Five Key Papers About Emergency Department Fall Evaluation: A Curated Collection for Emergency Physicians

Sung-Ho Kim, Masaya Higuchi, Yuichiro Ishigami, Go Makishi, Masafumi Tada, Seikei Hibino, Michael Gottlieb, Sangil Lee

Abstract

The evaluation of patients who have experienced a fall has been an integral part of geriatric emergency care. All physicians who engage in the care of the geriatric population in acute settings need to familiarize themselves with the current literature on this topic. However, it can be challenging to navigate the large body of literature on this topic. The purpose of this article is to identify and summarize the key studies that can be helpful for faculty interested in an evidence-based fall evaluation.

The authors compiled a list of key papers on emergency department (ED) based upon a structured literature search supplemented with suggestions by key informants and an open call on social media; 32 studies on ED evaluation were identified. Our authorship group then engaged in a modified Delphi technique to develop consensus on the most important studies about fall evaluation for emergency physicians. This process eventually resulted in the selection of the top five articles on fall evaluation. Additionally, we summarize these studies with regard to their relevance to emergency medicine (EM) trainees and junior faculty.

Evaluation of older patients with a history of falls is a challenging but crucial component of EM training. We believe our review will be educational for junior and senior EM faculty to better understand these patients’ care and to design an evidence-based practice.

Introduction And Background

Falls are a common reason for presentation to the emergency department (ED). Fall injuries and related healthcare use among older adults are increasing in the United States [1]. Each year, three million older people are treated in EDs for injuries related to falls [2]. In 2015, the total medical cost for falls amounted to more than $50 billion [3]. Moreover, falls are associated with high mortality rates [4].

However, there are several causes of falls: syncope, polypharmacy, impaired gait, adverse effects of medications, immobility, and physical inactivity. A fall can be seen as a manifestation of frailty, and it is common to find several underlying medical conditions in fall-related ED visits. Thus, emergency physicians must engage in comprehensive evaluations when examining an older adult with a fall. Emergency physicians also need to understand how to perform an adequate risk assessment for falls among older adults to prevent future falls. Those evaluations are challenging for both resident and attending physicians, and high-quality training in falls, geriatrics, and evidence-based medicine are needed. In light of this, this article seeks to summarize the top five key articles in the literature on falls and discuss their applicability for emergency physicians.

Review

Methods

The use of the existing literature for resident and student education is a key component of the evidence-based medicine curriculum. We used a modified Delphi method, which has been previously reported, to evaluate the top five articles suggested for inclusion [5-8].
This study was conducted between June 2019 and November 2020. Reviewers were invited via a mailing list of nonprofit organizations promoting emergency medical care in Japan [9]. Reviewers consisted of three senior and four junior emergency medicine (EM) physicians, palliative care physicians, and geriatricians. Senior faculty were defined as more than 10 years post-graduation, while junior faculty were defined as less than 10 years. The online meeting on the video platform Zoom™ (Zoom Video Communications Inc., San Jose, CA) involved junior faculty in EM and mentors who are senior-level faculty physicians in EM and geriatrics. To collect articles, we searched PubMed for the following Medical Subject Headings (MeSH) terms: ‘emergency medicine’, ‘accidental falls’, ‘falls’, ‘evaluation’, and ‘assessment.’ The authors also reached out to experts and identified key literature. This was further augmented with a call for articles on Twitter by using the hashtags #fall and #ED. After combining the above articles, we reviewed the abstracts to identify articles focused on fall patients in the ED. Articles not related to the ED or falls were excluded.

After the initial articles were identified, we engaged in three rounds of voting. During the first round of voting, participants read each article and scored it on a 1-7 Likert scale, with 1 representing ‘not relevant at all’ and 7 representing ‘very relevant.’ Votes from round one were subsequently compiled, and the distribution of scores was shared with participants in round two. During round two, participants were asked if each article should be included. While the end goal was to identify the top five articles, participants were allowed to choose more than five articles in this round. Votes from the second round were compiled, and the percentage of participants who thought each article should be included was shared with participants for the third round. During the third round, participants were asked to choose only the five articles that they thought were most relevant to be included in the manuscript. As there were more than five articles, we repeated the same selection process during the fourth round. Five articles were chosen as an a priori threshold by group consensus as a reasonable number to introduce the residents to the topic without overwhelming them.

