–20=“moderate”, 21–35=“moderate to severe”, 36 and above=“severe” [27]. The PSS has well-established reliability and validity in a variety of trauma populations, and previously has been used with older adults injured by falls [20].

1.3.2. Additional measures—Demographic background (i.e., age, gender, race/ethnicity, marital status, education, employment), clinical characteristics (i.e., other medical conditions, prior psychiatric history), and characteristics of the fall event (i.e., days since fall, location, time waiting to get help, body areas injured, and severity of injury) were assessed by interview. The Modified Falls Efficacy Scale measured self-efficacy as it relates to mobility [28].

1.4. Analytic strategy

In order to characterize early posttraumatic stress in this sample, the PSS total score was computed¹. Substantial posttraumatic stress was defined as total score 11 or greater, and the percentage of participants falling in this range was calculated accordingly. In order to identify which symptoms are commonly experienced in this patient population, the frequency with which each of the 17 posttraumatic stress symptoms was endorsed was tallied. A symptom was counted towards this total if reported to be present “a little” or more.

Because PSS total scores were not normally distributed (Median= 7.0, skewness=1.68, kurtosis 3.14), the study's exploration of the associates of posttraumatic stress total score employed non-parametric analyses. Spearman's Rho correlations were performed for continuous and ordinal variables (i.e., age, education, number of other medical conditions, days since the fall, MMSE score, falls efficacy score). Mann-Whitney-U tests were performed for dichotomous variables in order to compare two groups (i.e., gender, ethnicity, employment, location of fall, body areas injured, prior psychiatric history). Kruskal-Wallis one-way analysis of variance tests were performed for variables with three or more levels (i.e., marital status, time waiting to get help, severity of injury). Because these analyses were exploratory, significance was set at 0.10 without adjustment for multiple comparisons. All analyses were performed using the SPSS® Statistics 20 software package.

2. Results

2.1. Participant characteristics

Table 1 summarizes the demographic, clinical and fall event characteristics of the sample. The median age was 84 (range, 65–97). Participants were predominantly female (59%), white, non-Hispanic (91%), without a spouse/life partner (63%) and with high school or higher level of education (78%). On average, the fall of concern had occurred 3 days prior to interview. Most participants had fallen in the home (62%) and received help within one hour (82%). The most common type of injury resulting from the fall was a fracture (43%).

2.2. Posttraumatic stress

The median PSS total score was 7.0 (IQR=3.25–11.00; range, 0–39). Twenty-seven participants met the study criteria for “substantial” posttraumatic stress. The median number of symptoms endorsed was 4 in the overall sample (range, 2–6) and 8 among those with Substantial posttraumatic stress (range, 5–15). As shown in Table 2, the three most frequently endorsed symptoms among these participants were: Feeling emotionally upset when reminded of the fall (78%), Change in future plans or hopes (74%), and Problems falling or staying asleep (74%). (See Table 3.)

2.3. Associates of posttraumatic stress

In bivariate exploratory analyses, five patient characteristics were associated with increased posttraumatic stress severity: female gender, unemployment, lower level of education,

¹In seven instance in which subjects answered “don't know” to one of the scale's 17 items, total score was imputed by replacing the missing item with an average.

number of other medical problems, and injury to back/chest (all, $p < 0.10$) (See Table 4). No other study variables attained significance.

3. Discussion

A strength of the current study is its contribution of data on a vulnerable and overlooked patient population that is hard to recruit. It confirms the presence of early posttraumatic stress symptoms in a significant percentage of older adults hospitalized because of a fall accident. Symptoms were endorsed across the three symptom clusters (re-experiencing, avoidance/numbing, and hyperarousal) that comprise posttraumatic stress. The analyses raised the possibility that female gender, medical burden, and back/chest injury are risk factors for early distress while higher education level and employment appear to be protective. These patient factors can all be readily determined by healthcare providers.