**Results**

Figure 1 shows the flow chart of article selection in our review. Of 52 identified articles, 21 were excluded as they were not related to the ED.
We identified a total of 32 articles, which were narrowed down to five key papers using the modified Delphi methodology [10-41]. Table 1 shows all identified articles with ratings.

| Citation          | Round 1 initial mean scores (SD); max score: 7 | Round 2: percentage by raters | Round 3: percentage by raters | Round 4: percentage by raters | Top five articles |
|-------------------|-----------------------------------------------|--------------------------------|--------------------------------|--------------------------------|-------------------|
| Tirrell et al. [10] | 5.6 (0.5)                                    | 100                            | 100                            | 100                            | 1st               |
| Bhangu et al. [11]  | 5.4 (0.5)                                    | 85.7                           | 85.7                           | 85.7                           | 2nd (tie)         |
| Carpenter et al. [12] | 4.7 (1.8)                                    | 71.4                           | 85.7                           | 85.7                           | 2nd (tie)         |
| Jeanmonod et al. [13] | 5.4 (1.3)                                    | 85.7                           | 85.7                           | 85.7                           | 2nd (tie)         |
| Goldberg et al. [14]   | -                                            | -                              | -                              | 85.7                           | 2nd (tie)         |
| Banerjee et al. [15]  | 4.4 (1.4)                                    | 42.9                           | 0                              | NA                             |                   |
| Baraff et al. [16]   | 4.0 (1.2)                                    | 0                              | 0                              | NA                             |                   |

FIGURE 1: Article selection process
| Study                | Rating  | SD  | Details       | Comments |
|---------------------|---------|-----|---------------|----------|
| Baraff LJ, et al. [17] | 4.3 (1.1) | 28.6 | 0 | NA |
| Carpenter et al. [18] | 5.0 (2.2) | 57.1 | 42.9 | 20 |
| Carpenter et al. [19] | 5.0 (1.0) | 28.6 | 0 | NA |
| Caterino et al. [20] | 3.6 (1.3) | 14.3 | 0 | NA |
| Eagles et al. [21] | 4.3 (0.8) | 14.3 | 0 | NA |
| Goldberg et al. [22] | 3.4 (1.1) | 0 | 0 | NA |
| Harper et al. [23] | 3.9 (1.5) | 0 | 0 | NA |
| Harper et al. [24] | 3.9 (1.5) | 0 | 0 | NA |
| Huded et al. [25] | 4.6 (1.4) | 50 | 0 | NA |
| Hwang et al. [26] | 4.4 (1.5) | 33.3 | 14.3 | 20 |
| Jawa et al. [27] | 5.1 (0.9) | 42.9 | 0 | NA |
| Kara et al. [28] | 4.3 (1.5) | 0 | 0 | NA |
| Kim et al. [29] | 4.9 (0.9) | 28.6 | 0 | NA |
| Labib et al. [30] | 5.1 (1.1) | 57.1 | 42.9 | 20 |
| McMahon et al. [31] | 4.9 (1.6) | 14.3 | 0 | NA |
| Miró et al. [32] | 4.9 (1.1) | 28.6 | 14.3 | 20 |
| Patterson et al. [33] | 3.7 (0.5) | 0 | 0 | NA |
| Pförtmueller et al. [34] | 4.9 (0.9) | 0 | 0 | NA |
| Polinder et al. [35] | 4.3 (1.1) | 0 | 0 | NA |
| Schoenenberger et al. [36] | 4.6 (1.3) | 28.6 | 14.3 | 0 |
| Schrijver et al. [37] | 4.4 (0.8) | 0 | 0 | NA |
| Southerland et al. [38] | 4.6 (1.3) | 28.6 | 14.3 | 20 |
| Tan et al. [39] | 4.0 (0.8) | 0 | 0 | NA |
| Terrell et al. [40] | 3.4 (1.0) | 0 | 0 | NA |
| Yu et al. [41] | 4.6 (0.5) | 28.6 | 0 | NA |

**TABLE 1: Reviewer ratings for all 32 articles**

SD: standard deviation

**Discussion**

Based on our review and modified Delphi process, we identified five articles of interest and relevance to junior-level EM providers. Further, we added commentary below to explain the relevance of these studies to trainees and highlight teaching points for senior EM faculty who teach these concepts to trainees. Here, we provide a summary of the articles:
Summary: This study evaluated how the current clinical evaluation of older adult patients presenting to the ED with falls was discordant with the geriatric fall guidelines. Older patients with more comorbidities may have received more comprehensive evaluations due to several reasons, such as clinicians' biases and the severities of comorbidities, which could lead to a longer length of stay in the ED. The adherence rates for the history and physical examination items recommended by the guidelines were generally poor. Future studies should examine methods to implement the guidelines while minimizing the burden on ED clinicians. While it may not be realistic to have emergency physicians follow every fall recommendation, there is still significant room for improvement. The authors concluded that the current evaluation of older adult fallers in the ED is discordant with general and ED-specific fall guidelines.

Relevance to emergency physicians: This study shows that the ED evaluation of older adult patients with falls was discordant with geriatric fall guidelines. Older patients with more comorbidities may have received more comprehensive evaluations due to several reasons, such as clinicians' biases and the severities of comorbidities, which could lead to a longer length of stay in the ED. The adherence rates for the history and physical examination items recommended by the guidelines were generally poor. Future studies should examine methods to implement the guidelines while minimizing the burden on ED clinicians. While it may not be realistic to have emergency physicians follow every fall recommendation, there is still significant room for improvement. The authors concluded that the current evaluation of older adult fallers in the ED is discordant with general and ED-specific fall guidelines.

2. Bhangu J, Hall P, Devaney N, Bennett K, Carroll L, Kenny RA, McMahon CG: The Prevalence of Unexplained Falls and Syncope in Older Adults Presenting to an Irish Urban Emergency Department. Eur J Emerg Med. 2019, 26:100–104 [11]

Summary: This article reveals the probability of an unexplained fall (UEF) and syncope as the cause of falls in elderly patients who present to the ED. UEF is defined as an event where the patient has no recollection of a mechanism to account for the fall. UEF accounted for 20-30% of all ED visits; however, because they are often treated as UEF, syncope has likely been underestimated as a cause. Patients with repeated syncopal episodes were more likely to be treated as cases of UEF. UEF was also said to be associated with greater use of medical resources and hospitalization-related costs. Therefore, the authors analyzed the prevalence, hospitalization patterns, and costs related to UEF. The authors classified patients over 50 years of age who presented with a fall as explained fall (EF), UEF, syncope, or an alternative medical cause. EF is defined as an event that results in a person coming to rest inadvertently on the ground. Alternative medical causes included stroke, witnessed seizure, sepsis, anemia, acute blood loss, and alcohol intoxication. Interestingly, UEF and syncope were less likely to be traumatic. The authors speculate that this may be because syncope is associated with a few seconds of warning beforehand, allowing for self-protective behavior. Of note, 30% of UEF patients had a fall-related ED visit within the past six months; UEF within one year were also five times more likely than EF. Up to 50% of UEF had underlying carotid sinus syndrome, and 20% had an underlying arrhythmia, both considered treatable conditions. Patients with UEF and syncope were twice as likely to be hospitalized and four times more likely to have brain imaging. In this cohort, the cost of hospitalization and diagnostic imaging alone amounted to more than three million Euros; however, the actual cost could be much higher, as the socioeconomic cost for caregivers was not measured. The use of fall and syncpe specialists reduced hospitalization rates, length of stay, and unnecessary diagnostic tests, leading to a 36% reduction in subsequent falls. The authors concluded that screening for causes of falls, including syncope, may help prevent a recurrence.

Relevance to emergency physicians: This article highlights UEF and syncope as causes of falls. In particular, when UEF is recognized, syncope should be considered and evaluated aggressively. Finding hidden syncope in the UEF can reduce future falls and hospitalization costs. For this reason, standard syncope assessment and risk stratification for emergency patients are essential to determine the appropriate treatment.

3. Carpenter CR, Avidan MS, Wildes T, Stark S, Fowler SA, Lo AX: Predicting Geriatric Falls Following an Episode of Emergency Department Care: A Systematic Review. Acad Emerg Med. 2014, 21:1069–1082 [12]

Summary: This systematic review and meta-analysis assessed the prognostic accuracy of predictors or constellations of predictors for fall risk in community-dwelling older adults who visit the ED because of a...
The intervention reduced subsequent fall-related ED visits (adjusted incidence rate ratio: 0.34, 95% CI: 0.15 to 0.54) after home safety measures to prevent falls, but pharmacy and physical therapy consultations were not available.