Posttraumatic stress severity in this American sample is consistent with that found in Chung's study of a British sample [20]. Our findings also converge with the range of clinically significant symptoms found in survivors of accidental injury [12,29,30]. The data provided provisional support for our hypothesis, based on the literature on various index traumatic events, that older women are at risk for early posttraumatic stress after falls. On the other hand, contrary to our predictions, severe injury (fracture) did not emerge as a risk factor. The study designated fracture as serious injury, but future studies should use standardized assessments of injury severity [31]. It should be noted that the literature does not consistently show injury severity to be a predictor of PTSD [32].

Some unanticipated candidate factors emerged. The number of other medical conditions was associated with posttraumatic stress, which is consistent with the literature showing medical burden to be related to PTSD in patients who have experienced traumatic events such as stroke [33] and to anxiety in older adults more generally [34]. Lower level of education and unemployment were also related to posttraumatic stress. This may be because these states serve as a proxy for cognitive reserve or financial vulnerability, which potentially modulate both the experience stress and coping ability [35]. The association with injury to the back/chest has not to our knowledge been found in the literature and warrants further evaluation. Even though posttraumatic stress has been reported in adults after head injury [36], there was no association between head injury and symptoms in our study. This may be because the effect has only been studied in younger populations [37], but warrants further investigation. Finally, it should be noted that although the length of time spent on the ground waiting for help after a fall is a risk factor for poor medical outcomes [38], it was not associated with posttraumatic stress. This null finding, however, is limited by the fact that most in the sample rapidly got help.

One limitation of the study is that its cross-sectional approach cannot answer whether the early symptoms pre-dated the fall accident or were related to other traumatic experiences. Information on premorbid psychiatric history was collected via medical record and subject report and so some prior conditions may have gone undetected. Moreover, no questions were included about prior trauma, although this was not seen by Chung and colleagues to be associated with PTSD [20]. This gap would be best addressed by studies incorporating

standardized assessments of premorbid anxiety and depression, as well as lifetime history of trauma and PTSD.

A related limitation is the absence of follow-up data which would clarify the extent to which symptoms persist or diminish. It is possible, for example, that some early symptoms could later be accounted for by aspects of the hospital setting (e.g., frequent interruptions for medical tests and procedures disrupt sleep). Prior research has shown that acute posttraumatic stress disorder can be expected to decrease over time. In Chung's study, the proportion of older adults with PTSD dropped from 35% at one month to 5% at 6 months. However, two other studies point to the important predictive value of early posttraumatic stress symptoms. In one study of adult trauma survivors, avoidance/numbing and hyperarousal symptoms increased from their initial levels in the hospital setting over the course of 3- and 12-month follow-up assessments [39]. In another study of adults admitted to an ICU, early posttraumatic stress symptoms predicted the development of PTSD over a year's follow-up [40]. Although we did not follow up with all participants, we reassessed 12 subjects from the hospitalized sample for our treatment study, and some did go on to develop PTSD. Of these subjects, six met the study criteria for substantial posttraumatic stress during hospitalization. Evaluation using the Clinician Administered PTSD Scale [41] an average of 14 weeks post-fall (range, 8–35 weeks) indicated that five met criteria for full PTSD. Among these five subjects, three had premorbid psychiatric conditions and the range of prior traumatic experiences was 2–9. Two subjects met criteria for sub-threshold PTSD, while the remaining five did not.

We cannot rule out the possibility of a selection bias whereby eligible patients with lesser symptoms may have declined participation in the study because they viewed it as irrelevant. Conversely, highly anxious patients may have been reluctant to pursue a research opportunity. Finally, although males and females were both well represented, the sample underrepresented racial/ethnic minorities, population identified to be at risk for PTSD in other studies of injury survivors [11].