To assess the risk of falls and develop an action plan for rehabilitation with automated communication to the patient, the intervention included consults with a pharmacist (to change medications that might put the patient at risk of falling) and with a physiotherapist (to assess the risk of falls and develop an action plan for rehabilitation with automated communication to the patient).

ED patients aged 65 years or older who presented to the ED within seven days of a fall were eligible to be included. The intervention included consults with a pharmacist (to change medications that might put the patient at risk of falling) and with a physiotherapist (to assess the risk of falls and develop an action plan for rehabilitation with automated communication to the patient).

Summary: This randomized controlled trial examined the effect of an ED-initiated intervention to prevent subsequent falls and healthcare use in older adults. ED patients aged 65 years or older who presented to the ED within seven days of a fall were eligible to be included. The intervention included consults with a pharmacist (to change medications that might put the patient at risk of falling) and with a physiotherapist (to assess the risk of falls and develop an action plan for rehabilitation with automated communication to the patient). The usual care provided patients with a brochure that contained a checklist of home safety measures to prevent falls, but pharmacy and physical therapy consultations were not available. The intervention reduced subsequent fall-related ED visits (adjusted incidence rate ratio: 0.34, 95% CI: 0.15 to 0.54).
Relevance to emergency physicians: This article is highlighted because it is one of a few interventional studies demonstrating a reduction of falls among older adults seen in the ED. A structured pharmacy and physical therapy review led to a reduction of future falls, which is essential knowledge for any practicing EM provider. However, it is necessary to understand that not all EDs have access to such resources as physiotherapists and pharmacists in the ED. Although this is an important article, it calls for further study to implement a formal medication review and physical therapy evaluation in the ED.

Limitations
Our review has several limitations. Firstly, this review was not intended to be a comprehensive systematic review; instead, it chose to focus on five key articles for those interested in advancing their knowledge of fall care. As such, it is possible that we may have missed some key articles. We sought to reduce this limitation by utilizing social media and expert consultation, as well as a structured literature review. Additionally, this review focused on ED-based fall care, which may have led to the exclusion of topics on fall care in other settings. Finally, it is possible that new literature may have been published since the completion of this review. However, we believe that these articles constitute the landmark papers in the ED-based fall care at the time of this writing.

Conclusions
We extracted and reviewed five key papers about fall assessment using a modified Delphi process. Appropriate evaluation in the ED for fall patients is crucial. These five articles are of value to EM providers to enhance their care of patients presenting with falls.

Additional Information
Disclosures
Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that they are not other relationships or activities that could appear to have influenced the submitted work.

References
1. Shankar KN, Liu SW, Ganz DA: Trends and characteristics of emergency department visits for fall-related injuries in older adults, 2003-2010. West J Emerg Med. 2017, 18:785-95. 10.5811/westjem.2017.5.33615
2. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. (2017). Accessed: July 1, 2021: https://www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html.
3. Florence CS, Bergen G, Aherly A, Burns E, Stevens J, Drake C: Medical costs of fatal and nonfatal falls in older adults. J Am Geriatr Soc. 2018, 66:693-8. 10.1111/jgs.15304
4. Liu SW, Obermeyer Z, Chang Y, Shankar KN: Frequency of ED revisits and death among older adults after a fall. Am J Emerg Med. 2015, 33:1012-8. 10.1016/j.ajem.2015.04.023
5. Hasson F, Keeney S, McKenna HP: Research guidelines for the Delphi survey technique. J Adv Nurs. 2000, 32:1088-15. 10.1046/j.1365-2648.2000.0111-1-01567.x
6. Gottlieb M, Chan TM, Fredette J, et al.: Academic primer series: five key papers about study designs in medical education. West J Emerg Med. 2017, 18:705-12. 10.5811/westjem.2017.4.33906
7. Gottlieb M, Grossman C, Rose E, Sanderson W, Ankel F, Swaminathan A, Chan TM: Academic primer series: five key papers about team collaboration relevant to emergency medicine. West J Emerg Med. 2017, 18:503-10. 10.5811/westjem.2016.11.31212
8. King A, Boyson-Osborn M, Cooney R, et al.: Curated collection for educators: five key papers about the flipped classroom methodology. Cureus. 2017, 9:e1801. 10.7759/cureus.1801
9. Emergency Medicine Alliance. (2021). Accessed: July 1, 2021: https://www.emalliance.org.
10. Tirrell G, Sri-on J, Lipsitz LA, Camargo CA Jr, Kahrbel C, Liu SW: Evaluation of older adult patients with falls in the emergency department: discordance with national guidelines. Acad Emerg Med. 2015, 22:461-7. 10.1111/acep.12634
11. Bhanu J, Hall P, Devaney N, Bennett K, Carroll L, Kenny RA, McMahon CG: The prevalence of unexplained falls and syncpe in older adults presenting to an Irish urban emergency department. Eur J Emerg Med. 2019, 26:100-4. 10.1097/MEJ.0000000000000554
12. Carpenter CR, Avidan MS, Wildes T, Stark S, Fowler SA, Lo AX: Predicting geriatric falls following an episode of emergency department care: a systematic review. Acad Emerg Med. 2014, 21:1069-82. 10.1111/acep.12488
13. Jeanmonod R, Asher S, Roper J, et al.: History and physical exam predictors of intracranial injury in the elderly fall patient: a prospective multicenter study. Am J Emerg Med. 2019, 37:1470-5. 10.1016/j.ajem.2018.10.049
14. Goldberg EM, Marks SJ, Resnik LJ, Long S, Mellett H, Merchant RC: Can an emergency department-initiated intervention prevent subsequent falls and health care use in older adults? A randomized controlled trial. Ann Emerg Med. 2020, 76:739-50. 10.1016/j.annemergmed.2020.07.025

15. Banerjee I, Benger J, Trelu J, et al.: The National Falls and Bone Health Audit: implications for UK emergency care. Emerg Med J. 2012, 29:830-2. 10.1136/emj.2011-202001

16. Baraff LJ, Lee TJ, Kader S, Della Penna R: Effect of a practice guideline for emergency department care of falls in elderly patients on subsequent falls and hospitalizations for injuries. Acad Emerg Med. 1999, 6:1224-31. 10.1111/j.1553-2712.1999.tb00158.x

17. Baraff LJ, Lee TJ, Kader S, Della Penna R: Effect of a practice guideline on the process of emergency department care of falls in elderly patients. Acad Emerg Med. 1999, 6:1216-23. 10.1111/j.1553-2712.1999.tb00156.x

18. Carpenter CR, Cameron A, Ganz DA, Liu S: Older adult falls in emergency medicine—a sentinel event. Clin Geriatr Med. 2018, 34:555-67. 10.1016/j.cger.2018.04.002

19. Carpenter CR, Scheatzle MD, D’Antonio JA, Ricci PT, Cohen JH: Identification of fall risk factors in older adult emergency department patients. Acad Emerg Med. 2009, 16:211-9. 10.1111/j.1553-2712.2009.00351.x

20. Catedra JM, Karzanam R, Arrora V, Martin JL, Hiendstra BC: Comparison of balance assessment modalities in emergency department elders: a pilot cross-sectional observational study. BMC Emerg Med. 2009, 9:19. 10.1186/1471-227X-9-19

21. Eagles D, Perry JI, Sirosi MJ, et al.: Timed Up and Go predicts functional decline in older patients presenting to the emergency department following minor trauma. Age Ageing. 2017, 46:214-8. 10.1095/ageing/afw184

22. Goldberg EM, McCreedy EM, Gettel CJ, Merchant RC: Slipping through the cracks: a cross-sectional study examining older adult emergency department patient fall history, post-fall treatment and prevention. R I Med J (2013). 2017, 100:18-23.

23. Harper KJ, Arends G, Geelhoed EA, Barton AD, Celenza A: Cost analysis of a brief intervention for the prevention of failure after discharge from an emergency department. J Eval Clin Pract. 2019, 25:244-50. 10.1111/jep.15041

24. Harper KJ, Barton AD, Arends G, Edwards DG, Petta AC, Celenza A: Failure of falls risk screening tools to predict outcome: a prospective cohort study. Emerg Med J. 2018, 35:28-32. 10.1136/emermed-2016-206233

25. Hudek MJ, Dresden SM, Gravenor SJ, Rowe T, Lindquist LA: Screening for fall risks in the emergency department: a novel nursing-driven program. West J Emerg Med. 2015, 16:1045-6. 10.5811/westjem.2015.10.26097