4. Conclusions

The findings of the present study complement the growing literature on depression in adults who experience serious falls [42]. Having replicated a study showing the incidence of posttraumatic stress in the inpatient setting, we suggest that three steps be taken. One is to examine the impact of these symptoms on outcomes in the inpatient setting, where survivors of traumatic falls must engage their medical care and rehabilitation. Are symptoms associated with failure in early mobilization, functional improvement, length of stay, or hospital readmission? A medical-record review study failed to find significant effect in hip fracture patients [43], but psychiatric symptoms elsewhere have been associated with functional improvement in patients in a rehabilitation setting [44]. If this is borne out, the second step would be to identify risk and protective factors for early posttraumatic stress symptoms in this patient population in order to identify patients who might benefit from intervention. The third step would be to study whether early symptoms endure. What proportion of patients develops chronic PTSD? What proportion of patients develop other conditions (e.g., adjustment disorder, depression)? And, what characteristics put patients at

risk for chronic symptoms? Answers to such questions would encourage healthcare providers integrate the identification and treatment of posttraumatic stress into the structure of professional care for older patients who have had fall accidents.

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Table 1

Sample characteristics (N=100)

Demographic characteristics	Median (IQR) (range) or %
Age	84 (78–89) (65–97)
Old-old	50
Mid-old	34
Young-old	16
Gender	
Female	59
Male	41
Ethnic group	
White, non-Hispanic	91
Other	9
Marital status	
Married/cohabitating	37
Widowed	26
Never-married	24
Separated/divorced	13
Education	
High school or less	22
Some college	14
College graduate	26
Postgraduate	37
Employed (full- or part-time)	27
Clinical and fall characteristics	
Days since fall	3 (2–5) (0–69)
Location of fall	
In the home	62
Out of the home	38
Time to get help	
Not needed/immediate	66
Within one hour	16
More than one hour	18
Severity of injury	
Fracture	43
Head	26
Wound/laceration	19
Other	12
Location of injury	
Head	38
Upper extremities	22
Back/chest	16

Demographic characteristics	Median (IQR) (range) or %
Pelvis/hip	18
Lower extremities	30
No. other medical conditions	3 (2–5) (0–10)
Prior psychiatric history	25
MMSE score	28 (26–29) (24–30)
Falls Efficacy score	99 (61–125) (0–140)

Table 2

Percentage of participants endorsing symptoms within total sample (N=100) and within those with substantial posttraumatic stress (N =27)

Posttraumatic stress symptoms	Total sample (N=100%)	Substantial posttraumatic stress (N=27%)
Upsetting thoughts/images	32	59
Bad dreams/nightmares	9	26
Reliving the fall event	12	33
Emotionally upset when reminded of fall	42	78
Physical reactions when reminded of fall	12	30
Avoidance/numbing		
Avoidance of thoughts/feelings	27	56
Avoidance of activities/people/places	24	56
Cannot remember important details of fall	28	36
Loss of interest in activities used to enjoy	30	63
Feeling detached or cut off from others	19	41
Feeling emotionally numb	13	41
Change in future plans or hopes	53	74
Hyperarousal		
Problems falling or staying asleep	40	74
Irritability/anger	26	59
Difficulty concentrating	33	41
Overly alert	30	59
Jumpy or easily startled	26	63

Table 3

Patient characteristics associated with posttraumatic stress (N=100)

	Percent with substantial symptoms	Median number of symptoms	Median total severity	P value [*]
Gender ^a			.06	
Female	32	4	8	
Male	20	3	5	
Education ^b				.05
High school or less	32	4	8	
Some college	36	4	9	
College graduate	35	4	8	
Postgraduate	17	3	5	
Employment ^c (full- or part-time)				.07
Yes	18	3	5	
No	30	4	7	
No. other medical conditions ^d				.02
0–2	11	3	5	
3–5	35	4	9	
>5	45	4	8	
Back/chest injured ^e				.02
Yes	44	6	10	
No	24	4	6	

^{*} P values for gender, employment and back/chest injury based on Mann–Whitney test using posttraumatic stress total score as outcome variable. P values for association between posttraumatic stress total score and education and number of medical conditions based on Spearman's rho.

^a Mann–Whitney $U=939.00$, $P=.058$.

^b Spearman's rho correlation between posttraumatic stress score and education level= -0.195 ; $P=.054$.

^c Mann–Whitney $U=756.00$, $P=.074$.

^d Spearman's rho correlation between posttraumatic stress score and number of medical conditions= 0.245 ; $P=.019$.

^e Mann–Whitney $U=413.50$; $P=.022$.