26. Hwang HF, Cheng CH, Chien DK, Yu WY, Lin MR: Risk factors for traumatic brain injuries during falls in older persons. J Head Trauma Rehabil. 2015, 30:E9-17. 10.1097/HTR.0000000000000093

27. Jawa RS, Singer AJ, Rutigliano DN, et al.: Spinal fractures in older adult patients admitted after low-level falls: 10-year incidence and outcomes. J Am Geriatr Soc. 2017, 65:909-15. 10.1111/jgs.14669

28. Kara H, Bayir A, Ak A, Akinci M, Tufekci N, Deginemenci S, Azap M: Trauma in elderly patients evaluated in a hospital emergency department in Konya, Turkey: a retrospective study. Clin Interv Aging. 2014, 9:17-21. 10.2147/CIA.S56542

29. Kim SH: Risk factors for severe injury following indoor and outdoor falls in geriatric patients. Arch Gerontol Geriatr. 2016, 62:75-82. 10.1016/j.archger.2015.10.005

30. Labib N, Nouh T, Winocour S, et al.: Severely injured geriatric population: morbidity, mortality, and risk factors. J Trauma. 2011, 71:1908-14. 10.1097/TA.0b013e318209f9ed

31. McMahon GC, Cahir CA, Kenny RA, Bennett K: Inappropriate prescribing in older fallers presenting to an Irish emergency department. Age Ageing. 2014, 43:44-50. 10.1093/ageing/afu114

32. Miró Ò, Brizzi BN, Aiguélo S, et al.: 180-day functional decline among older patients attending an emergency department after a fall. Maturitas. 2019, 129:50-6. 10.1016/j.maturitas.2019.08.008

33. Patterson BW, Repplinger MD, Pulia MS, et al.: Using the Hendrich II inpatient fall risk screen to predict outpatient falls after emergency department visits. J Am Geriatr Soc. 2018, 66:760-5. 10.1111/jgs.15299

34. Pförtmüller CA, Kuna M, Lindner G, Zisak A, Puig S, Exadaktylos AK: Fall-related emergency department admission: fall environment and settings and related injury patterns in 6537 patients with special emphasis on the elderly. ScicentificWorldJournal. 2014, 2014:256519. 10.1155/2014/256519

35. Polinder S, Boyé ND, Mattace-Raso FU, et al.: Cost-utility of medication withdrawal in older fallers: results from the improving medication prescribing to reduce risk of FALLs (IMPROveFALL) trial. BMC Geriatr. 2016, 16:179. 10.1186/s12877-016-0534-7

36. Schoenberger AW, Bieri C, Özgüler O, et al.: A novel multidimensional geriatric screening tool in the ED: evaluation of feasibility and clinical relevance. Am J Emerg Med. 2014, 32:625-8. 10.1016/j.ajem.2014.03.024

37. Schriever EJ, Toppinga Q, de Vries OJ, Kramer MH, Nanayakkara PW: An observational cohort study on geriatric patient profile in an emergency department in the Netherlands. Neth J Med. 2015, 71:324-50.

38. Southerland LT, Slattery L, Rosenthal JA, Kegelmeyer D, Kloos A: Are triage questions sufficient to assign fall risk precautions in the ED?. Ann Emerg Med. 2017, 35:329-32. 10.1016/j.amepre.2016.10.035

39. Spurlock ME, Sponsler KM, Sponsler KA, et al.: The prevalence and characteristics of patients who experience a fall in the emergency department. J Am Geriatr Soc. 2018, 66:1516-23. 10.1111/jgs.15308

40. Terrell KM, Weaver CS, Giles BK, Ross MI: ED patient falls and resulting injuries. J Emerg Nurs. 2009, 35:89-92. 10.1016/j.jen.2008.01.004

41. Yu WY, Hwang HF, Hu MH, Chen CY, Lin MR: Effects of fall injury type and discharge placement on mortality, hospitalization, falls, and ADL changes among older people in Taiwan. Acad Ansl Prev. 2015, 50:877-94. 10.1016/j.ansp.2012.07.015

42. Hamden K, Aggredi D, Jeannmonod R, Woods D, Reiter M, Jeannmonod D: Characteristics of elderly fall patients with baseline mental status: high-risk features for intracranial injury. Am J Emerg Med. 2014, 32:890-4. 10.1016/j.ajem.2014.04.051